

# 01.

## Trade Introduction and Occupational Safety

1. The Symbol below, marked on packing case indicates.



- (a) Don't touch with bare hands, Hazardous material inside.
- (b) Don't use your hands while opening the package. Use hammer to break the package for releasing inside material.
- (c) The package is heavy. Use machine strength to handle the package.
- (d) Don't touch the inside material with bare hands. The material inside is prone to electrostatic discharge.

ISRO URSC-18.04.2024, 1:00 PM - 2:30 PM

**Ans. (d) :** The symbol shown above marked on packing case indicates that don't touch the inside material with bare hands. The material inside is prone to Electrostatic Discharge (ESD).

It is a self adhesive ESD protected sign which is ideal for both clean room and ESD protected workplace.

The Electrostatic Discharge (ESD) symbol has a slash through the black triangle and yellow symbol and yellow background.

2. The shape of the warning sign is-

- (a) Circular
- (b) Square
- (c) Triangular
- (d) Rectangular

ISRO VSSC-14.07.2021

R.R.B. Guwahati Asst. Loco Pilot 22.01.2006

**Ans : (c)** The shape of the warning sign is triangular.

• These are represented by a black shape on a yellow background.

• Some warning signs are fear of fire, fear of electric shock, poisonous substances, explosive substances etc.



Risk of Fire



Risk of Electric Shock



Toxic Hazard



Risk of Danger

3. What type of gloves are required when performing performance testing on rated electrical equipment rated at 480V AC ?

- (a) low voltage
- (b) high voltage
- (c) cotton lined
- (d) prescribed temperature

ISRO. 28.08.2016, 10:00 AM – 11:30 AM

**Ans. (a) :** Low voltage gloves are required when performing performance tests on electrical equipment rated at 480V AC.

• For 480V and 575V work the minimum distance from un-insulated body parts is 12 inches, so rubber gloves are required.

• If the voltage is high then we use high voltage gloves.

4. PPE is generally used to carry out maintenance activities except which of the following?

- (a) safety glasses
- (b) gloves
- (c) ear plug
- (d) work permit

ISRO. 28.08.2016, 10:00 AM – 11:30 AM

**Ans. (d) :** PPE protect the human body as a covering in various forms. The following are the means helpful in protecting the human body-

1. **Protection of head-** To protect the head, safety helmet, hair net, bump cap etc should be used.



Head protection

2. **Protection of eye-** Protective glasses, hand screen glasses should be used to protect eyes.



Eye protection

3. **Protection of hearing-** Hearing protection should be done by using ear valve, muffs, ear plugs etc.



Hearing protection

4. **Protection of feet-** For this safety boots, shoes, foot coverings anklets etc should be used.



5. **Hand Protection:** For this safety hand gloves should be used



6. **Body protection-** For body protection, donkey Jacket, coat, apron coat, body warmer should be used.



• The full name of PPE is 'Personal Protective Equipment'. Therefore, it is clear that except for work permits, PPE is used to implement maintenance activities.

5. **The value of voltage used for components in electronics is-**

- (a) High (b) Low  
(c) Medium (d) All of the above

**R.R.B. Kolkata Asst. Loco Pilot 16.07.2006**

**Ans : (b)** The value of voltage used for components in electronics is low.

- The various components by which electronics circuits are made, called electronics components.
- Resistor, Inductor, Capacitor, Diode, Transistor, MOSFET, IGBT, SCR, Op-amp etc are the electronics components.

6. **Which of the following is not personal protective equipment to protect feet?**

- (a) Obstruction  
(b) Asbestos safety boots  
(c) Anti-static footwear  
(d) Bump cap

**R.R.B. Mumbai Asst. Loco Pilot 03.06.2001**

**Ans : (d)** Bump cap is not personal protective equipment to protect feet. It is used to protect the head.

- The following equipments are used to protect feet while working in a factory-

- (1) Obstruction  
(2) Asbestos safety boots  
(3) Anti-static footwear

7. **The components used in electronics mechanic trade are-**

- (a) Resistor (b) Capacitor  
(c) Inductor (d) All of the above

**R.R.B. Gorakhpur Asst. Loco Pilot 21.10.2001**

**Ans : (d)** The components used in electronics mechanic trade are resistor, inductor, capacitor, diode, transistor, MOSFET, IGBT, SCR, Photo diode, LED, Op- amp etc.

8. **Which of the following must the trainee have knowledge of ?**

- (a) Knowledge of soldering  
(b) Knowledge of electronics components  
(c) Knowledge of electric line safety  
(d) All of the above

**R.R.B. Secunderabad Asst. Loco Pilot 11.11.2001**

**Ans : (d)** It is very important for the trainee to have knowledge of the following-

- Knowledge of soldering so that he can easily connect any components.
- Must have knowledge of various electronics components.
- It is very important to have knowledge of safety from electric lines.

9. **Which wound healing tube is kept in first aid box?**

- (a) Sofromycin (b) Boroline  
(c) Betadine (d) Penicillin

**R.R.B. Patna Asst. Loco Pilot 11.11.2001**

**Ans : (c)** Betadine tube is kept in the first aid box for wound healing.

**First aid box-** It is a kit in which medicines, equipments, cotton bandage, dettol etc are kept to be used in emergency situation.

10. **Which of the following is the method of artificial respiration?**

- (a) Shaffer method (b) Sylvester method  
(c) Laborde method (d) All of the above

**R.R.B. Chennai/Bangalore Asst. Loco Pilot 27.10.2002**

**Ans : (d)** The methods of artificial respiration are as follows-

- **Shaffer method-** In this method the victim is made to lie down on the chest and artificial respiration is given.
- **Sylvester method-** In this method the victim is made to lie on his back and artificial respiration is given.
- **Giving air from mouth to mouth-** This method is also known as Laborde method. This is the most suitable method in the injured condition of the victim.

11. **The first aid item is-**

- (a) Dettol (b) Cotton  
(c) Round bandage (d) All of the above

**R.R.B. Mumbai/Bhopal Asst. Loco Pilot 05.01.2003**

**Ans : (d)** The items like, dettol, cotton, round bandage, bandage, betadine etc are kept in the first aid box.

**First aid-** The limited treatment given by an untrained person in case of any disease or injury is called first aid.

12. **Which of the following equipment is related to electronics mechanic trade?**

- (a) ECG (b) Computer  
(c) Fax machine (d) All of the above

**R.R.B. Ranchi Asst. Loco Pilot 19.01.2003**

**Ans : (d)** All of the following equipments are related to electronics mechanic trade-

- ECG (Electrocardiography)
- Computer
- Fax machine
- Mobile
- Tape recorder

13. If you want to describe several types of hazards for security purposes, which term would you use?

- (a) Warning (b) Caution  
(c) Notice (d) Danger

R.R.B. Gorakhpur Asst. Loco Pilot 12.10.2003

Ans : (d) For security purposes, if you want to tell about many types of dangers, then you will use the word danger so that a person becomes alert.

• If you want to warn a trainee about the dangers occurring at the work place from safety points of view, then you will use the word danger.

14. Which of the following is used for fire extinguishing in electrical equipments?

- (a) CO<sub>2</sub>, Dry powder (b) Water  
(c) Foam (d) Blanket

R.R.B. Bangalore Asst. Loco Pilot 25.01.2004

Ans : (a) CO<sub>2</sub>, Dry powder, Carbon tetrachloride (CCl<sub>4</sub>) etc. are used for fire extinguishing in electrical equipments.

• Foam or liquid (water) etc fire extinguishers should not be used under any circumstances to extinguish the fire in electrical equipments.

15. The shape used for prohibition sign is-

- (a) Triangular (b) Circular  
(c) Square (d) Oblong

R.R.B. Ajmer Asst. Loco Pilot 23.05.2004

Ans : (b) The shape used for prohibition sign is circular.



- These signs prohibit doing certain types of work (forbidden) is done.
- These circular signs are made in black color with red border and cross bar on a white screen.
- Prohibitory signs like no smoking, no burring of fire, no running away etc.

16. In dynamic method of lifting weight, the distance between the legs should be approximately-

- (a) 8 inches (b) 10 inches  
(c) 15 inches (d) 18 inches

R.R.B. Ajmer Asst. Loco Pilot 10.10.204

Ans : (d) In the dynamic method of lifting weight, the distance between the feet should be 18 inches.

• If the difference is less then balance will not be achieved.

17. Extinguishing a fire by cutting off the supply of oxygen through blankets, sand etc is called-

- (a) cooling (b) smothering  
(c) to put a blanket (d) extinguish

R.R.B. Kolkata Asst. Loco Pilot 06.02.2005

Ans : (b) Extinguishing a fire by cutting off the supply of oxygen through blankets, sand etc is called smothering.

- In this type of fire extinguishing equipment powder is filled with air pressure instead of water.
- This powder is neither inflammable nor helps in burning.
- On pressing the lever of the machine, the sand extinguishes the fire by blocking the oxygen supply to the burning object.

18. If a person has received an electric shock, he should-

- (a) Freeing the victim by turning the main switch 'off'  
(b) To free the victim from electrical contact by pulling him while keeping himself isolated from ground contact  
(c) Remove the plug-top of the power supply cable of the appliance without touching the victim.  
(d) Adopting any one of the above mentioned methods

R.R.B. Mumbai Asst. Loco Pilot 05.06.2005

Ans : (d) If a person has received an electric shock then we should adopt the following methods-

- The victim should be free by turning off the main switch.
- Keeping oneself isolated from ground contact, the victim should be pulled and free from electrical contact.
- The plug-top of the power supply cables of the appliance should be removed without touching the victim.

19. Water spray can be used effectively for fire extinguishing when there is a fire-

- (a) in wood, paper, clothes etc  
(b) in flammable substance  
(c) in gas LPG, CNG etc  
(d) in electrical cables/equipments etc

R.R.B. Ajmer Asst. Loco Pilot 05.06.2005

Ans : (a) In case of fire in wood, paper, cloth etc. water spray can be used effectively to extinguish the fire.

- This type of fire has been classified as class A fire.
- To extinguish the fire, pressurized water foam or multipurpose dry chemical fire extinguishers should be used.

20. For combustion it is necessary-

- (a) Fuel, oxygen and heat  
(b) Fuel and heat  
(c) Heat and oxygen  
(d) Fuel and oxygen

R.R.B. Ranchi Asst. Loco Pilot 04.09.2005

Ans : (a) Fuel, oxygen and heat are necessary for combustion.

- The combustion of petrol engine, diesel engine or gas engine, oxygen and heat are required to burn the fuel.
- In the absence of any one of fuel, oxygen and heat, combustion of fuel cannot occur. Hence all three are mainly necessary.

21. **While lifting heavy loads-**
- keep your back bent forward
  - keep your back straight
  - keep your back bent backward
  - None of the above

**R.R.B. Kolkata Asst. Loco Pilot 16.07.2006**

**Ans : (b)** While lifting heavy loads, one should try to keep the back as straight as possible and lift the load with the strength of the legs.

- The laborer should know his capacity to lift the load and should never try to lift more load than his capacity.

22. **As a protective precaution against electric shock-**

- The metallic shell of the electrical equipment should be earthed.
- The neutral wire of the AC supply must be earthed.
- Earthing line should be installed along with the supply line.
- All the above steps should be taken.

**R.R.B. Mumbai Asst. Loco Pilot 16.07.2006**

**Ans : (d)** The following steps should be taken as protective precautions against electric shock-

- The metallic shell of the electrical equipment should be earth.
- The neutral wire of the AC supply should be earthed.
- Earthing line should be install along with the supply line as a safety precaution against electric shock.

23. **During the manufacturing of loudspeaker box, which of the following factors should be given importance?**

- The thickness of the material used for making the box should be at least 10 mm.
- The larger the box, the better its low frequency reproduction.
- A part from the holes left for the passage of reproduced sound waves, the box should be completely airtight.
- All of the above.

**R.R.B. Secunderabad Asst. Loco Pilot 29.06.2008**

**Ans : (d)** While manufacturing loudspeaker box, importance should be given to the following factors-

- The thickness of the material used for box manufacturing should be at least 10 mm.
- The larger the size of the box, the better will be its low frequency reproduction.
- The box should be completely airtight except for the holes left for the passage of reproduced sound waves.

24. **Which of the following instructions should be followed while making a 'chassis' for an electronics device?**

- The sheet should be rust free
- The chassis can be easily installed in the cabinet and taken out
- The chassis should be light in weight
- All of the above

**R.R.B. Allahabad Asst. Loco Pilot 03.08.2008**

**Ans : (d)** While making the 'chassis' of any electronic device, the following instructions should be followed-

- The sheet should be rust free.
- The chassis can be easily installed in a cabinet and taken out.
- The chassis should be light in weight.

25. **All hand tools should be saved-**

- from rust
- from dust
- from hot weather
- from dry air

**R.R.B. Chandigarh Asst. Loco Pilot 14.09.2008**

**Ans : (a)** All hand tools should be saved from rust.

- The category of hand tools includes all those tools and accessories with the help of which the artisan completes his craft work through his skill.
- If it gets rusted then it will not be able to work properly so we will need more force.

26. **The sharp hand tools-**

- should be kept in an iron box
- should be kept in separate wooden boxes
- Their edge should be kept downwards
- should be kept wrapped with a cloth strip

**R.R.B. Kolkata Asst. Loco Pilot 02.11.2008**

**Ans : (d)** In the workshop, the trainee should keep sharp hand tools like scissors, knife, spanner etc. Wrapped with a cloth strip so that their edges do not get spoiled and no accident occurs.

27. **Which of the following is not expected from an electronics mechanic?**

- Clear identification of tools
- Repair of equipment in 'on' state
- Soldering work efficiency
- To protect oneself

**R.R.B. Kolkata Asst. Loco Pilot 02.11.2008**

**Ans. (b) :** A person working as an electronics mechanic is not expected to repair the equipment in the 'on' state because the circuit may get shorted or get burnt in the 'on' state.

Therefore, any electronics equipment should not be repaired by any mechanic in on state.

28. **Which of the following methods is used to find out the exact location of bone fracture in any part of the body?**

- ECG machine
- X-Ray machine
- EEG machine
- None of the above

**R.R.B. Muzaffarpur Asst. Loco Pilot 15.02.2009**

**Ans. (b) :** X-Ray machine is used to find out the exact location of bone fracture in any part of the body because X-Ray cannot pass through the fracture area of bone.

- X-Ray is a type of electromagnetic radiation whose wavelength ranges from 10 to 0.01 nm.
- It is most commonly used for diagnosis in medicine.

29. **Consider the following statements.**

**Statement-I : The condition of the brain is determined through ECG.**

**Statement-II : The condition of the heart is determined through EEG.**

**Which of the above statements is/are true?**

- statement-I is correct
- statement-II is correct
- both the statements are correct
- None of these

**R.R.B. Bhubaneswar Asst. Loco Pilot 14.06.2009**

**Ans. (d) :** EEG stands for Electroencephalogram which measures the electrical activity of the brain.

- ECG stands for Electrocardiograph which measures the electrical activity of the heart.
- Therefore, it is clear that none of the above statements is correct.

- 30. Which of the following is the reason for the artisan's lack of interest in work?**
- (a) family problem (b) financial problem  
(c) to have a fight (d) All of these

**R.R.B. Mumbai Asst. Loco Pilot 14.06.2009**

**Ans. (d) :** The artisan may not be interested in the work due to the following reasons-

(i) Family problem  
(ii) Financial problem  
(iii) To have a fight  
(iv) Fatigue due to excessive work  
(v) Not sleeping properly at night

- 31. Which of the following should a person not do while doing any work?**
- (a) maintaining cleanliness  
(b) stopping the moving machine by hand  
(c) to keep the machine stable  
(d) making proper arrangements for lighting while cutting tools

**R.R.B. Gorakhpur Asst. Loco Pilot 11.10.2009**

**Ans. (b) :** While doing any work, a person should not do the following things-

- A moving machine should not be stopped by hand.
- One should not joke or laugh during work.
- A running machine should not be cleaned.
- The tool should not be in darkness while cutting.
- If doing electrical work then the switch should not be turned on.

- 32. The ..... must be spread under the feet of the person working on the table.**
- (a) steel sheet  
(b) aluminum sheet  
(c) rubber matting  
(d) all of these

**R.R.B. Bhopal Asst. Loco Pilot 06.06.2010**

**Ans. (c) :** The rubber matting must be spread under the feet of the person working on the table and rubber must be used in the oily place so that if the oil falls down, the person is protected from slipping.

- 33. Consider the following statements.**
- Statement-I :** The phase wire should be connected to the electrical load only after controlling it with a switch.
- Statement-II :** To switch off an electrical appliance, it should be disconnected from the socket by holding the plug top and not by holding its lead.
- Which of the above statements is/are true?**
- (a) only statement-I is true  
(b) only statement-II is true  
(c) Both statements are true  
(d) None of the above

**R.R.B. Bhopal Asst. Loco Pilot 06.06.2010**

**Ans. (c) :** The phase wire should be connected to the electrical load only after controlling it with a switch. So that it can be switched on and off when needed.

- To switch off an electrical appliance, one should not hold its lead as this may cause electrocution to the person.
- Hence both the above statements are true.

- 34. The main reason for electric shock is-**
- (a) Low amount of electric current  
(b) Intense amount of electric current  
(c) Negligible electrical resistivity  
(d) All of these

**R.R.B. Chennai Asst. Loco Pilot 06.06.2010**

**Ans. (b) :** The main reason for electric shock is intense amount/rapid flow of electric current.

- The faster the current flows through the person's body, the stronger the shock will be.

**Resistance of human body-**

- Dry state - 100000  $\Omega$
- Moist state - 1000  $\Omega$

- 35. For safety reason, fuse should always be connected-**
- (a) on neutral wire (b) on earthing wire  
(c) on phase wire (d) none of these

**R.R.B. Jammu-Kashmir Asst. Loco Pilot 06.06.2010**

**Ans. (c) :** For safety reasons, fuse should always be connected on phase wire so that if there is excessive current flowing in the conductor, it can automatically melt and interrupt the flow of current and protect the equipment.

- Fuse wire is a thin wire made of alloy (Tin and Lead) with low melting point and low specific resistance.

- 36. While changing the fuse wire, which of the following is mandatory from safety point of view?**
- (a) Switching off the equipment  
(b) Shutting off the input supply of the equipment  
(c) Switching off the main switch  
(d) Switching on the main switch

**R.R.B. Secunderabad Asst. Loco Pilot 06.06.2010**

**Ans. (c) :** For safety reasons, while changing the fuse wire, the main switch should be switched off so that the flow of current in the conductor wire stops and the possibility of electrocution is eliminated.

- The fuse wire should always be connected to the phase wire.
- The fuse wire is made of an alloy of low melting point and low specific resistance.

- 37. Which safety symbol is shown in the figure?**



- (a) Prohibitive  
(b) Positive or imperative  
(c) Whip  
(d) Informative

**R.R.B. Chandigarh Asst. Loco Pilot 15.07.2012**

**Ans. (b) :** Positive safety sign is shown in the figure.

- The shape of positive safety sign is circular, color is blue and the symbol is white.
- Wearing glasses to protect the eyes wearing a cap to protect the head, protecting the ears etc are the examples of positive safety sign.



**38. Which of the following statements is true regarding informational signs?**

- Their background is blue
- Their shape is circular
- Their background is green
- Their shape is triangular

**R.R.B. Bangalore Asst. Loco Pilot 15.07.2012**

**Ans. (c) :** The background of informational sign is green.

- A square shape is used for informational signs in which white sign is given on green colour.



**39. .... signs are made in black shape on a white background with red border and crossbars.**

- Prohibitive
- Mandatory
- Warning
- Informative

**R.R.B. Bhubaneswar Asst. Loco Pilot 15.07.2012**

**Ans. (a) :** Prohibitive signs are made in black shape on white background with red border and crossbar.

- Circular shape is used for prohibitive sign.
- The meaning of this symbol indicated that do not do it.
- **Prohibitive signs-**



**40. Which of the following safety signs is an example of a mandatory sign?**

- Danger of electric shock
- Wear head protection
- Corrosive substance
- Smoking prohibited

**R.R.B. Bilaspur Asst. Loco Pilot 15.07.2012**

**Ans. (b) :** Under the mandatory sign, wear head protection, wear eye protection, wear foot protection etc are the examples of mandatory sign.

- The shape of mandatory sign is circular and it is represented by white symbol on blue background.

**41. Which of the following symbols indicates 'danger of 415 V' ?**

- Prohibitive sign
- Positive sign
- Warning sign
- Informative sign

**R.R.B. Ahmadabad Asst. Loco Pilot 2014**

**Ans. (c) :** The danger of 415 V is indicated by warning sign as shown in the figure given below.



- The warning sign is triangular in shape and is represented by a black border and symbol on a yellow screen.

- The warning sign indicates caution, risk of electric shock, etc. Some major warning signs are as follows.



**42. A warning sign is shown in figure. Which sign indicates "probability of danger"?**

- Exclamation mark symbol
- Starburst symbol
- Explosion symbol
- Lightning bolt symbol

**R.R.B. Ranchi Asst. Loco Pilot 2014**

**Ans. (a) :** The probability of danger is represented in the figure given below.



**43. Which mandatory sign for wearing hearing protection is represented in the figure?**

- Head protection sign
- Hearing protection sign (earplugs)
- Foot protection sign (boot)
- Hand protection sign (gloves)

**R.R.B. Ranchi Asst. Loco Pilot 2014**

**Ans. (b) :** The sign required to wear hearing protection is shown in the given figure.

- The positive safety sign is shown in the figure.
- Their shape is circular color blue and the symbol is white.

**Examples-** wearing glasses to protect the eyes, wearing a cap to protect the head, wearing a head protection etc.



44. Which type of shape is used to represent "No Smoking"?

- (a) Rectangular (b) Circular  
(c) Square (d) Triangular

R.R.B. Kolkata Asst. Loco Pilot 2014

**Ans. (b) :** A circular shape is used to indicate 'No Smoking'.



To represent this sign, it is displayed by a black symbol on a white screen.

45. The color used to represent prohibition sign is .....

- (a) Red border and cross bar, black sign and white background  
(b) Red border and cross bar  
(c) Black sign and white background  
(d) Black sign

R.R.B. Siliguri Asst. Loco Pilot 2014

**Ans. (a) :** The color used to represent prohibition sign is red border and cross bar, black sign and white background.

- It is displayed by a circular shape which indicates don't do it. example- No smoking.

46. Match List-I with List-II.

List-I (Safety signs)	List-II(Color background)
A. Prohibitory sign	(i) green
B. Mandatory sign	(ii) yellow
C. Indicator sign	(iii) blue
D. Informative sign	(iv) white

**Code-**

- (a) A- (i) ; B- (ii) ; C- (iii) ; D- (iv)  
(b) A- (ii) ; B- (i) ; C- (iii) ; D - (iv)  
(c) A- (iv) ; B- (iii) ; C- (ii) ; D- (i)  
(d) A- (iii) ; B- (ii) ; C- (i) ; D- (iv)

R.R.B. Siliguri Asst. Loco Pilot 2014

**Ans. (c) :**

- Prohibitory sign → White
- Mandatory sign → Blue
- Indicator sign → Yellow
- Informative sign → Green

47. What is the meaning of the symbol shown below?



- (a) danger of fire  
(b) danger of electric shock  
(c) general warning of danger  
(d) overload

R.R.B. Patna Asst. Loco Pilot 2014

**Ans. (b) :** The meaning of the symbol shown above is danger of electric shock.

- Its shape is triangular.
- Its color is yellow and the borders and symbols are black, which means danger, warning and fear; like fire hazard, electrical hazard etc.



48. Which of the following is not related to prohibition sign?

- (a) Smoking and open fire  
(b) Refusal to walk  
(c) Use eye protection  
(d) None of these

CRPF Constable Tradesman 2016

**Ans. (c) :** Prohibitory sign symbolizes prohibition of smoking, open fire and walking.

- Eye protection is not related to prohibition sign, it is a mandatory sign.

49. What should be done immediately in case of excessive bleeding ?

- (a) Apply pressure on the wound  
(b) Do not make direct contact with the injured  
(c) Apply clean pads and bandage strictly  
(d) Dressing the wound

CRPF Overseer 2016

**Ans. (a) :** In case of excessive bleeding as part of first aid, first of all the person should stop the bleeding by applying sufficient pressure on the injured area, so that the blood flow stops.

50. What would be your first step to save someone who has come in contact with a live line?

- (a) will call the doctor soon  
(b) hold his hand and pull him away from the live line  
(c) will separate it from the live line  
(d) will send him to the hospital

HAL Electrician 2015

**Ans. (c) :** To save a person who comes in contact with a live line, the first step is to separate him from the live line and then massage his hands, legs, body, after that call a doctor immediately.

51. If blood is leaking from the victim's wound, then a solution of ..... in distilled water should be applied.

- (a) Phenyl (b) Foam  
(c) Alum (d) Oil

MES Electrician Tradesman 2015

**Ans. (c) :** If blood is leaking from the wound of the victim, then a solution of alum should be made in distilled water and applied.

- In case of bleeding, first aid should be to stop the blood flow by applying adequate pressure on the injured area.

52. Which of the following method of giving artificial respiration is the best?

- (a) Sylvester method
- (b) Shaffer method
- (c) Mouth-to mouth respiration method
- (d) None of the above

VIZAAG Steel Electrician 2015

Ans. (c) : Mouth to mouth respiration method is the best method of giving artificial respiration.

- This procedure is done 10-12 times in a minute.
- This procedure is done quickly which helps the patient to breathe quickly.

53. In which of the following methods, the victim is made to lie on his back and a pillow is placed under his back?

- (a) In Sylvester method
- (b) In Shaffer method
- (c) In mouth-to-mouth respiration method
- (d) All of the above

R.R.B. Patna Asst. Loco Pilot 2014

Ans. (a) : In Sylvester method, the victim is made to lie on his back and a pillow is placed under his back so that he can be given artificial respiration.

- The action of respiration should not be done at very fast speed.
- It should happen about 10-12 times in a minute.
- In this process, the lungs get compressed and expanded again and again and the patient starts breathing.

54. In case the victim has blisters on his chest and stomach, the person treating him should sit near ..... the patient.

- (a) Head
- (b) Foot
- (c) Chest
- (d) Knees

R.R.B. Bilaspur Asst. Loco Pilot 15.07.2012

Ans. (a) : In case of blisters on the chest and stomach of the victim, the person treating him should sit near the patient's head and provide artificial relief. So that the person's wound is not affected, oil should be applied on the person's wound.

55. Name the method of artificial respiration to bring back consciousness in case of wound/burn in chest or stomach.

- (a) Halogen-Nelson's method
- (b) Shaffer's method
- (c) Mouth-to-mouth method
- (d) None of the above

R.R.B. Bhubaneswar Asst. Loco Pilot 15.07.2012

Ans. (c) : Mouth-to mouth respiration method is the best method to bring back consciousness in case of wound/burn in chest or stomach.

With this method, the artificial respiration process is completed without affecting the wounds in the patient's stomach and chest.

56. Fire is a mixture of-

- (a) Fuel + air + temperature
- (b) Fuel + carbon + oil
- (c) Oil + air + paper
- (d) None of these

R.R.B. Bangalore Asst. Loco Pilot 15.07.2012

Ans. (a) Fire is a mixture of fuel, air and temperature.

- Burning of combustible substance is called fire. To keep a fire burning, the following three factors are necessary.
- If any of these three factors are removed, the fire goes out.
- **Fuel-** Any substance like solid, liquid or gas.
- **Heat-** When fuel is heated, heat is released from it which causes fire.
- **Oxygen-** It helps in burning of fuel, which is present in sufficient quantity in the air.

57. .... is used to extinguish category 'B' fire.

- (a) Foaming machine
- (b) Hot water
- (c) Cold water
- (d) Dry powder machines

R.R.B. Chandigarh Asst. Loco Pilot 15.07.2012

Ans. (a) : Fire caused by combustible liquids like petrol, diesel, kerosene etc. is called category 'B' fire.

- To extinguish this category of fire, foam, carbon dioxide, ordinary or halon chemical fire extinguishers should be used.

58. Which class of fire can be easily extinguished by water?

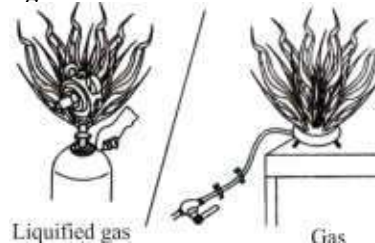
- (a) Class A
- (b) Class B
- (c) Class C
- (d) Class D

R.R.B. Secunderabad Asst. Loco Pilot 06.06.2010

Ans. (a) : Generally fire caused by combustible material like paper, wood, coal etc. is called class A fire.

- Class A fire can be easily extinguished with water.

59. Name the category of fire for the fuel shown in the figure.



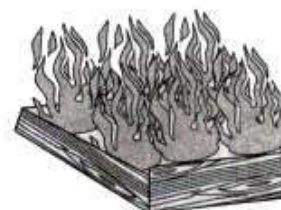
- (a) Class D fire
- (b) Class C fire
- (c) Class B fire
- (d) Class A fire

R.R.B. Chennai Asst. Loco Pilot 06.06.2010

Ans. (b) : The above shown figure is an example of class C fire.

- Gas, LPG, Biogas is called class C fire.
- To extinguish the class C fire powder etc is used.

60. Which is the most suitable fire extinguisher to extinguish category 'D' fire shown in the figure?



- (a) Carbon tetrachloride (CTC) type fire extinguisher
- (b) Foam type fire extinguisher



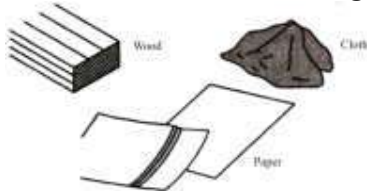
- (c) Water filled type fire extinguisher
- (d) Gas cartridge halon type fire extinguisher

**R.R.B. Bhopal Asst. Loco Pilot 06.06.2010**

**Ans. (a) :** Carbon tetrachloride (CTC) is used to extinguish class 'D' fire.

- Fire in electrical equipment is called class D type fire.

**61. On the basis of the nature of fuel, fires are classified into four groups. Name the category of fire for the fuels shown in the figure.**



- (a) Category 'D' fire
- (b) Category 'C' fire
- (c) Category 'B' fire
- (d) Category 'A' fire

**R.R.B. Gorakhpur Asst. Loco Pilot 11.10.2009**

**Ans. (d) :** On the basis of the nature of fuel, out of the four types of fire (A, B, C, D), class 'A' fire includes the fire caused by wood, cloth, paper etc.

- To extinguish this category of fire, the ordinary combustible material should be cooled and soaked to prevent it from catching fire again.

**62. In which type of fire, foam and dry powder type fire extinguishers can be used?**

- (a) Category 'A' fire
- (b) Category 'B' fire
- (c) Category 'C' fire
- (d) Category 'D' fire

**R.R.B. Mumbai Asst. Loco Pilot 14.06.2009**

**Ans. (b) :** Foam dry powder and carbon dioxide (CO<sub>2</sub>) fire extinguishers are used to extinguish the category 'B' fire.

**63. Which type of fire extinguisher will be used to extinguish the fire in electrical equipment?**

- (a) Foam type
- (b) Halon type
- (c) Water filled cartridge type
- (d) Stored pressure water filled type

**R.R.B. Bhubneswar Asst. Loco Pilot 14.06.2009**

**Ans. (b) :** Fire in electrical equipment is category 'D' fire.

- CTC and halon type fire extinguishers are used to extinguish the fire in electrical equipment.
- Under no circumstances should foam or liquid fire extinguishers be used to extinguish electrical equipment fires.

**64. Consider the following statements.**

**Statement-I : Fire caused by materials like wood, paper etc has been kept in class 'A'.**

**Statement-II : Class 'A' fire can be extinguished with water.**

**Which of the above statements is/are true?**

- (a) Only statement I is true
- (b) Only statement II is true
- (c) Both the statements are true
- (d) None of these

**R.R.B. Muzaffarpur Asst. Loco Pilot 15.02.2009**

**Ans. (c) :** Generally fires caused by combustible materials like wood, paper, clothes etc are kept in class 'A'. Water, sand, CTC, soil, powder etc. are used to extinguish the class 'A' type fire.

**65. Which of the following types of fire extinguishers should not be used to extinguish electrical based fires?**

- (a) Halon type fire extinguisher
- (b) Carbon tetrachloride (CTC) type fire extinguisher
- (c) Foam type fire extinguisher
- (d) Dry powder type fire extinguisher

**R.R.B. Kolkata Asst. Loco Pilot 02.11.2008**

**Ans. (c)** Halon, CO<sub>2</sub>, dry powder and CTC fire extinguishers can be used to extinguish the fire in electrical equipment.

- Foam type fire extinguisher should not be used to extinguish the fire in electrical equipment.

**66. Which of the following fire extinguishers is more suitable for extinguishing fire caused by LPG gas?**

- (a) Water based fire extinguisher
- (b) Dry powder fire extinguisher
- (c) Carbon dioxide fire extinguisher
- (d) All of the above

**R.R.B. Kolkata Asst. Loco Pilot 02.11.2008**

**Ans. (b)** Dry powder fire extinguisher is more suitable for extinguishing fire caused by LPG gas.

- These extinguishers are of gas cartridge or stored pressure.
- Its shape is similar to that of a water fire extinguisher and the method of use is also similar, the only difference is in the nozzle. Which are in the shape of a fork.



**67. Which of the following is Halon type fire extinguisher?**

- (a) Water-based fire extinguisher
- (b) Dry powder fire extinguisher
- (c) CTC Fire extinguisher
- (d) None of the above

**R.R.B. Chandigarh Asst. Loco Pilot 14.09.2008**

**Ans. (c)** Halon type fire extinguisher is a fire extinguisher with carbon tetrachloride (CTC) and bromochloride fluoromethane (BFC).

These types of fire extinguishers are used to extinguish the fire caused in electrical equipment.

1. In a crimping tool, ratchet mechanism is employed for.

- (a) squeezing the wire terminal to provide a firm grip on inserted wire.
- (b) stripping the insulation sleeve.
- (c) cut the wire for the required length.
- (d) None of the above.

ISRO URSC-18.04.2024, 1:00 PM - 2:30 PM

Ans. (a) : In a crimping tool ratchet mechanism is employed for squeezing the wire terminal to provide a firm grip on inserted wire.



- Ratchet crimping tools are suitable for left or right hand operation.
- Ratchet mechanism crimps tools for terminals.
- It creates secure connections between wires and connectors.
- It can easily join electrical wires, network cable, coaxial cable etc.

2. The process of making a mechanical joint between the strip end of the wire and the connector pin is.....

- (a) Chipping
- (b) Wire bonding
- (c) Crimping
- (d) Braiding

ISRO Technician 10.02.2019

Ans. (c) : The process of making a mechanical joint between the strip end of the wire and the connector pin is called crimping.

- The process of crimping usually involves jointing one or both of two pieces of metal or other ductile material (usually wire) by deforming them.
- Crimping is widely used in metallurgy.

3. Keeping all other parameters the same, what effect does increasing the gauge of wire from 22 AWG to 26 AWG have?

- (a) resistance increases
- (b) resistance decreases
- (c) resistance remains the same
- (d) None of the above

ISRO Technician 10.02.2019

Ans. (a) : Keeping all parameters same, resistance increases as the gauge wire increases from 22 AWG to 26 AWG.

- The full name of AWG is American Wire Gauge.
- It is a logarithmic scale.

4. By which metal are the pliers made?

- (a) Copper
- (b) Iron
- (c) Steel
- (d) None of these

ISRO Electroplating Technician-B 2016

Ans. (c) : Pliers are made of steel.

- Pliers are basically a pair of two legs.
- It is used to hold, fasten, pull and rotate small parts and components.
- The pliers are made from high quality stainless steel.
- Its metal parts should be wiped with a cloth dipped in oil.

5. Which of the following pliers is used to make small pieces of metal and give them shape?

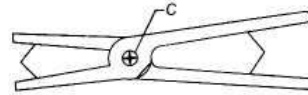
- (a) Diagonal cutting pliers
- (b) End cutting pliers
- (c) Flat nose pliers
- (d) None of these

ISRO Electronic Mechanic Technician-B 2016

Ans. (c) : Flat nose pliers are used to make small piece of metal and give them shape.

- Flat nose pliers are used to make and shape small pieces of wire and metal.
- It is also used to hold and fasten small parts.
- Flat nose pliers are made in lengths of 100, 120, 140, 160, 180 and 200 mm.

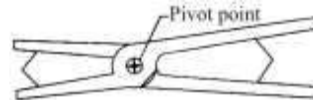
6. Identify the part marked 'C' in the figure of pliers shown-



- (a) Flat grip
- (b) Pivot
- (c) Side cutter
- (d) Joint cutter

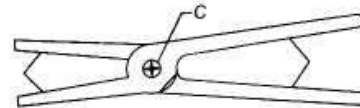
ISRO Satellite Centre Bengaluru 2016

Ans. (b) : The part marked with 'C' in the above given figure is called pivot.



- There is a hole between the jaw and the handle. The rivet is inserted into this hole and connected which makes it workable.

7. Which type of plier tool is shown in the figure?



- (a) Flat nose pliers
- (b) Round nose pliers
- (c) Diagonal cutting pliers
- (d) End cutting pliers

Jaipur Metro Electrician 2016

Ans. (a) : The figure shown above is a flat nose pliers.

- The mouth and nose of this type of pliers are flat from the front.
- These are smaller in size and lighter in weight as compare to the combination pliers.
- These are also made of steel and have insulation on the legs.
- It is used for holding, twisting and pulling wires.

8. Which of the following is not a part of a hammer?

- (a) Face (b) Peen  
(c) Handle (d) Shank

BMRC Electrician 2015

Ans. (d) : Shank is not a part of a hammer.

- Hammer is a tool made of Iron, which is also used for hammering nails and working with chisel.
- The main parts of a hammer are-handle, face, eye hole, cheek, peen and head.

9. Center punch is used for-

- (a) To make marks for properly seating the drill-bit on job  
(b) To make a light mark to rest the arm of the divider  
(c) To clarify the marking on the metal sheet  
(d) For all the above mentioned tasks

R.R.B. Gorakhpur Asst. Loco Pilot 08.10.2006

Ans : (d) Center punch is used for following works-

- To make marks for properly seating the drill bit on the job.
- To make a light mark to rest the arm of the divider.
- To clarify marking on sheet metal.

Note- Center punches are at a 90° angle to the punch point.

10. The rivets used to join two copper sheets by riveting should be-

- (a) made of silver  
(b) made of brass  
(c) made of copper  
(d) made of aluminum

R.R.B. Patna Asst. Loco Pilot 04.02.2007

Ans : (c) The rivets used to join two copper sheets by riveting should be made of copper.

- Connecting any metal sheets or plates with rivets is called riveting joint.
- There are two types of riveting joints-  
(i) Lap joint  
(ii) Butt joint
- To join two similar metal plates by rivet, rivet of the same metal is generally used.

11. The thickness of the metallic sheets used in sheet-metal workshop is usually-

- (a) Less than 1 mm (b) Less than 2 mm  
(c) Less than 3 mm (d) Less than 5 mm

R.R.B. Bangalore Asst. Loco Pilot 08.07.2007

Ans : (d) The thickness of the metallic sheets used in sheet-metal workshop is usually less than 5 mm.

- It is used to make a special work or a special object.

12. The tool used for cutting metallic sheets is-

- (a) Combination pliers  
(b) Side-cutting pliers  
(c) Snip  
(d) Cutter

R.R.B. Ranchi Asst. Loco Pilot 08.07.2007

Ans : (c) The tool used for cutting metallic sheets is called snip.

- It is also known as hand shears.
- It is used to cut thin metallic sheet whose thickness is about 1.2 mm, that sheet metal can be cut by snips.

13. The size of a tri-square is expressed as-

- (a) by the length of the stock  
(b) by the length of the blade  
(c) by the metal used in making tools  
(d) All of the above

R.R.B. Allahabad Asst. Loco Pilot 09.12.2007

Ans : (b) The size of a tri-square is expressed as by the length of the blade.

- Try-square is a marking instrument.
- It is 'L' shaped in appearance and the angle between blade and handle is 90°.
- It is used to check the flatness of the surface.
- It is also used to draw parallel and perpendicular lines while marking the job.
- By this tool we can hold the job piece in a vice.

14. Which instrument is used to measure the size of a conductor?

- (a) Bevel gauge  
(b) Vernier caliper  
(c) Standard wire gauge  
(d) Depth gauge

R.R.B. Allahabad Asst. Loco Pilot 03.08.2008

Ans. (c) : Standard Wire Gauge (SWG) is used to measure the size of the conductor.

- Through this, the diameter of wires or cables is determined.
- There are cuttings around the circumference, on which numbers are written.
- By inserting the wire in the cutting its gauge is determined.
- The slot in which the wire fits properly is its gauge number.

15. For which type of work flat cold chisel is not suitable?

- (a) To remove metal from large flat surfaces  
(b) To square the corners of the workpiece  
(c) To remove excess metal from casting  
(d) To remove excess metal from welded joints

R.R.B. Secunderabad Asst. Loco Pilot 29.06.2008

Ans : (b) : Flat cold chisel is not suitable to square the corners of the workpiece.

- Flat cold chisel is useful for the following types of work-  
(i) To remove metal from large flat surfaces.  
(ii) To remove excess metal from castings.  
(iii) To remove excess metal from welded joints.

16. For insulated combination pliers, care should be taken that it-

- (a) Will not be used as a hammer  
(b) Will not throw down from a high place  
(c) Will apply oil from time to time  
(d) All of the above

R.R.B. Allahabad Asst. Loco Pilot 09.12.2007

Ans : (d) The following precautions will be taken for insulated combination pliers-

- Do not use it as a hammer so that its insulation is not damaged.
- Do not throw it down from a high place so that its insulation does not get damaged.

- Oil should be applied from time to time so that it does not rust.
- Its insulation should be maintained so that they can be used even on live lines
- Its cutters should not be used for cutting steel wires.
- It should not be used to hold hot objects.

17. **What precautions should be taken while using the phase tester?**

- Will not be used at a range more than 500 V
- Will check the insulation
- While checking, finger will place on the metal clip and remain in contact with the earth
- All of the above

**R.R.B. Ranchi Asst. Loco Pilot 08.07.2007**

**Ans : (d) :** Phase tester is used to determine the presence of current flow. Following precautions should be taken while using it-

- Should not work at a range greater than 500 V.
- Check the insulation before working.
- While checking keep the finger on the metal clip or in contact with the earth.

18. **What precautions will you take while using a screw driver-**

- The screwdriver will be selected according to the size of the screw
- Do not hit the handle of the screwdriver with a hammer
- It will not be used in place of chisel
- All of the above

**R.R.B. Bangalore Asst. Loco Pilot 08.07.2007**

**Ans : (d) :** The following precautions should be taken while using a screwdriver-

- The screwdriver will be selected according to the size of the screw.
- Do not hit the handle of the screwdriver with a hammer like a chisel.
- It will not be used in place of chisel.
- The screwdriver should be oiled from time to time so that it does not rust.
- The tip of the screwdriver should be of correct design so that it can be matched properly with the slot.
- To prevent injury, the tip of the screwdriver should not be made too sharp by grinding.
- The axis of the screw blade should remain connected to the axis of the screwdriver, otherwise the tip of the screwdriver or the beads inside the hole may be damaged.
- Before use, if there is grease etc on the handle, it should be cleaned so that the possibility of the screwdriver slipping is minimal.
- A screwdriver with a wide tip equal to the length of the slot cut in the screw should be used.

19. **What precautions will you take while using the hammer?**

- Hold the end of the handle in your hand
- Hold the handle close to the hammer
- Will keep the hammer greased
- Will work even with loose handles

**R.R.B. Patna Asst. Loco Pilot 04.02.2007**

**Ans : (a) :** While using the hammer, the following precautions will be taken-

- Hold the end of the handle in hand.
- Protect the fingers while hitting with hammer.
- When we want to hit something, the hammer should be parallel to the object, so that there is neither a possibility of slipping and injury, nor a possibility of the nail becoming crooked.
- Before working, it should be checked that there is no oil or grease on the face or handle of the hammer.

20. **What precautions will you take for hand drill machine ?**

- The drill bit will fit well in the jaw
- While running the machine, press the handle straight
- Before making holes in metal sheets, marks will be made with center punch
- All of the above

**R.R.B. Gorakhpur Asst. Loco Pilot 08.10.2006**

**Ans : (d) :** Following precautions will be taken for hand drill machine-

- The drill bit will fit well in the jaw.
- While running the machine, press the handle straight
- Before making holes in metal sheets, marks will be made with center punch
- While using hand tools, the hands of the trainee and the handles of the hand tools should be dry and grease free.
- The handles of hand tools used for electrical work should be completely insulated.

21. **At what angle is the marking blade attached to the base of the tri-square?**

- 45°
- 90°
- 120°
- 180°

**R.R.B. Malda Asst. Loco Pilot 16.07.2006**

**Ans : (b) :** The marking blade is attached to the base of the tri-square at 90° angle.

- Tri-square is a steel blade of 15, 20, 30 cm length.
- It is also called 'Guniya'.
- It is used to check the right angle (90°) in electrical wiring.

22. **A hammer made of wood is-**

- Mallet
- Ball pin hammer
- Straight pin hammer
- Cross pin hammer

**R.R.B. Mumbai Asst. Loco Pilot 16.07.2006**

**Ans : (a) :** A hammer made of wood is called mallet.

- It is mostly used for sheet metal.
- Generally rosewood, tamarind, kikar, teak or any other hard wood is used to make it.
- It is also used for carpentry work.

23. **The shape of the cutter used to remove insulation at the front part of a wire stripper is-**

- V-shaped
- O-shaped
- T-shaped
- None of the above

**R.R.B. Kolkata Asst. Loco Pilot 16.07.2006**

**Ans : (a) :** The shape of the cutter used to remove insulation at the front part of a wire stripper is V-shaped.

- Wire stripper is used to remove insulation from wires of different thickness used in assembly.
- Its length is usually 20 cm.
- A V-shaped gauge center is fitted in it.

**24. The true statement for bench vice is-**

- Bench vice is clamped on the table
- It has teeth in its jaws
- Its size is taken from the length of the jaw
- All of the above

**R.R.B. Guwahati Asst. Loco Pilot 22.01.2006**

**Ans : (d) :** Following are the important functions and parts of bench vice-

- Bench vice is clamped on the table.
- It has teeth in its jaws.
- Its size is taken from the length of the jaw.
- Any type of object can be held well in a bench vice.
- It is also called engineering vice.
- Is made of cast iron and cast steel.
- Its size is according to its jaw plates.
- Handle, moveable, jaw fixed jaw etc are the parts of bench vice.

**25. The screw driver used to tighten or loosen a very hard screw is called-**

- Instrument screwdriver
- Straight screwdriver
- Tapered wings screwdriver
- Impact screwdriver

**R.R.B. Ranchi Asst. Loco Pilot 04.09.2005**

**Ans : (d)** The screwdriver used to tighten or loosen a very hard screw is called impact screwdriver.

- Impact screwdriver is often used by mechanics to loosen larger screws, bolts and nuts that are corrosively frozen or over torque.
- An impact driver bit set includes a variety of bits that can be used with an impact screwdriver to drive or remove screws and bolts.

**26. Which of the following is used to fit the screw into a deep hole and also to pull the screw out, forming a knot and ring on the wire end?**

- Side cutting pliers
- Chisel
- Nose pliers
- Electrician knife

**R.R.B. Ajmer Asst. Loco Pilot 05.06.2005**

**Ans : (c)** Nose pliers are used to fit the screw into the deep hole and to pull the screw out, to form a knot and ring on the wire end.

- Nose pliers are used to hold, tighten, pull and rotate small parts and components.
- It is also used for bending and cutting small diameter wires.

**27. Which of the following joints is suitable for roofing work?**

- Lap joint
- Butt joint
- Hinged joint
- Double grooved seam joint

**R.R.B. Mumbai Asst. Loco Pilot 05.06.2005**

**Ans : (d) :** Double grooved seam joint is suitable for roofing work.

- Double grooved seam joint is constructed with two open seams like a grooved seam, the double seam has a 90° angle to form a corner.
- This joint is ideal for compound curves and may require special tooling to clasp it tightly.

**28. Which of the following tools is used to flatten metal around a punched hole?**

- Ball pin hammer
- Riveting hammer
- Setting hammer
- Sledge hammer

**R.R.B. Kolkata Asst. Loco Pilot 06.02.2005**

**Ans : (a) :** Ball pin hammer is used to flatten the metal around the punched hole.

- Ball pin hammer is made by forging iron.
- The shape of one side is like a ball in a ball pin hammer.
- The shape of its other side is flat.
- According to BIS, ball pin hammers are found in the range of 0.11 to 0.91 kg.
- It is also called engineer's hammer or chipping hammers.
- It is used for making rawal plugs in earthen walls, for marking, chipping and riveting.

**29. When shaping and seaming of funnel and tapered items, which of the following stakes is used?**

- Hatchet stake
- Half moon stake
- Funnel stake
- Creasing stake

**R.R.B. Ahmadabad Asst. Loco Pilot 17.10.2004**

**Ans : (c) :** Funnel stake is used for shaping and seaming of funnel and tapered objects.

- The upper part of the funnel stake is semi-conical.
- It is used to make seams in conical objects and to give them shape.

**30. The minimum distance between rivets should be three times the rivet diameter, if the distance between rivets is too short then-**

- There will be a fissure in it
- Rivaton will be difficult
- Will split the end of the joint
- Will separate the metal near the center line of the rivets

**R.R.B. Ajmer Asst. Loco Pilot 10.10.2004**

**Ans : (d)** The minimum distance between rivets should be three times the rivet diameter, if the distance between rivets is too short then the metal near the center line of the rivets will separate.

- Riveting is done to join two sheets or plates of any metal in semi-permanent manner.
- The type of metal sheets commonly joined.
- Rivets are also made of the same metal.
- The distance between two rivets should be three times the diameter of the rivet.
- If the distance between the rivets is reduced then the metal will separate near the center of the rivets.

31. What material are scribers made of ?

- (a) Mild steel (b) Hard carbon steel  
(c) Brass (d) Cast iron

R.R.B. Ajmer Asst. Loco Pilot 23.05.2004

Ans : (b) : Scribes are made of hard carbon steel material.

- Scribe is a pointed and sharp tool made of steel or carbon steel.
- In electricity, mainly plane and double ended scribes are used.
- Scribes are used to make the finished planes for cutting work.



Plane scribe

32. The angle of the scribe's points is-

- (a) 30° (b) 60°  
(c) 5° to 10° (d) 12° to 15°

R.R.B. Bangalore Asst. Loco Pilot 25.01.2004

Ans : (d) : The angle of the scribe's point is 12° to 15°.

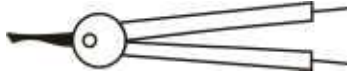
- Scribe is a sharp edged tool which is used to draw lines while marking.
- As per Indian standard, scribes are found in length from 125 mm to 200 mm.

33. The legs of the divider are-

- (a) equally pointed  
(b) up-down  
(c) one straight and the other bent inwards  
(d) one at 45° and the other at 60°

R.R.B. Ranchi Asst. Loco Pilot 21.09.2003

Ans : (a) : The legs of the divider are equally pointed.



- The divider is a two-legged marking tool similar to a compass made of mild steel or high carbon steel.
- The size of divider is expressed by the distance from the center to the point of its rivet or pivot pin.
- Its both legs are of equal length and pointed.
- According to the work, dividers are of 100, 150 and 200 mm in size.

34. Which tool is used for laying out large circles?

- (a) Tremel (b) Janney caliper  
(c) Divider (d) Scribe

R.R.B. Chandigarh Asst. Loco Pilot 25.05.2003

Ans : (a) : Tremel tool is used for laying out of large circles.

- Tremel is used for marking large size circles and arcs.
- These are found from 15 cm to 50 cm in size depending on the work.
- Its structure consists of a steel rod which is called a beam.
- Two slide heads are mounted on top of the beam which are moved here and there on the beam.
- The points of the scribe of the tremel should be sharp.
- Oil or grease should be applied to the tremel from time to time so that it can be protected from rusting.

35. The function of universal marking block is-

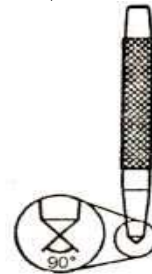
- (a) For marking lines at height  
(b) To find the center of the round rod  
(c) To measure straightness  
(d) To draw an angle

R.R.B. Mumbai/Bhopal Asst. Loco Pilot 05.01.2003

Ans : (b) : Universal marking block is used to find the center of the round rod.

- This marking block has a spindle in place of pillar.
- The spindle is not fitted directly into the base, it is fitted to the rocker arm attached to the base with the help of a lock nut.
- The rocker arm is directly connected to the base and the other end of the rocker arm is connected to an adjusting screw.
- With the help of adjusting screw, fine adjustment is done.
- The main parts of universal marking block are base, spindle, scribe, snug, rocker arm, fine adjusting screw, spindle lock nut and guide pin etc.

36. The punch shown in the figure is used to set a center point for the hole before making a hole in metals identify-



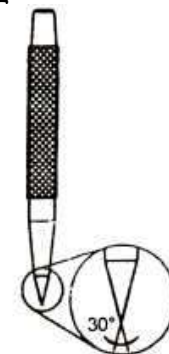
- (a) Prick punch (b) Center punch  
(c) Dot punch (d) Pin punch

R.R.B. Chennai/Bangalore Asst. Loco Pilot 27.10.2002

Ans : (b) : Center punch is used to set a center point for the hole before making a hole in metals.

- The punch is manufactured by hardened carbon steel.
- Its tip is narrow.
- Center punch is octahedral of 10 mm.
- It is made of cast steel and is about 125 mm long, the angle under the sharp part of which is kept at 90°.

37. Identify, which type of punches are used for fine marking-



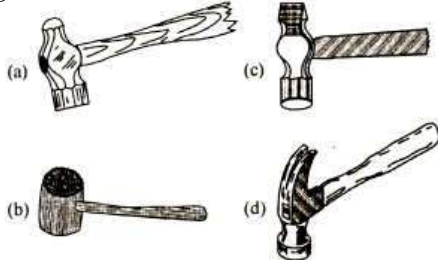
- (a) Drift punch (b) Dot punch  
(c) Prick punch (d) Hollow punch

R.R.B. Kolkata Asst. Loco Pilot 29.09.2002

**Ans : (c) :** Prick punch is used for fine marking.

- Its point is made by grounding it at a 30° angle.
- It is often used to make the market lines permanent by placing dots on the jobs of soft metals like Copper, Brass and Aluminum etc.

**38. Identify the claw hammer among the hammers given in the figure ?**



**R.R.B. Gorakhpur Asst. Loco Pilot 14.04.2002**

**Ans : (d)** Claw hammer is a special type of hammer.

- It has a round face on one end and the peen on the other end is tilted towards the handle.
- A slot is cut in its center with the help of this slot the nails can be taken out easily.

**39. The type of hammer which weights 3 kg to 9 kg and has a long wooden handle, which is used in the forge shop, is called-**

- Hand hammer
- Sledge hammer
- Ball peen hammer
- Straight peen hammer

**R.R.B. Patna Asst. Loco Pilot 11.11.2001**

**Ans : (b) :** The type of hammer which weighs 3 kg to 9 kg and has a long handle made of wood, which is used in the forge shop, is called sledge hammer.

- This type of hammer is mostly used by blacksmiths.
- It is used for straightening round rods, iron wares, angle iron, channel, plate iron etc.
- Its shape is similar to a double ended hammer.
- It is used for heavy jobs. Therefore its weight is more.
- Its weight ranges from 4 kg to 10 kg.

**40. Soft clamp is used for clamping sheet metal in bench vice because-**

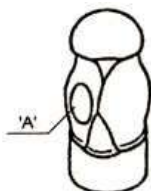
- It prevents breakage
- It prevents pressure marks
- It prevents friction
- It gives high accuracy

**R.R.B. Secunderabad Asst. Loco Pilot 11.11.2001**

**Ans : (b) :** Soft clamp is used for clamping sheet metal in bench vice, because it prevents pressure marks.

- Bench vice is also called engineer's vice.
- It is made by cast iron and cast steel.
- It is used to hold any metal while sanding, cutting and slotting.

**41. Identify the part 'A' of the hammer shown in the figure?**



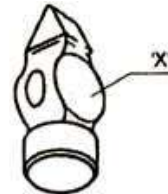
- chin
- eye hole
- peen
- mouth

**R.R.B. Secunderabad Asst. Loco Pilot 11.11.2001**

**Ans : (b) :** Part 'A' of the hammer shown in above figure is known as the eye hole.

- An elliptical hole is made in the top part of the hammer to fit the handle which is called eye hole.
- A wedge is sometimes used to fit the handle into this hole. So that the hammer does not come out of the handle.

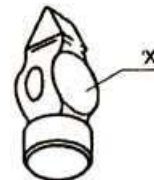
**42. Identify the part labeled with 'X' of the cross peen hammer shown-**



- peen
- mouth
- eye hole
- cheek

**R.R.B. Gorakhpur Asst. Loco Pilot 21.10.2001**

**Ans : (d)** The 'X' part of the cross peen hammer shown is called the cheek.



- Cheek is the softest part present in the head of the hammer which is on both sides at the top.
- This is the part between the peen and the panel.

**43. Diagonal cutting pliers are known by some other name?**

- End cutting pliers
- Flat nose pliers
- Round nose pliers
- Side cutting pliers

**R.R.B. Mumbai Asst. Loco Pilot 03.06.2001**

**Ans. (d) :** Diagonal cutting pliers are also known as side cutting pliers.

- Side cutting pliers are used to cut small diameter wires and cables which are near the terminals.
- Diagonal cutting pliers are made in lengths of 100, 125, 140, 160, 180 and 200 mm.

**44. The length of the blade of a tenon saw is usually-**

- 30 cm
- 25 cm
- 35 cm
- 40 cm

**R.R.B. Mumbai Asst. Loco Pilot 03.06.2001**

**Ans. (a)** The length of the blade of a tenon saw is usually 30 cm.

- A string of 30-40 cm length is suitable for an electrician.
- It is used to cut wood, mica and plastic objects and give them the required shape.

**45. What is a key hole saw used for ?**

- For straight line cutting
- For curved line cutting
- To cut the shape
- Both (b) and (c)

**R.R.B. Mumbai Asst. Loco Pilot 03.06.2001**

**Ans. (d) :** Key-hole saw is used for curved line cutting and for cutting shapes.

- Key-hole saws are small saws with blades approximately 3-4 mm wide and 15-20 cm long.
- It is used to give rectangular shapes as per requirement to the holes made by drill machine in electrical wiring boards having sanmica top.

**46. Consider the following statements-**

**Statement I : Iron metal is used to make mallet.**

**Statement II : Hacksaw is used for cutting iron logs, sheets etc.**

**Which of the above statements is/are true?**

- (a) Statement I is true
- (b) Statement II is true
- (c) Both statement I and II are true
- (d) Both statement I and II are false

**R.R.B. Mumbai Asst. Loco Pilot 03.06.2002**

**Ans. (b) :** The above given statement II is true.

- Hacksaw is used for cutting iron logs, wooden items, thin iron sheets etc.
- A hammer made of wood is called a mallet.
- Mallets are mostly used for metal sheets.
- It is generally made of rosewood, tamarind, kikar, teak or any other hard wood.
- The hacksaw, primarily consists of an adjustable frame, handle, high carbon steel blade and adjustable blade holder.
- The length of its blade is usually 30 cm.

**47. Phase tester should not be used for testing voltage more than ..... volts.**

- (a) 300
- (b) 400
- (c) 500
- (d) 100

**R.R.B. Gorakhpur Asst. Loco Pilot 14.04.2003**

**Ans. (c) :** Phase tester should not be used for testing voltage more than 500 volts.

- Phase tester looks like a screwdriver and sometimes it is also used as screwdriver.
- The actual function of phase tester is to check the phase in any wire.
- If you don't know whether electricity is coming through any wire or not, then you can check by placing a phase tester on that wire.

**48. Consider the following statements-**

**Statement-I : Scriber is a pointed and sharp marking tool made of steel.**

**Statement-II : The blade used in the tri-square is called guniya.**

**Which of the above statements is/are true?**

- (a) Statement I is true
- (b) Statement II is true
- (c) Both statement I and II are true
- (d) Both statement I and II are false

**R.R.B. Kolkata Asst. Loco Pilot 29.09.2002**

**Ans. (c) :** The above given both statements I and II are true.

- Scriber is a pointed and sharp tool made of steel and the blade used in the tri-square is called guniya.
- Just as lines are drawn on paper with a pencil, similarly a scriber is used to draw lines on metal.

- Scribers are usually made of hard carbon steel or tool steel.

- Both legs of scriber are pointed at an angle of 12° or 15°.

- Tri-square is a steel blade of 15, 20, 30 cm length. It is also called guniya.

- It is used to check right angles in electrical wiring etc.

**49. The ..... of the job is checked by tri-square-**

- (a) Straightness
- (b) Acuteness
- (c) Obtuseness
- (d) None of these

**R.R.B. Chennai/Bangalore Asst. Loco Pilot 27.10.2002**

**Ans. (a)** The straightness of the job is checked by the tri-square.

- Tri-square is a checking tool, it is made up of two parts. In which the first part is the blade and the second part is the stock.

- The blade and stock are set at a 90° angle.

- The blade is made of high carbon steel and the stock is made of mild steel.

- The blade ranges from 10 cm to 30 cm long.

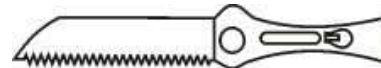
- Symbols in cm, mm or inches are marked on its surface.

**50. What is used to provide the required rectangular shape to the circular holes made by the drill machine?**

- (a) Saw
- (b) Key-hole saw
- (c) Tenon saw
- (d) None of these

**R.R.B. Mumbai Asst. Loco Pilot 03.06.2002**

**Ans. (b) :** Key-hole saw is used to provide the required rectangular shape to the circular holes made by the drill machine.



Key hole saw

- The key-hole saw is a long, narrow saw used for cutting small, often awkward features in various wooden materials.

**51. By which of the following is the work of permanent marking accomplished ?**

- (a) Scriber
- (b) Divider
- (c) Marking plate
- (d) Punch

**R.R.B. Ranchi Asst. Loco Pilot 19.01.2003**

**Ans. (d) :** Punch tool is used for the permanent marking

- Punching tool materials must be selected to suit the punching conditions, workpiece, lubrication and production quantity.

- Punch tools are used to indent or create a hole on a hard surface.

- It consists of a hard metal rod with a narrow tip at one end and a broad flat 'butt' at the other end.

**52. For light punch marks, a 30° prick punch is used, while for evidence marks, a ..... prick punch is used-**

- (a) 60°
- (b) 90°
- (c) 120°
- (d) 75°

**R.R.B. Chandigarh Asst. Loco Pilot 25.05.2003**



**Ans. (a) :** For light punch marks, a 30° prick punch is used, while for evidence marks, a 60° prick punch is used.

- The punch is made of hardened carbon steel and its tip is narrow.
- It is used to make marks before drilling holes.
- Center punch and prick punch are used in electrical related work.
- Center punches are at an angle of 90° to the punch point.
- The punch mark made at this angle is wide but not deep.

53. **Match List -I with List- II-**

List-I (Tool nature)		List-II (Tool)	
A.	Cutting	(i)	Divider
B.	Marking	(ii)	Steel scale
C.	Punching	(ii)	Hacksaw
D.	Measurement	(iv)	Drill machine

**Code-**

- (a) A-(iii); B- (i); C- (iv); D- (ii)  
 (b) A-(i); B- (ii); C- (iii); D- (iv)  
 (c) A- (iv); B- (iii); C- (ii); D- (i)  
 (d) A- (iii); B- (ii); C- (i); D- (iv)

**R.R.B. Ranchi Asst. Loco Pilot 21.09.2003**

**Ans. (a) :** Cutting work is done by hacksaw.

- Marking work is done by divider.
- Punching (Drilling) work is done by drill machine.
- Measurement work is done by steel scale.

54. **The point angle of center punch is-**

- (a) 30° (b) 45°  
 (c) 60° (d) 90°

**R.R.B. Gorakhpur Asst. Loco Pilot 12.10.2003**

**Ans. (d) :** The point of the center punch makes an angle of 90°.

- Center punch is used for marking.
- It is larger in size than dot punch.
- The angle of its point is kept at 90°. So that the drill point can easily sit in the center marked by the punch.
- The length of this punch is 125 mm and diameter is 10 mm.
- This punch is used to locate the centers of the holes.
- It is also used to deepen the center point.

55. **Which of the following tools is not included in tool kit tools?**

- (a) Screwdriver (b) Multimeter  
 (c) Saw (d) Tweezers

**R.R.B. Bangalore Asst. Loco Pilot 25.01.2004**

**Ans. (c) :** Saw is not included in tool kit tools.

- The tool kit of tools includes screwdriver, multimeter, tweezers, tri-square, file, sander, scriber, divider, steel scale, etc.

56. **Identify the type of file shown in the figure?**



- (a) Flat file (b) Half round file  
 (c) Round file (d) Rasp cut file

**R.R.B. Ajmer Asst. Loco Pilot 23.05.2004**

**Ans. (a)** The above figure shown is a flat file.

- It is used extensively and its cross section is rectangular.
- It is made slightly tapered both in width and thickness.
- It has a flat surface with parallel edges.
- Flat files are used to shape and smooth flat surfaces.

57. **Which of the following files is used for filing large quantities of metal?**

- (a) Double cut file (b) Dead smooth file  
 (c) Bastard file (d) Rough file

**R.R.B. Ajmer Asst. Loco Pilot 23.05.2005**

**Ans. (c) :** Bastard file is used for filing large quantities of metal.

- It is used to make the workpiece cleaner and smoother.
- These files have 12 teeth per cm.
- It is a medium grade file.
- It can be used on both hard and soft types materials. Therefore this is the most useful file.
- Its length ranges 100 mm to 450 mm.

58. **The hand tool shown in figure is-**



- (a) File (b) Punch  
 (c) Tri-square (d) Divider

**R.R.B. Trivandrum Asst. Loco Pilot 20.06.2004**

**Ans. (a) :** The hand tool shown in above figure is a file.

- It is used to smooth the job.
- The process of removing material in the form of powered by rubbing a tool with a rough surface from the surface of a workpiece is called filing.
- File is mostly made by forging hard carbon steel.
- Sometimes tungsten steel is also used in making file.
- File mainly consists of face, tang, handle, teak, tip, edge, shoulder and other parts.

59. **Which of the following types of file is not according to grade?**

- (a) Rough (b) Bastard  
 (c) Dead smooth (d) Double

**R.R.B. Ajmer Asst. Loco Pilot 10.10.204**

**Ans. (d)** Double type file is not according to grade.

**Rough file:-**

- This file has 8 teeth per cm.
- It is a file with the coarsest teeth.
- It cuts most metals.
- It slips on hard surfaces.
- It is 100 to 450 mm in length.

**Bastard file:-**

- It has 12 teeth per cm.
- It is a medium grade file.
- It is used in both hard and soft metals.
- It is 100 to 450 mm in length.

**Dead-smooth file:-**

- It has 28-35 teeth per cm.
- It is used to smooth the surface after rough filing.
- It is 100 to 300 mm in length.

60. **Which of the following is not a marking tool ?**

- (a) Scriber (b) Ship  
 (c) Punch (d) Divider

**R.R.B. Ahmadabad Asst. Loco Pilot 17.10.2004**

**Ans. (b) :** Snip is not a marking tool. It is a cutting tool.

- Snip is used to cut sheets by hand.
- Its structure is similar to scissors.
- It is used to cut any metal or object.
- It is made of hard carbon steel.
- Its cutting edges are hardened and tempered and the edges of its cutting blade are ground at approximately 80°.

- Its entire length represents its size.
- Scriber, punch and divider etc are the examples of marking tools.

61. The length of wire stripper is usually-

- (a) 20 cm (b) 15 cm  
(c) 10 cm (d) 5 cm

R.R.B. Kolkata Asst. Loco Pilot 06.02.2005

Ans. (a) : The length of wire stripper is usually 20 cm.

- In electrical wiring, wire stripper tools are used to remove the insulation of wires.
- It has a gauge setter with the help of which the gauge of the wire to be stripped is set.

62. For what works are snips used?

- (a) in cutting winding wires  
(b) in cutting mica sheet  
(c) in cutting hard insulation sheet  
(d) all of the above

R.R.B. Mumbai Asst. Loco Pilot 05.06.2005

Ans. (d) : Snip is used for the following works-

- in cutting winding wires
- in cutting mica sheet
- in cutting hard insulation sheet

Note:- Snips are also known as shears.

- Snips are made in various shapes and sizes for various purposes.
- Universal snips can cut in both straight and wide curves.

63. Which of the following tools does not come under folding tool?

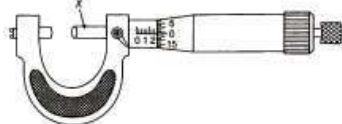
- (a) C-clamp (b) Vice  
(c) Angle steel (d) None of these

R.R.B. Ajmer Asst. Loco Pilot 05.06.2005

Ans. (b) : Vice tool does not come under the folding tool. It is used to hold the job properly.

- C-clamp, angle steel is used for folding works.

64. Identify the part marked 'X' in the micrometer shown in the figure.

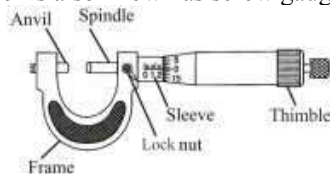


- (a) Thimble scale (b) Mail scale  
(c) Spindle (d) Frame

R.R.B. Ranchi Asst. Loco Pilot 04.09.2005

Ans. (c) : In the above given figure of micrometer, 'X' is known as spindle.

- Micrometer is also known as screw gauge.



- It is an instrument used to measure the diameter of thin wires or the thickness of sheet metal.
- It consists of a U-shaped frame with a screw pivot attached to metal rings.

65. In general works ..... cm jaw bench vice is used.

- (a) 10 cm (b) 15 cm  
(c) 20 cm (d) 5 cm

R.R.B. Ranchi Asst. Loco Pilot 04.09.2005

Ans. (a) : In general works 10 cm jaw bench vice is used.

- Bench vice is a machine tool which is used to hold the job properly.
- Bench vice is also called parallel head vice.
- It is installed on the bench. It has two main parts, fixed jaw and movable jaw. Both these jaw tools are made of steel.
- Its body is made of cast iron.
- The jaw plate is held tight with screws and has teeth cut into it so that the grip remain firm.

66. One should not try to make holes in objects made of ..... through an electric drill machine.

- (a) Tool-steel (b) Wood  
(c) Plastic (d) All of these

R.R.B. Guwahati Asst. Loco Pilot 22.01.2006

Ans. (a) : One should not try to make holes in objects made of tool steel with an electric drill machine because items made of tool steel are hard and there is a risk of the drill machine bit breaking.

- Electric drill machining is a portable instrument.
- It is a 220 volt to 250 volt machine that operates with AC supply.
- A twist drill bit is fitted in its wheel part. The wheel is used to insert or remove the bit.
- Holes up to 22 mm can be made with the electric drill machine.
- Electric drill machine should not be operated continuously for a long time.
- It should be kept straight while working.
- Water should be used while drilling holes.

67. That part of the drill bit, which is held and moved by the drilling machine is called .....

- (a) Shank (b) Bit  
(c) Tip (d) Flute

R.R.B. Kolkata Asst. Loco Pilot 16.07.2006

Ans. (a) : That part of the drill bit, which is held and moved by the drilling machine is called shank.

- The drilling machine is operated by holding the shank part of the drill bit.
- Shank is the outermost part of the drill. This part of the drill is plane.
- Shank is trapped or held in the drill machine.
- Shanks are of the following two type-  
1. Straight shank  
2. Taper shank.

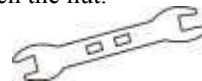
68. Which spanners are suitable for an electrician?

- (a) Single ended spanner  
(b) Double ended spanner  
(c) Ring spanner (d) Special spanner

R.R.B. Mumbai Asst. Loco Pilot 16.07.2006

Ans.(b): Double ended spanner is suitable for an electrician.

- It is used to open the nut.



- Spanners are usually available in sets numbered 6, 12, 19 etc.
- The shape of spanners jaw is called its size.
- There are many types of the spanners, like single ended, double ended, ring, valve special etc.
- Double ended spanners with jaws ranging from 3 mm to 25 mm are generally suitable for electricians.
- Spanners are used to tighten and loosen nuts and bolts.

69. Which of the following tools does not come under hand tools?

- (a) Screwdriver (b) Automatic soldering iron  
(c) Tweezers (d) Saw

R.R.B. Malda Asst. Loco Pilot 16.07.2006

Ans. (b) : Automatic soldering iron does not come under hand tools.

Hand tools are used for the following tasks-

- Screwdriver is used to tighten the screw.
- Tweezers are used to hold small objects
- Saw is used to cut a wooden or Iron sheet.
- Drill machine is used to make holes on the objects or walls.

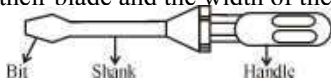
70. The length of the shank of screwdriver required for an electronic mechanic is-

- (a) 8 cm and 20 cm (b) 12 cm and 20 cm  
(c) 10 cm and 20 cm (d) None of these





ISRO Electroplating Technician-B 2016

Ans. (a) : The length of the shank of the screwdriver required for an electronic mechanic is 8 cm and 20 cm.

- There are many types of screwdrivers like flat-tip, cross-tip, U-tip etc.
- The size of screwdrivers is expressed on the basis of the length of their shank or blade.
- Generally screwdrivers with shank length of 5 cm to 30 cm are used.
- The measurement of flat-tip screwdrivers refer to the length of their blade and the width of their tip.



71. Match List-I with List-II

	List- I		List- II
A.		(i)	Tenon saw
B.		(ii)	Screwdriver
C.		(iii)	Scriber
D.		(iv)	Poker

Code-

- (a) A- (i); B- (ii); C- (iii); D- (iv)  
(b) A- (iv); B- (iii); C- (ii); (D)- (i)  
(c) A- (i); B- (iv); C- (iii); D- (ii)  
(d) A- (iii); B- (ii); C- (i); D- (iv)

R.R.B. Patna Asst. Loco Pilot 11.11.2001

Ans. (a) Tenon saw:- It is used for cutting wood, mica and plastic objects.



Screwdriver:- It is used to tighten or loosen the screw.



Scriber:- It is used to draw marking lines on the job.



Poker:- It is also called sumbi or bradl.

• It is used to make a small groove for the screw before screwing it in wooden fittings.



72. What is riveton process used for in electronic devices?

- (a) To make holes  
(b) For cabinet making

- (c) For manufacturing printed circuit boards  
(d) None of the above

R.R.B. Bangalore Asst. Loco Pilot 08.07.2007

Ans. (b) : Riveton process is used for cabinet making in electronic devices.

- Rivets are used to join thin sheets or plates.
- Rivets are usually made of mild steel, wrought Iron, Copper, Aluminium by the method of forging.
- To fit the rivet, its tail is upset (deformed) by inserting it into a punched or drilled hole.
- Due to which it expands to about 1.5 times the actual diameter of the shaft, fitting the rivet properly.

73. .... is done by riveting the tag.

- (a) Permanent combination  
(b) Semi-permanent combination  
(c) Temporary combination  
(d) None of these

R.R.B. Ranchi Asst. Loco Pilot 08.07.2007

Ans. (b) : The semi-permanent combination is done by riveting the tag.

- Riveting is a type of operation in which two plates are joined with the help of rivet.
- The joint can be made strong and leak proof with the help of force in this process.

74. Wire gauge is used to measure .....

- (a) Length of the wire  
(b) Cross-sectional area of the wire  
(c) Diameter of the wire  
(d) Thickness of dielectric layer

R.R.B. Ranchi Asst. Loco Pilot 08.07.2007

Ans : (c) Wire gauge is used to measure the diameter of the wire.

- A wire with a smaller gauge has a larger diameter and it can carry more power than one with a larger gauge.

75. Britannia joint is used .....

- (a) in the overhead line  
(b) in the underground line  
(c) in the conduit wiring  
(d) in the power wiring

R.R.B. Allahabad Asst. Loco Pilot 09.12.2007

Ans : (a) Britannia joint is used in overhead lines where higher tension strength is required.

- In this type of joint both the wires are joined and the surface is cleaned with fine sand paper.
- The rear part of the joined conductors is bent at right angles.
- It is also used both for inside and outside wiring where single conductors of diameter 4 mm or more are used.

76. Identify the hand tool shown in the figure-



- (a) Phase tester (b) Test lamp  
(c) Poker (d) Scriber

R.R.B. Gorakhpur Asst. Loco Pilot 14.04.2002

Ans. (c) : The figure shown above is a poker.

- A poker is used to make holes in a wooden or bakelite sheet. So that the screw can be easily tightened in that wooden or bakelite sheet.
- It can be made with a good quality stick, whose tip is very sharp.
- Its handle is often made of wood or plastic.

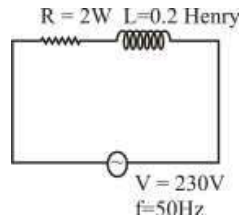
# 03.

# Alternating Current and Related Circuits

1. If an AC voltage of 230 V & 50 Hz frequency is applied to a series Resistance of 2 ohms and 0.2 H inductance, calculate the impedance.
- (a) 46 K ohms (b) 46 ohms  
(c) 62.8 ohms (d) 628 ohms

ISRO URSC-18.04.2024, 1:00 PM - 2:30 PM

Ans. (c) :



Given,

$$V = 230V, \quad F = 50, \quad L = 0.2$$

Put value,

$$\begin{aligned} XL &= 2\pi fL \\ &= 2 \times 3.14 \times 50 \times 0.2 \\ &= 62.8\Omega \end{aligned}$$

2. If the power factor of the circuit is one its reactive power is .....
- A. Zero  
B. Same as IR  
C. A negative quantity  
D. A very large quantity
- (a) A (b) B  
(c) C (d) D

ISRO SDSC-14.02.2024, 04:00-05:30 PM

Ans. (a) : If the power factor of the circuit is one its reactive power is zero.

Given,

$$\cos \phi = \frac{P}{S}$$

$$1 = \frac{P}{S}$$

$$S = P \quad \dots\dots(i)$$

$$S^2 = P^2 + Q^2 \quad \dots\dots(ii)$$

Putting the value of S in equation (ii)

$$P^2 = P^2 + Q^2$$

$$Q^2 = 0$$

$$\boxed{Q = 0}$$

3. In a circuit, the input voltage is 1V rms and the output voltage is 1 mV rms. The net gain of the circuit is-
- A. 30 dB  
B. +60 dB  
C. -60 dB  
D. +30 dB
- (a) A (b) B  
(c) C (d) D

ISRO SDSC-14.02.2024, 04:00-05:30 PM

Ans. (c) : Given,  
Input voltage  $V_i = 1V$   
Output voltage  $V_o = 1mV$   
Therefore,

$$\text{The net gain of the circuit in dB} = 20 \log_{10} \left( \frac{V_o}{V_i} \right) \text{dB}$$

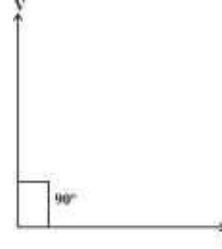
$$\begin{aligned} &= 20 \log_{10} \left( \frac{10^{-3}}{1} \right) \\ &= -20 \times 3 \log_{10} 10 \\ &= -60 \text{dB} \end{aligned}$$

4. In a purely inductive circuit,
- (a) voltage leads current by  $90^\circ$   
(b) current leads voltage by  $90^\circ$   
(c) voltage lags current by  $90^\circ$   
(d) voltage and current are in phase ( $0^\circ$ )

ISRO VSSC-26.11.2023

Ans. (a) : In a purely inductive circuit, voltage leads current by  $90^\circ$

• In a purely inductive circuit, the current lags behind the voltages by an angle of  $90^\circ$



5. A device is powered by a 48V supply with 100mA current. How much power is wasted as heat if the useful output power provided by the device is 1.5 W?

- (a) 1.5 W (b) 3.3 W  
(c) 6.3 W (d) 2.1 W

ISRO VSSC-26.11.2023

Ans. (b) : Given,

$$V = 48 \text{ volt}$$

$$I = 100 \text{ mA} = 0.1 \text{ A}$$

$$\text{Useful output power} = 1.5 \text{ W}$$

$$\text{So, Total power (P)} = VI$$

$$P = 48 \times 0.1$$

$$P = 4.8 \text{ W}$$

$$\text{Wasted power} = 4.8 \text{ W} - 1.5 \text{ W} = 3.3 \text{ W}$$

6. The SI unit of \_\_\_\_\_ is siemen meter<sup>-1</sup>
- (a) Resistance (b) Resistivity  
(c) Conductance (d) Conductivity

ISRO VSSC-26.11.2023

Ans. (d) : The SI unit of Conductivity is siemen meter<sup>-1</sup>. Conductivity is defined as a material's ability to conduct electricity or heat.

7. In an AC circuit, a capacitor has an impedance of 100 ohms at a frequency of 100Hz. What will be the impedance of the same capacitor if the frequency is doubled to 200 Hz?
- (a) 100 ohms (b) 200 ohms  
(c) 50 ohms (d) 25 ohms

ISRO VSSC-26.11.2023

Ans. (c) :

$$\begin{aligned} \therefore X_C &= \frac{1}{\omega C} = \frac{1}{2\pi f C} \\ \therefore \frac{(X_C)_1}{(X_C)_2} &= \frac{f_2}{f_1} \\ \frac{100}{(X_C)_2} &= \frac{200}{100} \\ (X_C)_2 &= 50 \text{ ohms} \end{aligned}$$

8. The mean value of alternating current for completing the full cycle will be
- (a) Infinity (b) Zero  
(c) One (d) 0.5

ISRO IPRC-10.04.2022

Ans. (b) : The mean value of alternating current for completing the full cycle will be zero. Alternating current can't be measured by DC ammeter.

- An electric current where magnitude and direction changes continuously is known as alternating current.
- The frequency of Alternating current in India is 50 Hz.

9. The root mean square value of alternating current is equal to
- (a) Twice the peak value  
(b) Half the peak value  
(c)  $1/\sqrt{2}$  times the peak value  
(d) Peak value

ISRO IPRC-10.04.2022

Ans. (c) : The root mean square value of alternating current is equal to  $1/\sqrt{2}$  times the peak value.

- The root mean square value of an AC circuit is the effective value of that circuit.

$$V_{\text{rms}} = \frac{V_m}{\sqrt{2}} \quad I_{\text{rms}} = \frac{I_m}{\sqrt{2}}$$

10. The characteristics of alternating current is
- (a) Magnitude changes with time and reverses the direction periodically  
(b) Frequency is zero  
(c) Direction remains constant  
(d) None of the above

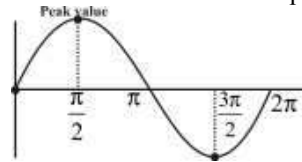
ISRO IPRC-10.04.2022

Ans. (a) : The characteristics of alternating current is magnitude changes with time and reverses the direction periodically. The alternating current produces sine waves. The flow of electric charge will oscillate between the maximum and the minimum value.

11. Single-phase AC power has voltage peaks at
- (a)  $90^\circ$  and  $270^\circ$   
(b)  $0^\circ$  and  $180^\circ$   
(c)  $180^\circ$  and  $360^\circ$   
(d) None of the above

ISRO IPRC-10.04.2022

Ans. (a) : A single phase AC power system peaks in voltage at  $90^\circ$  and  $270^\circ$  with a complete cycle at  $360^\circ$ .



Peak value is defined as the maximum value that the alternating quantity reaches in one cycle either positive or negative.

12. 1 C (Coulomb) is equal to the charge of
- (a)  $6.27 \times 10^{18}$  electrons  
(b)  $6.25 \times 10^{18}$  electrons  
(c)  $6.28 \times 10^{16}$  protons  
(d)  $6.25 \times 10^{18}$  neutrons

ISRO IPRC-10.04.2022

Ans. (b) : A quantity of 1 coulomb charge is equal to  $6.25 \times 10^{18}$  electrons. It is the value of electricity that a 1-Ampere current carries in one second.

13. Which of the following statements in correct regarding the instantaneous power of a current.
- I - It is simply the product of instantaneous voltage and instantaneous current.  
II - It is always expressed in watts.
- (a) Only-(I) (b) Both (I) and (II)  
(c) Neither (I) nor (II) (d) Only (II)

ISRO NRSC- 02.03.2024, 12:30-2:00PM

Ans. (b) : Both statements are correct regarding the instantaneous power of a current.

- Electric power measures the rate of electric circuit per unit of time

- $P = VI = \frac{V^2}{R} = I^2 R$

- $P = \frac{E}{t}$

- Its SI unit is watt (W).

14. The SI unit of current is .....

- (a) Ohm (b) Volt  
(c) Ampere (d) Coulomb

ISRO NRSC- 02.03.2024, 12:30-2:00PM

Ans. (c) : The rate of flow of charge in a circuit is called current. It is represented by I, its unit is ampere.

15. The power factor of an equipment with rating 230 V, 1.5 A, 276 W is
- (a) 0.8 (b) 1.0  
(c) 0.6 (d) 0.75

ISRO VSSC-14.07.2021

Ans. (a) : Given,  
Voltage  $V = 230$  V  
Current  $I = 1.5$  A  
Power  $P = 276$  W

Solution- Power factor ( $\cos\phi$ ) = ?

$$\begin{aligned} \cos\phi &= \frac{P}{VI} \\ &= \frac{276}{230 \times 1.5} = 0.8 \end{aligned}$$

16. **Duty cycle of a waveform is defined as**

- (a) ON Time ÷ Off Time
- (b) Off Time ÷ ON Time
- (c) ON Time ÷ (ON Time + Off Time)
- (d) Off Time ÷ (ON Time + Off Time)

ISRO VSSC-14.07.2021

**Ans. (c) :** The duty cycle is defined as the time the output is active divided by the total time period of the output signal.

$$\text{Duty cycle} = \frac{T_{\text{ON}}}{T} \times 100\%$$

Where,  $T_{\text{ON}}$  = ON time

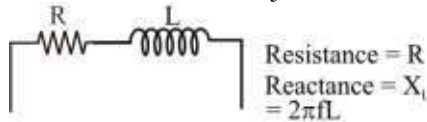
$T$  = Total time period = ON Time + Off Time

17. **Impedance of a circuit having resistance R and inductance L in series is**

- (a)  $R - j\omega L$
- (b)  $R + j\omega L$
- (c)  $R - 1/(j\omega L)$
- (d)  $R + 1/(j\omega L)$

ISRO VSSC-14.07.2021

**Ans. (b) :** Impedance of a circuit having resistance R and inductance L in series is  $R + j\omega L$ .



Impedance ( $Z$ ) =  $R + j\omega L$ .

18. **A Capacitor function is to .....**

- (a) stops AC and passes DC
- (b) passes both, DC and AC
- (c) stops both, AC and DC
- (d) stops DC and passes AC

RRB Asst. L.P. 23.01.2019, 4:30 PM-7:00 PM

**Ans. (d) :** A capacitor function is to stops DC and passes AC.

$$\therefore X_C = \frac{1}{\omega C} = \frac{1}{2\pi fC}$$

for DC,  $\omega = 0$

$$\therefore X_C = \infty \text{ (open circuit)}$$

Then D.C. will not pass.

$$\Rightarrow X_C = \frac{1}{j\omega C}$$

for A.C, the frequency is non zero, therefore the capacitive reactance is not infinity, and therefore the current flows. The capacitor allows AC to pass.

19. **What is the peak to peak value of a sine waveform whose average value is 12.74 volts?**

- (a) 10V
- (b) 20 V
- (c) 30 V
- (d) 40 V

RRB Asst. L.P. 21.01.2019, 12:30 PM-3:00 PM

**Ans. (d) :** Given data,

Average value of sine wave = 12.74V

Peak to Peak voltage ( $V_{P-P}$ ) = ?

$$V_{\text{avg}} = \frac{V_{P-P}}{\pi}$$

$$V_{P-P} = 12.74 \times 3.14 = 40.00 = 40V$$

20. **What is the ratio of RMS Value to the Average Value is known as?**

- (a) Form factor
- (b) Maximum value

- (c) Peak factor
- (d) Effective value

RRB Asst. L.P. 21.01.2019, 12:30 PM-3:00 PM  
R.R.B. Chandigarh Asst. Loco Pilot 14.09.2008

**Ans. (a) :** The ratio of RMS Value to the Average Value is known as form factor.

- The form factor of a sine wave is 1.11.
- The form factor of a square wave is unity because it has the same RMS and average value.
- The ratio of Peak value to RMS value is called peak factor.
- The peak factor of a sine wave is 1.414.

21. **RMS of sine wave equals to**

- (a) peak voltage/square root of 2
- (b) Peak voltage/square root of 6
- (c) Peak voltage/square root of 3
- (d) Peak voltage/square rot of 5

RRB Asst. L.P. 21.01.2019, 3:00 PM-4:30 PM

**Ans. (a):** RMS value of sine wave equal to peak Voltage/square root of 2. The RMS Value of current and voltage are respectively expressed by symbolic letters  $I_{\text{rms}}$  and  $V_{\text{rms}}$ .

- It is called Effective value, Real value, measuring value and RMS value.

$$V_{\text{rms}} = \frac{V_m}{\sqrt{2}} = 0.707 V_{\text{max}} \text{ V}$$

$$I_{\text{rms}} = \frac{I_{\text{max}}}{\sqrt{2}} = 0.707 I_{\text{max}} \text{ A}$$

22. **What will be the power required by a bulb load having a resistance of 50  $\Omega$  if the voltage applied is 220 V?**

- (a) 968 W
- (b) 200 W
- (c) 1068 W
- (d) 828 W

RRB Asst. L.P. 21.01.2019, 3:00 PM-4:30 PM

**Ans. (a) :**  $\therefore$  Resistance of bulb = 50  $\Omega$   
applied voltage = 220 V

$$\therefore P = \frac{V^2}{R}$$

$$P = \frac{220 \times 220}{50}$$

$$P = 220 \times 4.4$$

$$P = 44 \times 22$$

$$P = 968 \text{ Watt}$$

23. **What is the number of cycles completed by a 50-Hz line in 10 seconds?**

- (a) 500
- (b) 5000
- (c) 5
- (d) 50

RRB Asst. L.P. 21.01.2019, 3:00 PM-4:30 PM

**Ans. (a) :** Given that :

$$f = 50\text{Hz}, t = 10 \text{ Sec.}$$

$$\therefore f = \frac{\text{Number of Cycles}}{\text{Time in Sec. (t)}}$$

$$\therefore \text{No. of Cycle} = f \times t = 50 \times 10$$

$$\therefore \text{No. of Cycle} = 500 \text{ Ans.}$$

24. If current = 1.414 A and resistance = 50Ω, then find power

- (a) 400Watts (b) 300Watts  
(c) 100Watts (d) 200Watts

RRB Asst. L.P. 21.01.2019, 3:00 PM-4:30 PM

Ans. (c) : Given, current (I) = 1.414A =  $\sqrt{2}$  A,

Resistance (R) = 50Ω

$$P = I^2 R = (1.414)^2 \times 50$$

$$= (\sqrt{2})^2 \times 50 = 2 \times 50 = 100 \text{ watt}$$

$$= 100 \text{ watt}$$

25. How much is the Peak-to-Peak voltage for AC voltage of 220V RMS? (Take the square root of 2 as 1.4).

- (a) 110 V (b) 250 V  
(c) 308 V (d) 616 V

RRB Asst. L.P. 23.01.2019, 12:30 PM-3:00PM

Ans. (d) : Given,

$$V_{\text{rms}} = 220 \text{ V}$$

$$\therefore V_m = \sqrt{2} V_{\text{rms}}$$

$$V_m = 1.4 \times 220$$

$$\therefore V_m = 308.0$$

For peak to peak voltage =  $2V_m$

$$= 2 \times 308 = 616 \text{ V}$$

26. Which force is responsible for the flow of electron through conductor from point A to point B.

- (a) Resistance (b) Heat  
(c) Current (d) Voltage

RRB Asst. L.P. 23.01.2019, 12:30 PM-3:00PM

Ans. (d) : Voltage is responsible for the flow of electrons from point A to B through a conductor.

**Voltage**—Voltage is an electrical force, Due to which the current flows between any two points. When there is a potential difference between two points, the voltage exerts a force due to which the charge moves from one point to the other, due to which the current starts flowing in the circuit.

27. .... is defined in the form of number of cycles per second.

- (a) instantaneous value  
(b) Voltage  
(c) Frequency  
(d) RMS value

RRB Asst. LP- 23.01.2019, 4:30 PM-7:00PM

Ans. (c) : Number of revolutions per second is called frequency.

$$f = \frac{\text{Number of cycle}}{\text{Times in one second}}$$

$$f = \frac{1}{T}$$

28. If resistance = 50 ohms and power = 100watt then find the current-

- (a) 2 A (b) 1.414 A  
(c) 1.314 A (d) 3 A

RRB Asst. L.P. 23.01.2019, 8:30 AM-11:00 AM

Ans. (b) : Given,

Resistance = 50 Ω

Power = 100 watt

Current = ?

$$\text{Power} = (\text{current})^2 \times \text{Resistance}$$

$$I^2 = \frac{100}{50}$$

$$I^2 = 2$$

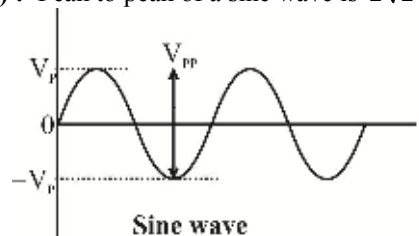
$$I = \sqrt{2} = 1.414 \text{ A}$$

29. Peak to peak of sine wave = .....

- (a)  $2\sqrt{3}$  RMS (b)  $2\sqrt{2}$  RMS  
(c)  $\sqrt{6}$  RMS (d)  $2\sqrt{5}$  RMS

RRB Asst. L.P. 23.01.2019, 8:30 AM-11:00 AM

Ans. (b) : Peak to peak of a sine wave is  $2\sqrt{2}$  RMS.



$$V_{\text{rms}} = \frac{V_p}{\sqrt{2}}$$

$$V_p = \sqrt{2} V_{\text{rms}}$$

$$\text{Peak to Peak } (V_{pp}) = 2\sqrt{2} V_{\text{rms}}$$

30. What is commonly used for connecting solar controller to battery storage station-

- (a) Waveguide (b) co-axial cable  
(c) AWG cable (d) Twisted cable

RRB Asst. LP- 23.01.2019, 8:30 AM-11:00AM

Ans. (c) : AWG (American Wire Gauge) cable is used to connect solar controller to battery storage station.

■ ASWG – American Standard Wire Gauge.

31. Inductive reactance of an inductor is given by

- (a)  $2\pi fL$  (b)  $\frac{1}{2\pi fL}$   
(c)  $\sqrt{2\pi fL}$  (d)  $\frac{1}{\sqrt{2\pi fL}}$

ISRO. 23.02.2020

ISRO LPSC. 04.03.2018

Ans (a) : The inductive reactance of inductor is represented by  $2\pi fL$ .

• Inductive reactance is that property of the coil which present a barrier in the flow of electric current through the circuit, is called inductive reactance.

It is represented by 'X<sub>L</sub>' and its unit is ohm (Ω).

• The inductive reactance of a coil with L Henry inductance.

$$X_L = 2\pi fL = \omega L$$

32. A 100 V peak AC has effective value as \_\_\_\_\_.  
 (a) 100V (b) 141.4V  
 (c) 70.7V (d) 50V

Electronic Mechanic 24.03.2019

Ans. (c) : Effective value or rms value is equal to

$$V_{\text{rms}} = \frac{100}{\sqrt{2}} = 70.7 \text{ Volt}$$

33. At resonance of a series RLC circuit,  
 (a) Capacitive reactance is equal to resistance  
 (b) Capacitive reactance is equal to inductive reactance  
 (c) Capacitive reactance is zero  
 (d) Capacitive reactance is equal to the sum of inductive reactance and resistance

ISRO Electronic Mechanic 02-06-2019

Ans. (b) : The capacitive reactance is equal to the inductive reactance on the resonance condition in the series RLC circuit.

$$X_L = X_C$$

34. A capacitor with reactance of  $3\Omega$  is connected in series with a resistor of  $4\Omega$  across a supply frequency of 50Hz. Find the power factor.  
 (a) 0.75 (b) 0.6  
 (c) 0.8 (d) 0.9

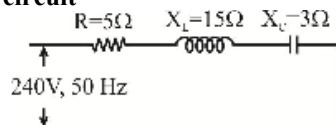
ISRO Electronic Mechanic 02-06-2019

Ans. (c) : Given -  $R = 4\Omega$   $X_C = 3\Omega$

$$\begin{aligned} \text{Impedance } Z &= \sqrt{R^2 + X_C^2} \\ &= \sqrt{4^2 + 3^2} = \sqrt{25} \\ Z &= 5\Omega \end{aligned}$$

$$\begin{aligned} \text{Power factor } (\cos \phi) &= \frac{R}{Z} \\ &= \frac{4}{5} = 0.8 \\ \cos \phi &= 0.8 \end{aligned}$$

35. Find the magnitude of impedance of the given RLC circuit



- (a)  $13\Omega$  (b)  $23\Omega$   
 (c)  $5\Omega$  (d)  $18\Omega$

ISRO Electronic Mechanic 02-06-2019

Ans. (a) : Given,  $X_L = 15\Omega$ ,  $X_C = 3\Omega$ ,  $R = 5\Omega$

$$\begin{aligned} \text{Impedance } Z &= \sqrt{R^2 + (X_L - X_C)^2} \\ &= \sqrt{5^2 + (15 - 3)^2} \\ &= \sqrt{25 + 12^2} \\ &= \sqrt{25 + 144} \\ &= \sqrt{169} \\ Z &= 13\Omega \end{aligned}$$

36. What is the frequency in Hz for the sinusoidal signal  $e = 10\sin 1000\pi t$ ?  
 (a)  $1000\pi$  (b) 1000  
 (c) 500 (d)  $500\pi$

ISRO Electronic Mechanic 10-02-2019

Ans. (c) : Given,  $e = 10 \sin 1000 \pi t$

$$\begin{aligned} \therefore \omega &= 1000 \pi \\ 2\pi f &= 1000 \pi \\ f &= \frac{1000}{2} \\ f &= 500 \text{ Hz} \end{aligned}$$

37. What is the peak voltage of a sinusoidal signal of 7V rms?  
 (a) 9.9 V (b) 7 V  
 (c) 3.5 V (d) 14 V

ISRO Electronic Mechanic 10-02-2019

Ans. (a) : Given, the rms value of sinusoidal signal is 7V.

therefore,

$$\begin{aligned} V_{\text{rms}} &= \frac{V_m}{\sqrt{2}} \\ V_m &= V_{\text{rms}} \cdot \sqrt{2} \\ &= 7 \cdot \sqrt{2} \end{aligned}$$

peak voltage  $V_m = 9.9\text{V}$

38. If two electrically charged objects are connected by a wire, electric current will not flow. If.....  
 (a) Both have same capacitance  
 (b) Both have same temperature  
 (c) Both have same charge quantity  
 (d) Both have same potential

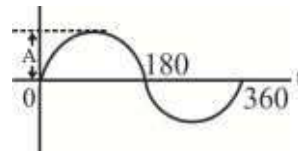
Indian Ordnance Factory (IOF) 2016

Ans. (d) : If two electrically charged objects are connected through a wire, the flow of the current will not happen until the same potential is present over it. If there is inequality in the potential, then the flow of the current is from the higher potential to the lower potential.

39. How many degrees of phase represents one full cycle?  
 (a)  $360^\circ$  (b)  $180^\circ$   
 (c)  $270^\circ$  (d)  $90^\circ$

ISRO Electronic Mechanic 10-12-2016

Ans. (a) :



Phase difference is  $180^\circ$  for half cycle and  $360^\circ$  for full cycle.

40. The factor of 0.707 for converting peak to rms applies only to  
 (a) square wave (b) triangular wave  
 (c) sine wave (d) saw tooth wave

ISRO Electronic Mechanic 10-12-2016



**Ans. (c) :**

(1) rms value for sine wave

$$V_{\text{rms}} = \frac{V_m}{\sqrt{2}}$$

$$V_{\text{rms}} = V_m \times 0.707$$

The root mean square value of sine wave is 0.707V.

(2) form factor =  $\frac{\text{rms value}}{\text{average value}}$

**41. What is the peak voltage of a sine wave that measures 220V AC rms?**

- (a) 155V (b) 169V  
(c) 311V (d) 440V

**ISRO Electronic Mechanic 10-12-2016**

**Ans. (c) :** Given,  $V_{\text{rms}} = 220$

$$V_{\text{rms}} = \frac{V_m}{\sqrt{2}}$$

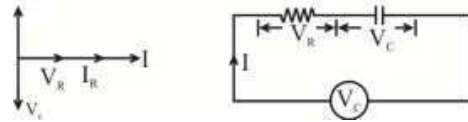
$$\begin{aligned} \text{Then, } V_m &= 220 \times \sqrt{2} \\ &= 220 \times 1.414 \\ &= 311.08 \text{ Volt} \end{aligned}$$

**42. What is the relationship between current (I) and voltage (E) in a circuit consisting of a capacitor in series with a resistor?**

- (a) I and E are in phase across the capacitor  
(b) I leads E across the resistor  
(c) E leads I across the capacitor  
(d) I and E are in phase across the resistor

**ISRO Electronic Mechanic 10-12-2016**

**Ans. (d) :** In a series RC circuit, the voltage across the resistance ( $V_R$ ) is in phase with the current flowing in the circuit and the voltage across the capacitor ( $V_C$ ) is  $90^\circ$  behind of the current flowing in the circuit.



**43. A sine wave has a frequency of 50 Hz. It's angular velocity in radian per second is-**

- (a)  $\frac{50}{\pi}$  (b)  $\frac{50}{2\pi}$   
(c)  $50\pi$  (d)  $100\pi$

**ISRO Electronic Mechanic 21-02-2015**

**Ans. (d) :** Given,  $f = 50\text{Hz}$

$$\begin{aligned} f &= \frac{\omega}{2\pi} \quad \because \omega = \text{angular velocity} \\ \omega &= 2\pi f = 2 \times \pi \times 50 = 2 \times \pi \times 50 \\ \omega &= 100\pi \end{aligned}$$

**44. In an electronics/electrical circuit the angle between voltage and current is called**

- (a) Form factor (b) Power factor  
(c) Peak factor (d) Phase difference

**ISRO Electronic Mechanic 21-02-2015**

**Ans. (d) :** The angle between voltage and current in an electronic/electrical circuit is called phase difference.

**Power factor is also displayed in the following forms-**

- The power factor is equal to the cosine of phase difference between the voltage and the current.

- The ratio of real power and apparent power drawn by the load on an electric circuit is called power factor.
- Power factor =  $\cos \phi$

**45. An RL circuit has a resistance of 3 Ohms and a reactance of 4 ohms, the impedance of the circuit is**

- (a) 5 Ohms (b) 7 Ohms  
(c) 1 Ohms (d) 1.33 Ohms

**ISRO Electronic Mechanic 22-12-2012**

**Ans. (a) :** Given,  $R = 3 \Omega$ ,  $X_L = 4 \Omega$

Impedance of RL circuit-

$$Z = \sqrt{R^2 + X_L^2}$$

$$= \sqrt{3^2 + 4^2}$$

$$\boxed{Z = 5\Omega}$$

**46. The rate of flow of charge is termed as \_\_\_\_\_**

- (a) Voltage (b) Current  
(c) Coulomb (d) Power

**ISRO Electronic Mechanic 22-12-2012**

**Ans. (b) :** The rate of charge flow is called electric current. If the value of charge passing through a point in 1 second is 1 coulomb, then the electric current will be 1 ampere.

$$\boxed{I = \frac{Q}{t}}$$

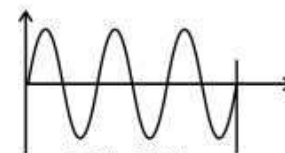
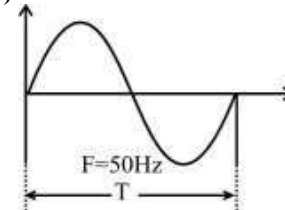
- Ammeter is used to measure electric current in an electric circuit.
- When both the magnitude and direction of electric current change with time, it is called alternating current.

**47. The frequency of the third harmonic of 50 Hz is:**

- (a) 75 Hz (b) 100 Hz  
(c) 150 Hz (d) 250 Hz

**ISRO 28.08.2016 Time (10:00-11:30)**

**Ans. (c) :** Fundamental first Harmonic



**3<sup>rd</sup> Harmonic**

Frequency of n the harmonics =  $n \times$  fundamental frequency

$$= 3 \times 50 = 150\text{Hz}$$

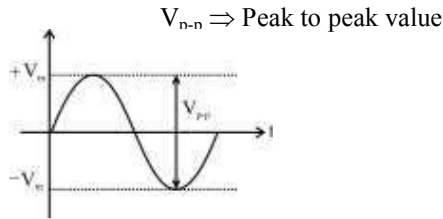
Harmonics are unwanted high frequencies that create distortion waves on the fundamental waveform in an AC circuit.

48. What is the peak-to-peak voltage of a  $2V_{RMS}$  sine wave?

- (a)  $2.0V_{p-p}$  (b)  $2.828V_{p-p}$   
 (c)  $4.0V_{p-p}$  (d)  $5.656V_{p-p}$

ISRO 28.08.2016 Time (10:00–11:30)

Ans. (d) :



Given,  $(V_{rms} = 2V_{rms})$

$$V_{rms} = \left( \frac{V_m}{\sqrt{2}} \right)$$

$$2V_{rms} = \frac{V_m}{\sqrt{2}}$$

$$V_m = 2\sqrt{2}V_{rms}$$

Given,  $V_m = 2\sqrt{2}$

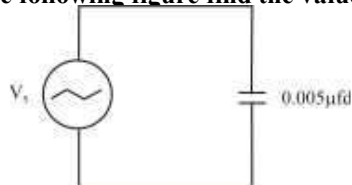
Then,  $V_{p-p} = 2\sqrt{2} + 2\sqrt{2}$

$$= \sqrt{2}(2+2)$$

$$= 4\sqrt{2}$$

$$= 4 \times 1.414 = 5.656 \text{ Volt}$$

49. In the following figure find the value of  $X_C$



$$X_C = \frac{1}{2\pi fC}$$

$$X_C = 31.83 \text{ k}\Omega$$

When  $C = 0.005\mu\text{f}$

If the frequency of the source is 1 kHz, what is the value of the capacitive reactance ( $X_C$ ) of the circuit if the capacitor value is changed to  $0.01\mu\text{f}$ ?

- (a)  $X_C = 63.6 \text{ k}\Omega$  (b)  $X_C = 31.8 \text{ k}\Omega$   
 (c)  $X_C = 15.9 \text{ k}\Omega$  (d)  $X_C = 5.0 \text{ k}\Omega$

ISRO 28.08.2016 Time (10:00–11:30)

Ans. (c) : Given,  $f = 1 \text{ kHz} = 1 \times 10^3 \text{ Hz}$

$$C = 0.01\mu\text{f}$$

$$= 0.01 \times 10^{-6} \text{ f}$$

Impedance  $X_C = \frac{1}{2\pi fC}$

$$= \frac{1}{2 \times 3.14 \times 1 \times 10^3 \times 0.01 \times 10^{-6}}$$

$$= \frac{1}{0.0628 \times 10^{-3}} = \frac{1000}{0.0628}$$

$$= \frac{10^3 \times 10000}{628} = 15.92 \text{ k}\Omega$$

50. The power factor of a circuit is equal to:

- (a)  $EI \cos\theta$  (b)  $\cos\theta$   
 (c)  $EI \sin\theta$  (d)  $\sin\theta$

ISRO 28.08.2016 Time (10:00–11:30)

Ans. (b) : The power factor of a circuit is equal to  $\cos\theta$ .

- The cosine of the phase angle is called the power factor.
- This is a unit less amount.
- $\cos\theta = \frac{R}{Z}$
- Its maximum value is unit.
- The power factor of an AC series circuit is the ratio of total resistance R and total impedance Z of that circuit.

51. For a frequency of 200Hz, the time period will be

- (a) 0.05 s (b) 0.005 s  
 (c) 0.0005 s (d) 0.5 s

ISRO 20.11.2016

Ans (b) :  $f = 200 \text{ Hz}$   
 Time period  $T = ?$

$$T = \frac{1}{f}$$

$$= \frac{1}{200} = 0.005 \text{ second}$$

52. The peak value of a sine wave is 200V. Its average value is

- (a) 127.4 V (b) 141.4 V  
 (c) 282.8 V (d) 200 V

ISRO 20.11.2016

Ans (a) : Average value =  $\frac{2V_m}{\pi}$

$$= \frac{2 \times 200}{3.14}$$

$$= 127.38 \text{ V}$$

$$V_{avg} = 127.4 \text{ V}$$

53. The input of an A.C. circuit having power factor of 0.8 lagging is 40 kVA. The power drawn by the circuit is

- (a) 12 kW (b) 22 kW  
 (c) 32 kW (d) 64 kW

ISRO 20.11.2016

Ans (c) : Given,  $\cos\phi = 0.8$

$$\text{Power (VI)} = 40 \text{ kVA}$$

Power drawn by the circuit =  $VI \cos\phi$

$$= 40 \times 0.8$$

$$= 32 \text{ kW}$$

54. The power factor of a D.C. circuit is always

- (a) Less than unity (b) Unity  
 (c) Greater than unity (d) Zero

ISRO 20.11.2016

**Ans (b) :** The power factor of DC circuit is always unit because the value of voltage and current in a DC circuit remains constant and a phase angle of  $0^\circ$  is formed between them. That is why power factor in DC circuit is unity.

$$\text{Power factor} = \cos \phi$$

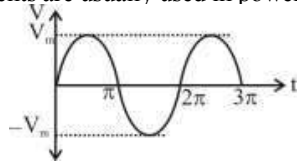
$$= \cos 0^\circ = 1$$

**55. The direction of current in an AC circuit**

- (a) is from positive to negative.
- (b) is always in one direction
- (c) varies from instant to instant.
- (d) cannot be determined

**ISRO 20.11.2016**

**Ans (c) :** The alternating current is an electric current, which changes its direction and value from time to time and these currents are usually used in power transmission.



**56. The self-capacitance values of the two coils are 4mH and 9mH respectively. If the coefficient of coupling is 0.5, then find the mutual inductance between two coils.**

- (a) 4 mH
- (b) 2 mH
- (c) 1 mH
- (d) 3 mH

**DMRC Maintainer 20.02.2020 (9:00-10:30)**

**Ans. (d)** Given,  $L_1 = 4 \text{ mH}$        $L_2 = 9 \text{ mH}$   
 $K = 0.5$

Formula-

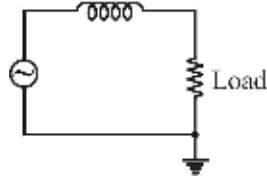
$$\text{Mutual inductance (M)} = K\sqrt{L_1 L_2}$$

$$= 0.5\sqrt{4 \times 9}$$

$$= 0.5 \times 6$$

$$M = 3 \text{ mH}$$

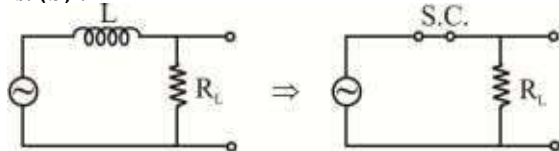
**57. In the circuit shown below, what is the function of the inductor?**



- (a) High Pass filter
- (b) Low pass filter
- (c) Band pass filter
- (d) Band stop filter

**ISRO 10.12.2016**

**Ans. (b) :**



$$\Rightarrow X_L = \omega L$$

$$X_L = 2\pi fL,$$

At  $f = 0$  So,  $X_L = 0$

Then short circuit will occur in the circuit

Therefore, the function of inductor in the circuit is done for low pass filter.

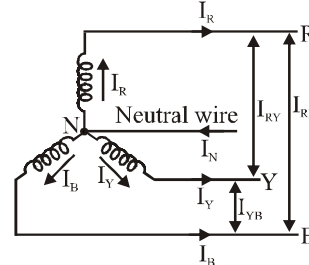
**58. Identify the correct statement for a 3 phase Star connection.**

- (a) Line Voltage < Phase Voltage
- (b) Line Current < Phase Current
- (c) Line Current = Phase Current
- (d) Line Voltage = Phase Voltage

**[DMRC Maintainer.18.04.2018]**

**Ans. (c) :** In 3-phase star connection

Line current = Phase current



$I_{RY}, I_{BY}, I_{RB} \rightarrow$  respectively line current

$I_{RN}, I_{BN}, I_{YN} \rightarrow$  respectively phase current

■  $I_{RY}, I_{BY}, I_{RB} = I_{RN}, I_{BN}, I_{YN}$

**59. The resonant frequency of a parallel resonant bandpass filter is 20 KHz and its band width is 2 KHz. Its upper cutoff frequency is .....**

- (a) 19 kHz
- (b) 22 kHz
- (c) 18 kHz
- (d) 21 kHz

**ISRO LPSC. 04.03.2018**

**Ans (d) :** Given,

Resonance frequency ( $f_r$ ) = 20kHz

Bandwidth (BW) = 2kHz

$$\text{Upper cutoff frequency (} f_H) = f_r + \frac{\text{BW}}{2}$$

$$= 20\text{kHz} + \frac{2\text{kHz}}{2}$$

$$f_H = 21 \text{ KHz}$$

$$\text{Lower cut off frequency (} f_L) = f_r - \frac{\text{BW}}{2}$$

$$= 20\text{kHz} - \frac{2\text{kHz}}{2}$$

$$= 20\text{kHz} - 1\text{kHz}$$

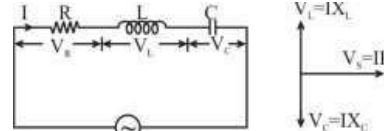
$$f_L = 19\text{kHz}$$

**60. At resonance, the impedance of series RLC circuit is**

- (a) R
- (b)  $X_L$
- (c)  $X_C$
- (d) None of the above

**ISRO LPSC. 04.03.2018**

**Ans (a) :**



Since in series RLC circuit  $X_L = X_C$

$$\text{Impedance (Z)} = \sqrt{R^2 + j(X_L - X_C)^2}$$

$$= \sqrt{R^2 + j(X_L - X_L)^2} = \sqrt{R^2}$$

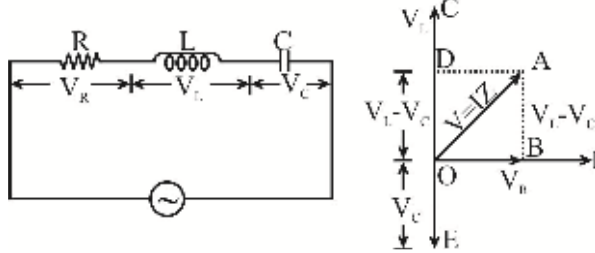
$$Z = R$$

61. The total circuit impedance of a series RLC circuit is

- (a)  $\sqrt{R^2 + (X_L - X_C)^2}$   
 (b)  $\frac{1}{2\pi\sqrt{LC}}$   
 (c)  $X_L + X_C$   
 (d) None of the above

ISRO LPSC. 04.03.2018

Ans (a) : In the series RLC circuit,



When DC(=OE) is subtracting from OC

We get the resultant drop

That is,  $OD = V_L - V_C = I(X_L - X_C)$

Used voltage V, which is denoted by OA.

$$OA = \sqrt{(OB)^2 + (AB)^2}$$

$$V = \sqrt{(V_R)^2 + (V_L - V_C)^2}$$

$$= \sqrt{(IR)^2 + (IX_L - IX_C)^2}$$

$$V = I\sqrt{R^2 + (X_L - X_C)^2} \quad \dots\dots\dots(i)$$

$$\frac{V}{I} = Z = \sqrt{R^2 + (X_L - X_C)^2}$$

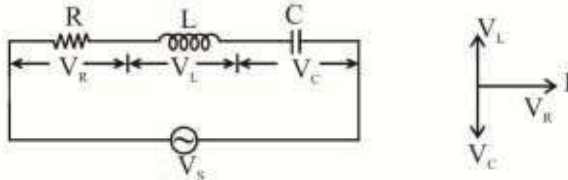
In equation (i),  $\sqrt{R^2 + (X_L - X_C)^2}$  is called the impedance of the circuit.

62. In a certain series resonant circuit  $V_C=100V$ ,  $V_L=100V$  and  $V_R= 35 V$ . The source voltage is

- (a) 100 V (b) 135 V  
 (c) 65 V (d) 35 V

ISRO LPSC. 04.03.2018

Ans (d) : Given,  $V_L=V_C=100V$ ,  $V_R= 35V$



$$V_S = \sqrt{(V_R)^2 + (V_L - V_C)^2}$$

$$V_S = \sqrt{35^2 + (100 - 100)^2}$$

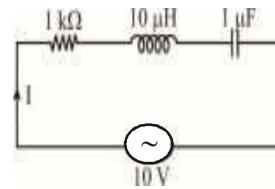
$$V_S = 35V$$

63. In a series RLC circuit,  $R=1k\Omega$ ,  $L= 10\mu H$ ,  $C = 1 \mu F$  and source voltage = 10 V, the current in the circuit at resonance is-

- (a) 10 mA (b) 100 mA  
 (c) 20 mA (d) 1 mA

ISRO LPSC. 04.03.2018

Ans (a) :



RLC series circuit

Since the current in the series circuit is the same, that is, the current which will flow in the resistance will also flow in the inductor and capacitor. The total impedance in the resonant condition is  $Z = R$ .

$$\therefore I = \frac{V}{R} = \frac{10V}{1k\Omega}$$

$$I = 10 \times 10^{-3} A$$

$$I = 10mA$$

64. For a sine wave with a frequency of 1000 Hz, the time period is .....

- (a) 1000 ms (b) 100 ms  
 (c) 10 ms (d) 1 ms

ISRO LPSC. 04.03.2018

Ans (d) : Given,

Frequency (f) = 1000Hz  
 Time period (T) = ?

$$\therefore \text{Time period} = \frac{1}{\text{Frequency}}$$

$$= \frac{1}{1000\text{Hz}}$$

$$T = 1ms$$

65. The peak to peak value of a sine wave is 300V. Its rms value is .....

- (a) 70.72 V (b) 141.4 V  
 (c) 14.14 V (d) 106.08 V

ISRO LPSC. 04.03.2018

Ans (d) : Given,

Peak to peak voltage ( $V_{pp}$ ) = 300V

$V_{rms} = ?$

$$\therefore V_{pp} = 2\sqrt{2} \cdot V_{rms}$$

$$V_{rms} = \frac{V_{pp}}{2\sqrt{2}}$$

$$= \frac{300}{2\sqrt{2}}$$

$$V_{rms} = 106.08V$$

66. A 10 mH coil has a resistance of 100 ohms. At what frequency does  $X_L = R$ ?

- (a) 15915.6 Hz (b) 7957.7 Hz  
 (c) 31830.9 Hz (d) 1591.5 Hz

[ISRO Propulsion, Mahendragiri- 22.04.2018]

Ans. (d) :  $\therefore X_L = 2\pi fL$ ,  $X_L = R = 100\Omega$

$$f = \frac{X_L}{2\pi L} = \frac{100}{2 \times 3.14 \times 10 \times 10^{-3}}$$

$$f = \frac{100 \times 10^3}{2 \times 3.14 \times 10} = \frac{100 \times 10^3}{62.8}$$

$$f = 1592.35 \approx 1591.5\text{Hz}$$

67. In a series AC circuit,  $X_L = 2350$  ohms,  $C = 0.005 \mu\text{F}$ , and  $R = 500\Omega$ . What is the impedance at resonance?

- (a) The frequency must be known  
 (b) 2.1 K  $\Omega$   
 (c) 4200 K  $\Omega$   
 (d) 0.5 K  $\Omega$

[ISRO Propulsion, Mahendragiri- 22.04.2018]

Ans. (d) : Given,  $X_L = 2350\Omega$ ,  $C = 0.005\mu\text{F}$ ,  $R = 500 \Omega$

$\therefore$  Since at resonance condition in the RLC series circuit

$$X_L = X_C$$

$$\text{Impedance} - Z = \sqrt{R^2 + j(X_L - X_C)^2}$$

$$Z = \sqrt{R^2 + j(X_L - X_L)^2}$$

$$Z = \sqrt{R^2}$$

$$Z = R = 0.5\text{k}\Omega$$

68. Form factor is equal to peak factor in case of

- (a) Square wave  
 (b) Triangular wave  
 (c) Sawtooth wave  
 (d) All of the above

[ISRO Propulsion, Mahendragiri- 22.04.2018]

Ans. (a) : In the case of square wave, The form factor is equal to the peak factor.

$$\text{Form factor} = \frac{\text{RMS value}}{\text{Average value}}$$

$$V_{\text{rms}} = V_m$$

$$V_{\text{avg}} = V_m$$

$$\text{Form factor} = \frac{V_{\text{rms}} \text{ value}}{V_{\text{avg}} \text{ value}}$$

$$= \frac{V_m}{V_m} = 1$$

$$\text{Peak factor} = \frac{\text{maximum value}}{\text{RMS value}}$$

$$\text{maximum value} = V_m$$

$$\text{Peak factor} = \frac{V_m}{V_m} = 1$$

69. In a series RL circuit voltage across Resistor and inductor are 3V and 4V respectively. Then what is the applied voltage?

- (a) 7V (b) 5V  
 (c) 4V (d) 3V

[ISRO Propulsion, Mahendragiri- 22.04.2018]

R.R.B. Gorakhpur Asst. Loco Pilot 14.04.2002

Ans. (b) : Given,  $V_R = 3\text{V}$ ,  $V_L = 4\text{V}$

$$\text{then } |V| = \sqrt{V_R^2 + V_L^2}$$

$$= \sqrt{(3)^2 + (4)^2}$$

$$= \sqrt{9+16} = \sqrt{25}$$

$$= 5\text{V}$$

70. RLC parallel circuit, if current through capacitor and inductor is equal, then, what is the power factor?

- (a) lagging (b) leading  
 (c) unity (d) zero

[DMRC Maintainer.18.04.2018]

[ISRO Propulsion, Mahendragiri- 22.04.2018]

Ans. (c) : In RLC parallel circuit, if the current through capacitor and inductor is equal, then the power factor will be unity.

$$\text{It means } |I_L| = |I_C| \rightarrow (\text{resonance})$$

$$I = I_R$$

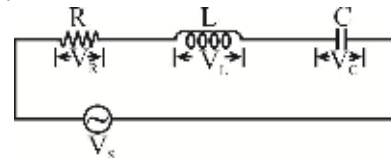
$$\text{power factor} = \cos \phi = \cos 0^\circ = 1 = \text{unity}$$

71. In RLC series circuit  $R = 2\Omega$ ,  $L = 2\mu\text{H}$  and  $C = 1\mu\text{F}$  and applied voltage is 10 V AC. Then, what is steady state current value?

- (a) 5A (b) 2A  
 (c) 1A (d) 0A

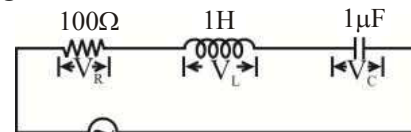
[ISRO Propulsion, Mahendragiri- 22.04.2018]

Ans. (d) :



In steady state condition, the capacitor behaves like open circuit while the inductor behaves like a short circuit. Therefore, the circuit will start behaving like an open circuit, which will reduce its current to zero.

72. Identify the value of current flowing through the given circuit at resonance.



220 V, 50Hz

- (a) 10 A (b) 22.5 A  
 (c) 12.5 A (d) 2.2 A

[DMRC Maintainer.18.04.2018]

Ans. (d) : Given- Voltage = 220 V

At resonance  $X_L = X_C$

$$Z = \sqrt{R^2 + (X_L - X_C)^2}$$

$$Z = \sqrt{R^2}$$

$$Z = R$$

$$Z = 100$$

$$\text{Current } (I) = \frac{V}{Z} = \frac{220}{100} = 2.2\text{A}$$

73. The effective value of a sine wave of 100 V<sub>pp</sub> is....

- (a) 35.35 Volt (b) 70.71 Volt  
 (c) 63.7 Volt (d) 50.0 Volt

[DMRC Maintainer.18.04.2018]

Ans. (a) : Effective value of sine wave  $= \frac{V_m}{2\sqrt{2}}$   
 $= \frac{100}{2\sqrt{2}} = 35.35 \text{ Volt}$

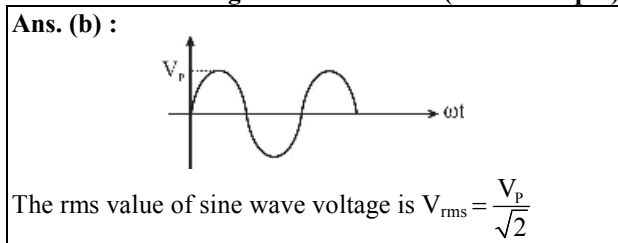
74. If time period of a sine wave is 0.5 milliseconds then its frequency is  
 (a) 20Hz (b) 200Hz  
 (c) 20000Hz (d) 2000Hz  
**ISRO Bengaluru. 20.08.2017 (12.00-1.30 pm)**

Ans. (d) : Given -  
 $T = 0.5 \text{ millisecond}$   
 $T = 0.5 \times 10^{-3} \text{ second}$   
 $\text{Frequency (f)} = \frac{1}{T} = \frac{1}{0.5 \times 10^{-3}}$   
 $= \frac{1000}{0.5} = 2000 \text{ Hz}$

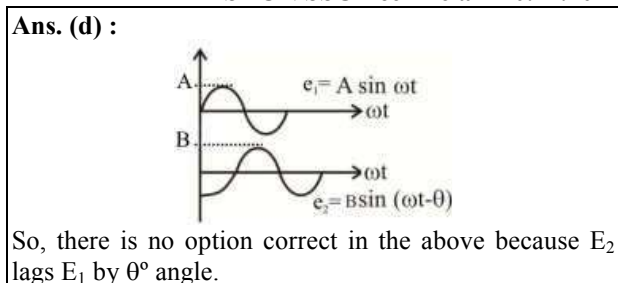
75. Impedance of an ideal parallel resonance circuit is  
 (a) Infinite (b) Zero  
 (c) 1 K ohms (d) None of the above  
**ISRO Bengaluru. 20.08.2017 (12.00-1.30 pm)**

Ans. (a) : The impedance of an ideal parallel resonance circuit is infinite whereas the impedance of a practical parallel resonance circuit is  $Z_L = \frac{L}{CR}$ .

76. If  $V_p$  is peak voltage of a sine wave then rms voltage will be  
 (a)  $\frac{V_p}{2}$  (b)  $\frac{V_p}{\sqrt{2}}$   
 (c)  $\frac{V_p^2}{2}$  (d)  $\frac{V_p}{4}$   
**ISRO Bengaluru. 20.08.2017 (12.00-1.30 pm)**



77. If  $e_1 = A \sin \omega t$  and  $e_2 = B \sin(\omega t - \theta)$ , then  
 (a)  $e_1$  lags  $e_2$  by  $\theta$   
 (b)  $e_1$  is in phase with  $e_2$   
 (c)  $e_2$  leads  $e_1$  by  $\theta$   
 (d) None of the above  
**ISRO VSSC Technician 10.12.2017**



78. The rms value of a sinusoidal ac current is numerically equal to its value at an angle of ..... degrees.  
 (a) 60 (b) 30  
 (c) 45 (d) 90  
**ISRO VSSC Technician 10.12.2017**

Ans. (c) : We know that -  
 $V_{rms} = \frac{V_m}{\sqrt{2}}$   
 From  $v = V_m \sin \theta$   
 $\frac{V_m}{\sqrt{2}} = V_m \sin \theta$   
 $\sin \theta = \frac{1}{\sqrt{2}}$   
 $\sin \theta = \sin 45^\circ$   
 $\theta = 45^\circ$

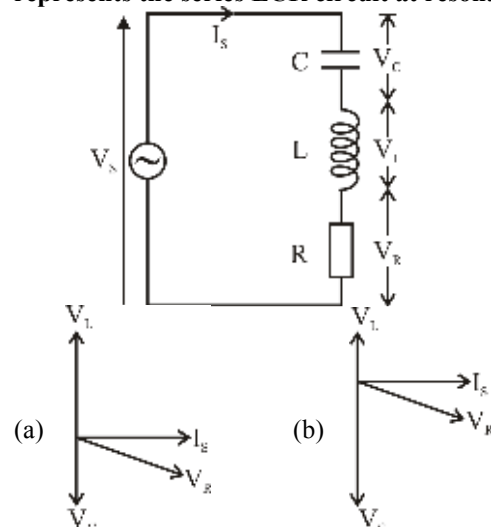
79. There are no transients in pure resistive circuits because .....  
 (a) they offer high resistance  
 (b) they obey Ohm's law  
 (c) they have not stored energy  
 (d) they are linear circuits  
**ISRO VSSC Technician 10.12.2017**

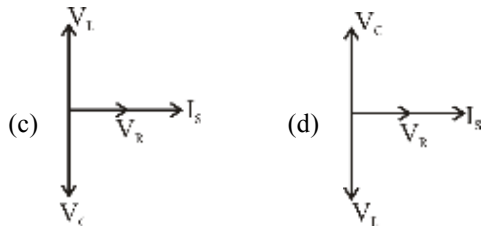
Ans. (c) : There are no transients in pure resistive circuits because there is no stored energy in them.

80. What is the Q (Quality factor) of a series circuit that resonates at 10 kHz, has equal reactance of 5 kilo-ohms each, and a resistor value of 50 ohms?  
 (a) 400 (b) 50  
 (c) 100 (d) 150  
**ISRO VSSC Technician 10.12.2017**

Ans. (c) : Given-  $X_L = X_C = 5 \text{ k}\Omega$ ,  $R = 50 \Omega$   
 $\therefore Q = \frac{X_L}{R} = \frac{5 \times 10^3}{50} = 100$

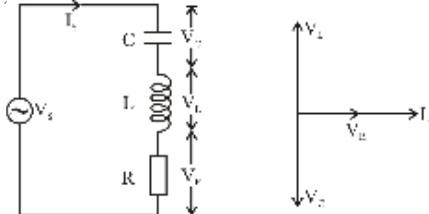
81. Which of the following phasor diagram represents the series LCR circuit at resonance?





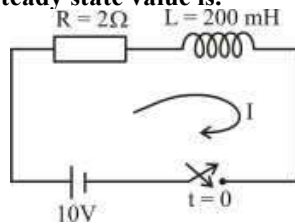
ISRO VSSC Technician 10.12.2017

Ans : (c)



**In RLC series circuit-** In the above circuit, the resistance voltage  $V_R$  and current  $I_s$  are in the same phase and the capacitor voltage  $V_C$  lags current  $I_s$  by  $90^\circ$  and the inductor voltage  $V_L$  leads current  $I_s$  by  $90^\circ$ .

82. In the given circuit the switch is closed at time  $t = 0$ . The time taken for the circuit current to reach steady state value is.



- (a) 0.2 sec (b) 5 sec  
(c) 2 sec (d) 0.5 sec

ISRO VSSC Technician 10.12.2017

Ans : (d) In an R-L circuit the time taken by the circuit current to attain the steady state value is 5 times to the time constant of the circuit.

$$\text{Time period } \tau = \frac{L}{R} \text{ Second}$$

$$\tau = \frac{200\text{mH}}{2} = 0.1 \text{ Second}$$

Time taken to achieve steady state value-

$$= 5\tau$$

$$= 5 \times 0.1$$

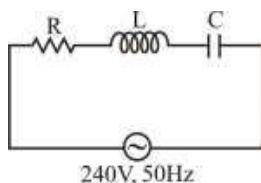
$$= 0.5 \text{ Second}$$

83. A series RLC circuit is connected to the 240V, 50Hz line. If  $R = 10$  ohms,  $L = 20$  mH and  $C = 20$   $\mu\text{F}$ , then the resulting reactance of the circuit is approximately.

- (a)  $-152.72 \Omega$  (b)  $165.28 \Omega$   
(c)  $175.72 \Omega$  (d)  $-142.72 \Omega$

ISRO VSSC Technician 10.12.2017

Ans : (a) Given,  $R = 10\Omega$ ,  $L = 20\text{mH}$ ,  $C = 20\mu\text{F}$



$$\text{Reactance of inductor } (X_L) = 2\pi fL$$

$$= 2\pi \times 50 \times 20 \times 10^{-3}$$

$$= 6.28\Omega$$

$$\text{Reactance of capacitor } (X_C) = \frac{1}{2\pi fC}$$

$$= \frac{1}{2\pi \times 50 \times 20 \times 10^{-6}}$$

$$= 159.23\Omega$$

Resultant reactance of series RLC circuit

$$X = X_L - X_C$$

$$= 6.28 - 159.23\Omega$$

$$= -152.95\Omega \text{ (approximate)}$$

84. In a series circuit, the current is

- (a) different in different resistors  
(b) proportional to the resistance  
(c) constant  
(d) varies

ISRO VSSC 21.02.2015

Ans. (c) : In a series circuit, the current is constant. In a series circuit, the flow of the current is same in each component and voltage is different.

85. A R-L circuit has 6 ohms resistance and 8 ohms inductive reactance. Its impedance will be

- (a) 6 ohms (b) 14 ohms  
(c) 10 ohms (d)  $8/6$  ohms

ISRO VSSC 21.02.2015

Ans. (c) : According to R-L series circuit

Impedance  $Z = R + j X_L$

$$|Z| = \sqrt{R^2 + X_L^2}$$

$$|Z| = \sqrt{(6)^2 + 8^2} = \sqrt{36 + 64}$$

$$|Z| = \sqrt{100} = 10 \text{ ohms}$$

86. If  $E_1 = A \sin \omega t$  and  $E_2 = A \sin (\omega t - \theta)$  then-

- (a)  $E_2$  is greater than  $E_1$  by  $\theta$   
(b)  $E_2$  is less than  $E_1$  by  $\theta$   
(c)  $E_1$  and  $E_2$  is in same phase  
(d) None of the above

DMRC Maintainer. 20.07.2014

Ans : (b)  $E_1 = A \sin \omega t$

$$E_2 = A \sin (\omega t - \theta)$$

$E_2$  is less than  $E_1$  by  $\theta$

87. The frequency of AC power in India is-

- (a) 20 Hz (b) 50 Hz  
(c) 100 Hz (d) 220 Hz

DMRC Maintainer. 20.07.2014

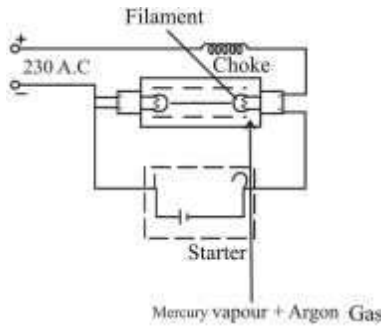
Ans : (b) In India the frequency of AC power is 50Hz. In America the frequency of AC power is 60Hz.

88. High voltage flow in tube light circuit is generated by-

- (a) Starter (b) Choke  
(c) Glass tube (d) Electrode

DMRC Maintainer. 20.07.2014

Ans : (b) In the tube light circuit high voltage current is generated by choke. Choke is an inductor with high inductive reactance. It converts the low voltage in the initial state to high voltage. When the tube light starts glowing, this choke acts like a normal circuit.



89. The value of form factor in alternating current is-

- (a) 1.50 (b) 1.11  
(c) 1.80 (d) 2.50

R.R.B. Kolkata Asst. Loco Pilot 02.11.2008

Ans. (b) : RMS value of alternating current =

$$\frac{V_m}{\sqrt{2}} = 0.707 V_m$$

Average value of alternating current =

$$\frac{2V_m}{\pi} = 0.637 V_m$$

$$\text{Form factor} = \frac{\text{RMS Value}}{\text{Average value}} = \frac{V_m/\sqrt{2}}{2V_m/\pi} = \frac{0.707V_m}{0.637V_m} = 1.11$$

90. The value of complex voltage is  $V = 16\sqrt{2} \sin t + 12\sqrt{2} \sin 3t$ . Its r.m.s value will be-

- (a)  $20\sqrt{2}$  (b) 20  
(c)  $28\sqrt{2}$  (d) 192

R.R.B. Bhubaneswar Asst. Loco Pilot 14.06.2009

Ans. (b) :  $V = 16\sqrt{2} \sin \omega t + 12\sqrt{2} \sin 3\omega t$

$$\begin{aligned} V_{\text{rms}} &= \sqrt{V_0^2 + \frac{1}{2}(V_1^2 + V_2^2 + \dots)} \\ &= \sqrt{\frac{1}{2}[(16\sqrt{2})^2 + (12\sqrt{2})^2]} \\ &= \sqrt{\frac{1}{2}(512 + 288)} = \sqrt{\frac{1}{2} \times 800} = \sqrt{400} \\ V_{\text{rms}} &= 20 \end{aligned}$$

91. If the maximum value of current in a sinusoidal equation is  $I_m$ , then what will be its average value ( $I_{\text{av}}$ )?

- (a)  $I_{\text{av}} = I_m/2$  (b)  $I_{\text{av}} = \frac{\pi}{2}/I_m$   
(c)  $I_{\text{av}} = \frac{2I_m}{\pi}$  (d)  $I_{\text{av}} = \frac{I_m}{\sqrt{2}}$

R.R.B. Mumbai Asst. Loco Pilot 14.06.2009

Ans. (c) : If current  $i = I_m \sin \theta$

$$I_{\text{av}} = \frac{2I_m}{\pi}$$

$$I_{\text{av}} = 0.637I_m$$

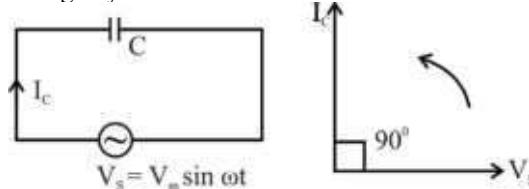
92. In a pure capacitive circuit-

- (a) Current leads the voltage by  $90^\circ$   
(b) Voltage leads current by  $90^\circ$   
(c) Current leads the voltage by  $180^\circ$   
(d) Voltage leads the current by  $180^\circ$

R.R.B. Gorakhpur Asst. Loco Pilot 11.10.2009

R.R.B. Ajmer Asst. Loco Pilot 23.05.2004

Ans. (a) : In a pure capacitive circuit the current leads the voltage by  $90^\circ$ .



93. The power factor is expressed as-

- (a)  $\sin \phi$  (b)  $\tan \phi$   
(c)  $\cos \phi$  (d) All of above

Jaipur Metro Electrician 2016

Ans : (c) The power factor is expressed as  $\cos \phi$ .

$$P = VI \cos \phi$$

$$\cos \phi = \frac{P}{VI}$$

Where  $\cos \phi$  is the power factor

V = voltage

I = Current

P = Power

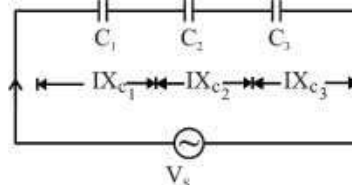
**Power factor-** The ratio of real power and apparent power taken by a load working on AC electric power is called power factor, it is represented by  $\cos \phi$ . Its value is between zero and one.

94. If two or more capacitor are connected in a series circuit, then the voltage across the capacitor with smallest capacitance will be less than the other-

- (a) Maximum  
(b) Minimum  
(c) Same  
(d) Same to the applied voltage

R.R.B. Bhopal Asst. Loco Pilot 06.06.2010

Ans. (a) : Let's  $C_1 < C_2 < C_3$



$$\text{Impedance } X_{C_1} = \frac{1}{2\pi f C_1}, \quad X_{C_2} = \frac{1}{2\pi f C_2},$$

$$X_{C_3} = \frac{1}{2\pi f C_3}$$

When  $C_1 < C_2 < C_3$  तो  $X_{C_1} > X_{C_2} > X_{C_3}$

When voltage will be-  $IX_{C_1} > IX_{C_2} > IX_{C_3}$ .

Hence, it is clear that the voltage drop in the capacitor with minimum capacitance will be higher than others because the value of reactance is highest.



95. The total resistance of a series RC circuit will be-

- (a)  $R^2 + \sqrt{X_C^2}$       (b)  $\sqrt{R^2 + (X_L - X_C)^2}$   
 (c)  $\sqrt{R^2 + X_C^2}$       (d) None of these

R.R.B. Jammu-Kashmir Asst. Loco Pilot 06.06.2010

Ans. (c) : In the RC series circuit

$$Z = \sqrt{R^2 + X_C^2}$$

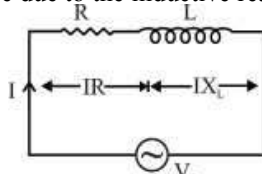
Total impedance  $Z = \sqrt{R^2 + X_C^2}$

96. Due to which in the AC circuit, the impedance of a coil is greater than its ohmic resistance?

- (a) Inductive reactance  
 (b) Capacitive reactance  
 (c) Resistive circuit  
 (d) None of the above

R.R.B. Sikandrabad Asst. Loco Pilot 06.06.2010

Ans. (a) The impedance of a coil is greater than its ohmic resistance due to the inductive reactance.



R = Internal resistance of inductor  
 $X_L$  = Inductive reactance of inductor

Total impedance  $Z = \sqrt{R^2 + X_L^2}$

Here,  $Z > R$ , because the value of impedance is the combined form of resistance (R) and inductance ( $X_L = 2\pi fL$ ).

97. What is the unit of inductive reactance?

- (a) Ohm      (b) Ohm - meter  
 (c) Ampere      (d) Ohm - ampere

R.R.B. Mumbai Asst. Loco Pilot 15.07.2012

Ans. (a) : We know that-  $V_C = IX_C$

$$X_C = \frac{V_C}{I} = \text{volt / Amp or } \Omega$$

Therefore, the unit of a inductive reactance is ohm. Inductive reactance is the property of opposing the current flowing in a inductor is called a inductive reactance.

98. If the voltage of a 3- phase supply is 400 volts, then the voltage between one phase and one neutral will be-

- (a) 200 V      (b) 210 V  
 (c) 220 V      (d) 230 V

R.R.B. Chennai/Bangalore Asst. Loco Pilot 27.10.2002

Ans. (d) : Given,  $E_L = 400$

$$E_P = ?$$

$$E_L = \sqrt{3} E_P$$

$$400 = \sqrt{3} E_P$$

$$\frac{400}{\sqrt{3}} = E_P$$

$$230.94 = E_P$$

Therefore, the voltage between one phase and one neutral will be 230 V.

99. In an electrical circuit, a capacitor of value  $20\mu\text{F}$  has been connected to a 200 volt power supply, due to which a current of 1.256 ampere flow in it. The frequency value of the current flowing in the circuit will be-

- (a) 45 Hz      (b) 48 Hz  
 (c) 50 Hz      (d) 54 Hz

R.R.B. Chandigarh Asst. Loco Pilot 15.07.2012

Ans. (c) : Given,  $C = 20\mu\text{F} = 20 \times 10^{-6}\text{F}$ ,  $V = 200\text{V}$   
 $I = 1.256\text{A}$        $f = ?$

$$I = \frac{V}{X_C} = \frac{V}{1/2\pi f C} = V \cdot 2\pi f C$$

$$1.256 = 200 \times 2 \times 3.14 \times f \times 20 \times 10^{-6}$$

$$\text{or } f = \frac{1.256}{200 \times 2 \times 3.14 \times 20 \times 10^{-6}} = \frac{1.256 \times 10^6}{25120} = 50 \text{ Hz}$$

100. If the value of the inductor used in an AC circuit is 0.08 Henry and the frequency of power supply is 50 Hz, then the value of inductive reactance of this circuit will be-

- (a) 25.13 $\Omega$       (b) 15.70 $\Omega$   
 (c) 29.38 $\Omega$       (d) 17.53 $\Omega$

R.R.B. Bangalore Asst. Loco Pilot 15.07.2012

Ans. (a) : Given,  $L = 0.08$  Henry  
 $f = 50\text{Hz}$

Inductive reactance ( $X_L$ ) = ?

$$X_L = 2\pi f L$$

$$= 2 \times 3.1428 \times 50 \times 0.08$$

$$= 314.28 \times 0.08$$

$$X_L = 25.1424\Omega$$

$$\approx 25.13\Omega$$

101. When the AC circuit is short, the voltage becomes-

- (a) Maximum      (b) Minimum  
 (c) Infinite      (d) Zero

ISRO Electronic Mechanic Technician-B 2016

Ans : (b) When AC (Alternating current) is short, the value of voltage becomes lowest.

102. The value of which increases as the value of reactive power component decreases in AC circuit?

- (a) Resistance      (b) Impedance  
 (c) Power factor      (d) Active power

R.R.B. Mumbai/Bhopal Asst. Loco Pilot 05.01.2003

Ans : (c) In AC circuit, the value of power factor increases as the value of reactive power component decreases.

Power factor is the ratio of real power and apparent power in an alternating current electric circuit.

$$\text{Power factor} = \frac{\text{Real power}}{\text{Apparent power}}$$

103. In an alternating current (AC) circuit the electric current is opposed by .....

- (a) Resistance  
 (b) Capacitive reactance  
 (c) Inductive reactance  
 (d) All of these

R.R.B. Bhubaneswar Asst. Loco Pilot 15.07.2012

**Ans. (d) :** The effective opposition to the current in an AC circuit is the impedance, which depend on the values of resistance, inductive reactance an capacitive reactance.

R = Resistance,  $X_L$ = Inductive reactance,  $X_C$  = capacitive reactance that is

$$Z = \sqrt{R^2 + (X_L - X_C)^2}$$

**104. If the value of capacitor used in an RC series circuit is 50  $\mu$ F and the value of resistors is 10 $\Omega$  which is connected to the source voltage of 250V, 50Hz, then the value of impedance of that circuit will be-**

- (a) 63.7 $\Omega$  (b) 64.4 $\Omega$   
 (c) 86  $\Omega$  (d) 25.3  $\Omega$

**R.R.B. Bilaspur Asst. Loco Pilot 15.07.2012**

**Ans. (b) :** Given, In RC series circuit-

$$C = 50 \mu\text{F} = 50 \times 10^{-6}\text{F} \quad R = 10\Omega$$

$$f = 50 \text{ Hz} \quad V = 250 \text{ V} \quad Z = ?$$

$$X_C = \frac{1}{2\pi fC} = \frac{1}{2 \times 3.14 \times 50 \times 50 \times 10^{-6}}$$

$$= 63.67\Omega$$

$$Z = \sqrt{R^2 + X_C^2} = \sqrt{(10)^2 + (63.67)^2}$$

$$= 64.45\Omega$$

**105. In a series R-L-C circuit, if  $X_L > X_C$ , then the value of phase angle will be-**

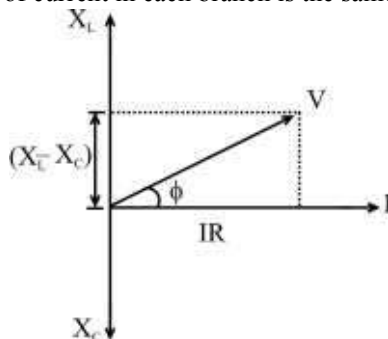
- (a) Positive (b) Negative  
 (c) Zero (d) None of these

**R.R.B. Ahamadabad Asst. Loco Pilot 2014**

**Ans. (a) :** When  $X_L > X_C$

So, the effective reactance is inductive and the voltage in the inductor leads the current due to which the phase angle between voltage and current positive.

- While drawing the phasor of an RLC series circuit, the current is considered as the basis because the value of current in each branch is the same.

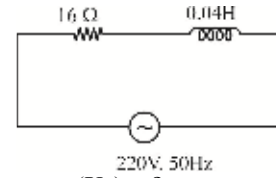


**106. If a coil is connected to 220V, 50Hz AC supply whose inductance is 0.84 Henry and resistance is 15 $\Omega$ , then the value of inductive reactance of circuit will be-**

- (a) 120.6  $\Omega$  (b) 10.5  $\Omega$   
 (c) 11.56  $\Omega$  (d) 12.57  $\Omega$

**R.R.B. Ranchi Asst. Loco Pilot 2014**

**Ans. (d)** Given,  $L = 0.04 \text{ H}$   $R = 16\Omega$



Inductive reactance ( $X_L$ ) = ?

$$\therefore X_L = 2\pi fL$$

$$= 2 \times 3.14 \times 50 \times 0.04$$

$$= 6.28 \times 2.00$$

$$X_L = 12.56$$

$$X_L \approx 12.57 \Omega$$

**107. Which of the following is the effect of inductive reactance when the frequency of AC supply increases?**

- (a) The value of inductive reactance increases.  
 (b) The value of inductive reactance decreases.  
 (c) The value of inductive reactance remains unaffected.  
 (d) There is an unexpected decrease in the value of inductive reactance.

**RRB Asst. LP- 23.01.2019, 8:30 AM-11:00AM**

**R.R.B. Siliguri Asst. Loco Pilot 2014**

**Ans. (a) :** The value of inductive reactance increases as the value of the frequency of AC supply increases.

Hence inductive reactance,

$$X_L = 2\pi fL$$

$$X_L \propto f$$

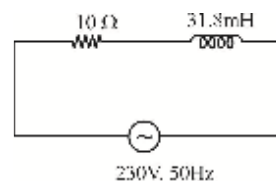
That is, the inductive reactance ( $X_L$ ) is proportional to the frequency ( $f$ ). Therefore, increasing the frequency increases the value of the inductive reactance.

**108. The resistance of a coil is 10  $\Omega$  and inductance is 31.8 mH. Which is connected to 230 V, 50 Hz supply. The current in the circuit will be-**

- (a) 16.20A (b) 1.62 A  
 (c) 16.26 A (d) 62 A

**R.R.B. Patna Asst. Loco Pilot 2014**

**Ans. (c)** Given,  $R = 10\Omega$   $L = 31.8\text{mH} = 31.8 \times 10^{-3}\text{H}$



Current  $I = ?$

Therefore, inductive reactance  $X_L = 2\pi fL$

$$= 2 \times 3.14 \times 50 \times 31.8 \times 10^{-3}\Omega$$

$$= 9.985\Omega$$

$$\approx 10\Omega$$

Hence impedance ( $Z$ ) =  $\sqrt{R^2 + X_L^2} = \sqrt{(10)^2 + (10)^2}$

$$Z = 10\sqrt{2} \Omega$$

Therefore current flow in the circuit  $I = \frac{V}{Z} = \frac{230}{10\sqrt{2}}$

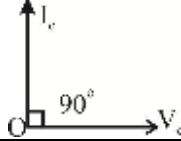
$$I = 16.26 \text{ Ampere}$$

109. If alternating voltage  $v = V_m \sin \theta$  is applied in a pure capacitive circuit, the current equation will be-

- (a)  $I_m \sin \theta$  (b)  $I_m \sin (\theta - \pi / 2)$   
 (c)  $I_m \sin (\theta + \pi / 4)$  (d)  $I_m \sin (\theta + \pi / 2)$

DMRC (Maintainer) Electrical 13.07.2014

Ans. (d) : When voltage  $v = V_m \sin \theta$  is applied in a pure capacitive circuit, the current equation will be  $I = I_m \sin (\theta + \pi/2)$ , because in a pure capacitive circuit the current (I) leads the voltage (V) by  $90^\circ$ .



110. A 500V sine wave generator is connected across a  $10k\Omega$  resistance. What will be the value of instantaneous current in the resistance when the phase angle is  $35^\circ$ ?

- (a) 12.4 mA (b) 22.6 mA  
 (c) 52 mA (d) 40.6 mA

DMRC Maintainer Electronic 20.07.2014

Ans. (d) : Voltage (V) = 500V This is r.m.s Value.

$$V_{rms} = 500V \quad \therefore V_m = \sqrt{2} V_{rms}$$

$$= \sqrt{2} \times 500$$

$$R = 10k\Omega = 10000\Omega \quad V_m = 500\sqrt{2} V$$

Hence, instantaneous current,  $I = \frac{V}{R} = \frac{V_m \sin 35^\circ}{R}$

$$I = \frac{500\sqrt{2} \times 0.57}{10000} = 40.3047mA$$

$$I \approx 40.6mA$$

111. What will be the time constant of a series RC circuit in which the values of R, C are  $50\Omega$ ,  $100\mu F$  respectively?

- (a)  $20\mu s$  (b)  $5 \times 10^{-4}s$   
 (c)  $0.005s$  (d)  $500s$

Noida Metro Maintainer Electrician 2017

Ans. (c) : Given,  $R = 50\Omega$ ,  $C = 100\mu F = 100 \times 10^{-6}F$   
 Time constant  $\tau = ?$

$$\tau = RC$$

$$\tau = 50 \times 100 \times 10^{-6}$$

$$= 5 \times 10^{-3}$$

$$\tau = 0.005 \text{ sec.}$$

112. In a pure resistive circuit the value of transient voltage and current are respectively  
 $v = 250 \sin 314t$  volt

$$i = 10 \sin 314t \text{ Ampere}$$

Then the value of peak power of the circuit will be-

- (a) 1250 Watt (b) 25 Watt  
 (c) 2500 Watt (d) 250 Watt

ISRO Satellite Centre Bengaluru 2016

Ans. (c) :  $v = 250 \sin 314t$

$$i = 10 \sin 314t$$

Comparing the above equation ( $v = V_m \sin \theta$  and  $i = I_m \sin \theta$ ) with the standard equation

$$I_m = 10A, V_m = 250 V$$

$$\text{Hence peak power (P)} = V I \cos \theta \quad (\because \theta = 0^\circ) \cos 0^\circ = 1$$

$$= 250 \times 10$$

$$P = 2500W$$

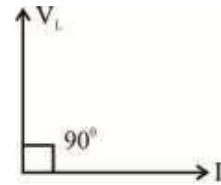
113. What causes the absorbed power zero in a pure inductive circuit?

- (a) Due to the inductive component of current being zero  
 (b) Due to maximum active component of current  
 (c) Due to the power coefficient of the circuit being zero  
 (d) None of the above

R.R.B. Mumbai Asst. Loco Pilot 03.06.2001

Ans. (c) : Power (p) =  $VI \cos \phi \dots(1)$

In a pure inductive circuit the current lags the voltage by  $90^\circ$ . That is, phase difference between V and I,  $\theta = 90^\circ$



From equation (1)

$$P = VI \cos 90^\circ$$

$$P = 0$$

Therefore, pure inductor does not consume any electrical power.

114. When a series RL circuit is connected to the supply voltage, then the voltage between R and L is 3V and 4V respectively, then what will be the value of the supply voltage in the circuit?

- (a) 7 V (b) 1 V  
 (c) 3.5 V (d) 5 V

R.R.B. Gorakhpur Asst. Loco Pilot 14.04.2002

Ans. (d) : Given,  $V_R = 3V$  and  $V_L = 4V$

Then supply voltage in the circuit  $V = \sqrt{V_R^2 + V_L^2}$

$$= \sqrt{(3)^2 + (4)^2} = \sqrt{9+16} = \sqrt{25}$$

$$V = 5V$$

115. Q-factor of the series RLC circuit is-

(a)  $Q = \frac{1}{R} \sqrt{\frac{L}{C}}$  (b)  $Q = R \sqrt{\frac{L}{C}}$

(c)  $Q = \frac{1}{R} \sqrt{\frac{C}{L}}$  (d)  $Q = R \sqrt{\frac{C}{L}}$

R.R.B. Kolkata Asst. Loco Pilot 29.09.2002

Ans. (a) : Q-factor of the series RLC circuit =  $\frac{1}{R} \sqrt{\frac{L}{C}}$

$$Q = \frac{1}{R} \sqrt{\frac{L}{C}}$$

Quality factor (Q) and resistance (R) are inversely proportional to each other.

that is,

$$\downarrow Q \propto \frac{1}{\uparrow R}$$

- Quality factor (Q) is inversely proportional to the bandwidth (B.W)

That is 
$$\downarrow Q \propto \frac{1}{\uparrow \text{B.W}}$$

- Q meter works on the principle of series resonance.

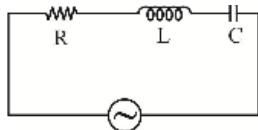
**116. If in an AC circuit the voltage  $V=(200+j40)$  volt and current  $I = (30-j10)$  amperes, then what will be the values of active power and reactive power of the circuit?**

- 6400 W, 800 VAR Capacitive
- 6400 W, 800 VAR Inductive
- 5600 W, 3200 VAR Capacitive
- 5600 W, 3200 VAR Inductive

**R.R.B. Chennai/Bangalore Asst. Loco Pilot 27.10.2002**

**Ans. (d)** Voltage in A.C. circuit  $V=(200 + j 40)$   
and current  $I = (30-j10)$   
Then, Active power (P) = ? Reactive power (Q) = ?  
 $\therefore$  Apparent Power  $S = V.I^* = (200+j.40).(30-j.10)^*$   
 $S = (200 + j40). (30 + j.10)$   
 $S = 6000 + 1200j + 2000j + j^2.400 \quad [\because j^2 = -1]$   
 $S = 6000 - 400 + j3200$   
 $S = 5600 + j3200 \quad \dots\dots\dots(i)$   
Comparing equation (i) with  $S = P + jQ$   
 $P = 5600\text{W}$  this is a active power  
 $Q = 3200 \text{VAR}$  this is a reactive power

**117. If in the circuit shown in the figure the voltage between R,L,C is 3V, 14V and 10V respectively, then what will be the rms voltage of the input sinusoidal power supply?**

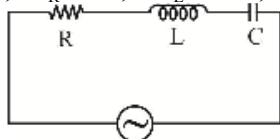


- 10V
- 5V
- 2.5V
- 15V

**[SSC Junior Engineer Exam- 2013]**

**R.R.B. Mumbai/Bhopal Asst. Loco Pilot 05.01.2003**

**Ans. (b)** Given,  $V_R = 3\text{V}$ ,  $V_L = 14\text{V}$ ,  $V_C = 10\text{V}$



Resultant voltage  $V = \sqrt{V_R^2 + (V_L - V_C)^2}$   
 $= \sqrt{(3)^2 + (14 - 10)^2}$   
 $= \sqrt{9 + 16} = \sqrt{25}$   
 $V = 5\text{V}$

**118. If a series RL circuit in which each resistance is 4 ohms is connected to a voltage supply then what can be possible in the circuit?**

- Current leads  $45^\circ$  to voltage
- Current lags  $45^\circ$  to voltage

- Current lags  $60^\circ$  to voltage
- None of the above

**R.R.B. Ranchi Asst. Loco Pilot 19.01.2003**

**Ans. (b)** : Given,  
Resistance  $R = 4\Omega$ , Reactance  $X_L = 4\Omega$   
then  $\tan \phi = \frac{X_L}{R} = \frac{4}{4} = 1$   
 $\tan \phi = \tan 45^\circ \quad \{ \because \tan 45^\circ = 1 \}$   
 $\phi = 45^\circ$

Since in RL circuit the voltage (V) leads the current (I). Hence, in the above RL circuit, the current lags the voltage by  $45^\circ$ .

**119. A parallel resonant RLC circuit is provided with a frequency of  $\omega$  radian/sec. If the power factor of the circuit is-**

- Zero
- Unity
- Leading
- Lagging

**R.R.B. Mumbai Asst. Loco Pilot 14.06.2009**

**[UKPSC Asst. Engineer Exam-2013]**

**R.R.B. Chandigarh Asst. Loco Pilot 25.05.2003**

**Ans. (b)** : A parallel resonant RLC circuit is provided with a frequency of  $\omega$  radian/second. If the power factor of the circuit is unity. Since the circuit is resonant. Therefore for resonant circuit-

Phase angle  $\phi = 0$   
and power factor  $\cos \phi = 1$  (unity)

**120. A series RLC circuit is resonant at 100 Hz. If capacitance is increased to 4 times, the resonance frequency will be-**

- 50 Hz
- 100 Hz
- 200 Hz
- 400 Hz

**[UKPSC Asst. Engineer Exam-2013]**

**R.R.B. Gorakhpur Asst. Loco Pilot 12.10.2003**

**Ans. (a)** : Given,  $f_1 = 100\text{Hz}$   
Let's capacitance  $C_1 = C$   
and  $C_2 = 4C$   
 $f_2 = ?$

From resonance frequency  $\therefore f = \frac{1}{2\pi\sqrt{LC}}$

$$f \propto \frac{1}{\sqrt{C}}$$

Hence,  $\frac{f_1}{f_2} = \sqrt{\frac{C_2}{C_1}}$

$$\frac{100}{f_2} = \sqrt{\frac{4C}{C}}$$

$$\Rightarrow f_2 = \frac{100}{\sqrt{4}} = \frac{100}{2}$$

$$f_2 = 50 \text{ Hz}$$

That is, by increasing the capacitance 4 time, the resonance frequency will be half.

**121. Impedance of parallel resonant circuit?**

- Zero
- Maximum
- Minimum
- Infinity

**[UKPSC Asst. Engineer Exam-2013]**

**R.R.B. Ajmer Asst. Loco Pilot 23.05.2004**

**Ans. (b) :** The impedance of a parallel resonant circuit is maximum.

Impedance  $Z_{\max} = \frac{L}{CR}$

■  $\frac{L}{CR}$  is called the dynamic impedance of the tank circuit.

■ The Admittance of parallel resonant circuit is minimum.

$$Z_{\max} = \frac{1}{Y_{\min}}$$

■ The current in parallel resonant circuit is minimum.

$$I_{\min} = \frac{V}{L/CR}$$

■ Since the impedance of parallel resonant circuit is maximum. Therefore it is called rejector circuit.

**122. Three equal impedances (R+jx) combined in delta are carrying a balance line current  $I_L$  total active and reactive powers are being**

- (a)  $I_L^2 R$  and  $I_L^2 X$  respectively
- (b)  $3 I_L^2 R$  and  $3 I_L^2 X$  respectively
- (c)  $I_L^2 R/3$  and  $I_L^2 X/3$  respectively
- (d)  $I_L^2 X$  and  $I_L^2 R$  respectively

[UKPSC Asst. Engineer Exam-2013]

R.R.B. Ajmer Asst. Loco Pilot 23.05.2002

**Ans. (a)** Given  $Z = R+jX$  there are three impedances which are equal and line current in delta connection

$$I_L = \sqrt{3} I_{ph}$$

and line voltage,  $V_L = V_{ph}$

Active power =  $I_L^2 R$

Reactive power =  $I_L^2 X$

**123. In a series circuit,  $R = 4\Omega$ ,  $X_L = 12\Omega$  and  $X_C = 9\Omega$  and supply of 200V, 50Hz, then calculate the power.**

- (a) 6400 W
- (b) 8000 W
- (c) 14400 W
- (d) 19200 W

R.R.B. Ajmer Asst. Loco Pilot 23.05.2004

**Ans. (a) :** Given,  $R = 4\Omega$ ,  $X_L = 12\Omega$ ,  $X_C = 9\Omega$ ,

$V = 200V$ ,  $f = 50Hz$

Power,  $P = ?$

Impedance  $Z = \sqrt{R^2 + (X_L - X_C)^2}$

$$= \sqrt{(4)^2 + (12-9)^2} = \sqrt{16+9}$$

$$= \sqrt{25} = 5$$

$$\boxed{Z = 5\Omega}$$

$$I = \frac{V}{Z} = \frac{200}{5} = 40A$$

Hence, power  $P = I^2 R$

$$= (40)^2 \times 4 = 6400 \text{ watt}$$

**Second Method-**

$$P = VI \cos \phi \quad \left( \because \cos \phi = \frac{R}{Z} \right)$$

$$P = 200 \times 40 \times \frac{4}{5} = 6400 \text{ watt}$$

**124. What will be the reactance of 1 farad capacitance, when it is connected to a DC circuit?**

- (a) Infinite
- (b) 1 Ohm
- (c) 0.5 Ohm
- (d) Zero Ohm

R.R.B. Trivandrum Asst. Loco Pilot 20.06.2004

**Ans. (a) :** Given,  $C = 1F$ ,  $X_C = ?$

$$X_C = \frac{1}{2\pi fC}$$

$$X_C = \frac{1}{2\pi \times 1 \times 0} \quad \because \{ \text{For d.c. circuit, } f = 0 \}$$

$$X_C = \frac{1}{0} \Rightarrow \boxed{X_C = \infty}$$

Hence, capacitive reactance is infinite ( $\infty$ ).

**125. In a RL series circuit, the phase difference between the applied voltage and the circuit current will increase if-**

- (a)  $X_L$  increases
- (b) R increases
- (c)  $X_L$  decreases
- (d) Supply frequency decreases.

R.R.B. Ajmer Asst. Loco Pilot 10.10.204

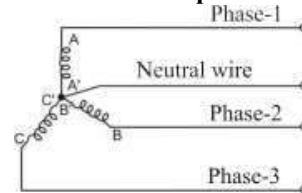
**Ans. (a)** For RL series circuit-

$$\tan \phi = \frac{X_L}{R}$$

phase difference  $\phi = \tan^{-1} \left( \frac{X_L}{R} \right)$

Therefore, as  $X_L$  increases, the phase difference ( $\phi$ ) between current and voltage will increase because the angle increases as the value of  $\tan \phi$  increases.

**126. The given wave form represents-**



- (a) Two phase
- (b) Single phase
- (c) Three phase
- (d) Four phase

R.R.B. Jaipur Asst. Loco Pilot 23.05.2004

**Ans. (c)** The given wave form represents a three phase and four wire system. It is called 3-phase 4 wire system in which the fourth wire represents the neutral wire (N).

**127. The formula to find the actual power (P) consumed by a 3-phase star connected load is....**

- (a)  $P = \sqrt{3} V_L I_L \cos \theta$
- (b)  $P = 3 E_L I_L \cos \theta$
- (c)  $P = \sqrt{3} V_p I_p \cos \theta$
- (d)  $P = V_p I_p \cos \theta$

R.R.B. Ajmer Asst. Loco Pilot 23.05.2005

**Ans. (a)** Power consumption in star and delta connection-

$$P = \sqrt{3}V_L I_L \cos\theta$$

In a star connection,

$$I_L = I_{Ph}$$

$$V_L = \sqrt{3}V_{Ph}$$

In a delta connection,

$$I_L = \sqrt{3}I_{Ph}$$

$$V_L = V_{Ph}$$

**128.** A series RLC circuit has a resonant frequency of 1kHz and quality factor (Q) = 100. If each of R, L and C is doubled from its original value, then the new Q of the circuit is-

- (a) 25 (b) 50  
(c) 100 (d) 200

[DMRC JE Examination (Electronics) 21.09.2014]  
R.R.B. Kolkata Asst. Loco Pilot 06.02.2005

**Ans. (b) :** Given,  $f = 1 \text{ kHz} = 1000 \text{ Hz}$

Quality factor  $Q_1 = 100$ ,  $Q_2 = ?$

According to question

Let's  $R_1 = R$ ,  $L_1 = L$ ,  $C_1 = C$

and  $R_2 = 2R$ ,  $L_2 = 2L$ ,  $C_2 = 2C$

$$\therefore Q = \frac{1}{R} \sqrt{\frac{L}{C}}$$

$$\frac{Q_1}{Q_2} = \frac{1}{R_1} \sqrt{\frac{L_1}{C_1}} \times \sqrt{\frac{C_2}{L_2}} \times R_2$$

$$\frac{100}{Q_2} = \frac{1}{R} \sqrt{\frac{L}{C}} \times \sqrt{\frac{2C}{2L}} \times 2R$$

$$Q_2 = \frac{100}{2} = 50$$

Therefore, if the value of each R, L, C is double by their original value, the new quality factor will become half.

**129.** Which of the following AC circuit has a power loss of zero?

- (a) Pure capacitive circuit  
(b) Inductive reactance circuit  
(c) Capacitive reactance circuit  
(d) None of the above

R.R.B. Mumbai Asst. Loco Pilot 16.07.2006

**Ans. (a)** Power loss of a pure capacitive circuit is zero. That is pure capacitive circuit does not consume any kind of electrical power.

that means  $P_{av} = 0$

- In the first half cycle, the amount of electric power that consumes, that same power delivers to the source in the second half-cycle. Therefore, power loss will be zero.
- In a pure capacitive circuit, the current is  $90^\circ$  leading by voltage.

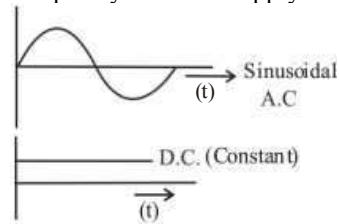
**130.** The value of AC remains with time.....

- (a) Constant (b) Variable  
(c) Both (a) and (b) (d) None of the above

R.R.B. Chennai/Bangalore Asst. Loco Pilot 27.10.2002

**Ans : (b)** The value of AC varies with time. Whereas the value of DC remains constant with time.

- The frequency of AC supply in India is 50Hz.



- The frequency of dc supply is zero.

**131.** The number of full cycles per second in AC is called-

- (a) Frequency (b) Time period  
(c) Peak value (d) None of the above

ISRO Electronic Mechanic 10-12-2016

R.R.B. Mumbai/Bhopal Asst. Loco Pilot 05.01.2003

**Ans : (a)** The number of full cycle per second in AC is called frequency. Its unit is hertz (Hz)

$$\text{Frequency } f = \frac{1}{\text{Time period (T)}}$$

$$f = \frac{1}{T} \text{ Second}^{-1} \text{ or Hertz}$$

The frequency of AC supply in India is generally 50Hz.

**132.** The value of the root mean square of the AC signal is-

- (a)  $\frac{I_m}{\sqrt{2}}$  (b)  $\frac{I_m}{4}$   
(c)  $\frac{I_m}{3}$  (d) None of the above

R.R.B. Ranchi Asst. Loco Pilot 19.01.2003

**Ans : (a)** The value of the root mean square of the AC signal is  $\frac{I_m}{\sqrt{2}}$ .

- Full wave Rectifier -  $I_{rms} = \frac{I_m}{\sqrt{2}}$

- Half wave Rectifier -  $I_{rms} = \frac{I_m}{2}$

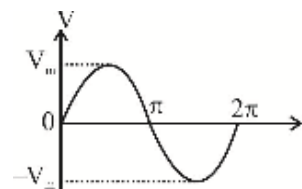
Where,  $I_m$  = Maximum current.

**133.** The high value obtained in one full cycle of the AC signal is called-

- (a) Frequency value (b) Peak value  
(c) Time period (d) Instant value

R.R.B. Chandigarh Asst. Loco Pilot 25.05.2003

**Ans : (b)** The high value obtained in a full-cycle of AC signal is called the peak value. That is, the maximum instantaneous value of an AC signal is called the peak value.



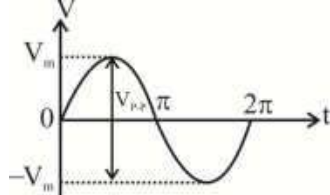
$V_m$  = Peak Voltage

134. The distance between positive and negative maximum value in a cycle of AC signal is called-

- (a) Peak value (b) Instant value  
(c) Peak to peak value (d) None of the above

R.R.B. Ranchi Asst. Loco Pilot 21.09.2003

Ans : (c) The distance between the positive and negative maximum values in a cycle of an AC signal is called the peak to peak value.

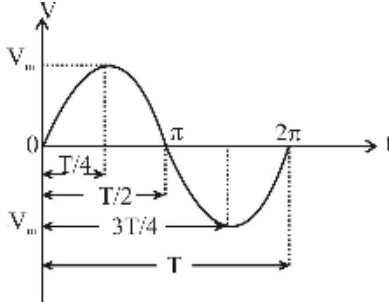


135. The value taken at a constant time in a cycle of AC signal is called-

- (a) Peak value (b) Instant value  
(c) Peak to peak value (d) None of the above

R.R.B. Gorakhpur Asst. Loco Pilot 12.10.2003

Ans : (b) The value taken at a constant time in a cycle of an AC signal is called an instant value. That is, the value of any moment of a signal is called an instantaneous value or a transient value.



- ⇒  $V = 0$  at  $t = 0$   
 ⇒  $V = V_m$  at  $t = T/4$   
 ⇒  $V = 0$  at  $t = T/2$   
 ⇒  $V = -V_m$  at  $t = 3T/4$

136. The voltage of a single phase (1- $\phi$ ) supply is-

- (a) 230V (b) 50V  
(c) 410V (d) 120V

R.R.B. Bangalore Asst. Loco Pilot 25.01.2004

Ans : (a) The voltage of single phase (1- $\phi$ ) supply-

- In India, 230V, 50Hz AC is used for 1- $\phi$  supply.
- A phase wire and a neutral wire are used in 1- $\phi$  supply.
- 3- $\phi$  supply has more advantage than 1- $\phi$  supply.

137. The normal voltmeter usually indicates-

- (a) Average value (b) Peak value  
(c) Peak to peak value (d) RMS value

R.R.B. Mumbai Asst. Loco Pilot 16.07.2006

Ans : (d) The normal voltmeter usually indicates R.M.S. value.

- Voltmeter is an instrument which measures voltage. It measures voltage in volts.
- The resistance of the voltmeter is kept high.
- The resistance of the ammeter is kept low.

138. In star connection of 3- $\phi$  phase AC supply, the line voltage is equal to-

- (a) Phase voltage (b)  $\sqrt{3}$  phase voltage  
(c)  $\sqrt{2}$  (d)  $3 \times$  Phase voltage

R.R.B. Malda Asst. Loco Pilot 16.07.2006

Ans : (b) In the star connection of a 3- $\phi$  A.C. supply, the line voltage is equal to  $\sqrt{3}$  time to the phase voltage.

In star connection  $V_L = \sqrt{3}V_{Ph}$

$$I_L = I_{Ph}$$

In delta connection  $V_L = V_{Ph}$

$$I_L = \sqrt{3}I_{Ph}$$

139. What will be the high value of a house hall equipment that uses a 230 volt AC source-

- (a)  $230\sqrt{2}V$  (b)  $\frac{230V}{\sqrt{2}}$   
(c) 230V (d) 480V

R.R.B. Gorakhpur Asst. Loco Pilot 08.10.2006

Ans : (a) The voltage 230V used in the R.M.S. value. Hence-

Given-

$$V_{rms} = 230V$$

and maximum voltage  $V_m = ?$

$$\text{from } V_{rms} = \frac{V_m}{\sqrt{2}}$$

$$V_m = \sqrt{2} \cdot V_{rms}$$

$$\text{Hence, } V_m = 230\sqrt{2} \text{ Volt}$$

140. The resonance is produced in the .....circuit.

- (a) RL (b) RC  
(c) RLC (d) None of the above

R.R.B. Ranchi Asst. Loco Pilot 08.07.2007

Ans : (c) The resonance is produced in the RLC circuit. Two types of resonant circuits are formed in the electric RLC circuit.

(1) Series resonance circuit (2) Parallel resonance circuit

- In series resonance circuit, the value of the current is high and the value of the impedance is low.
- Whereas in the parallel resonance circuit the impedance is maximum and the current is the minimum.

141. The correct equation for the status of resonance is-

- (a)  $X_L = X_C$  (b)  $X_L - 1 = X_C$   
(c)  $X_L = X_C - 1$  (d)  $X_L + X_C = 0$

R.R.B. Allahabad Asst. Loco Pilot 09.12.2007

Ans : (a)

The correct equation for the resonance is-  $X_L = X_C$

$$\text{Impedance } (Z) = \sqrt{R^2 + (X_L - X_C)^2}$$

$$Z = \sqrt{R^2 + (X_L - X_C)^2} \quad (\because X_L = X_C)$$

$$Z = \sqrt{R^2 + 0}$$

$$\Rightarrow Z = R$$

- The impedance is minimum and the current is maximum for series resonance.
- The resonance frequency is  $f_r = \frac{1}{2\pi\sqrt{LC}}$  Hz

142. The value of the resonant frequency production in the series resonance is-

- (a)  $\frac{1}{2\pi\sqrt{MC}}$  (b)  $2\pi\sqrt{LC}$   
 (c)  $\frac{1}{2\pi\sqrt{LC}}$  (d) All of these

R.R.B. Sikandrabad Asst. Loco Pilot 29.06.2008

Ans : (c) The value of the resonant frequency generated in the series resonance is  $f_r = \frac{1}{2\pi\sqrt{LC}}$ .

If in the series resonance circuit-

$$X_L = X_C$$

$$\omega_0.L = \frac{1}{\omega_0.C}$$

$$\text{Or } \omega_0^2 = \frac{1}{L.C}$$

$$\Rightarrow \omega_0 = \frac{1}{\sqrt{L.C}} \Rightarrow 2\pi f_0 = \frac{1}{\sqrt{L.C}}$$

$$\Rightarrow f_0 = f_r = \frac{1}{2\pi\sqrt{L.C}}$$

Hence resonance frequency  $f_r = \frac{1}{2\pi\sqrt{L.C}}$

143. The value of Q factor of the series resonance circuit is-

- (a)  $\frac{V_L}{V}$  (b)  $\frac{V_C}{V}$   
 (c)  $V_L/V_C$  (d) Both (a) and (b)

R.R.B. Allahabad Asst. Loco Pilot 03.08.2008

Ans : (d) Q-factor in series resonance circuit-

$$Q = \frac{f_r}{f_2 - f_1}$$

and  $Q = \frac{V_L}{V} = \frac{\text{Voltage across inductor}}{\text{Supply voltage}}$

$$\text{or } V_L = Q.V$$

and  $Q = \frac{V_C}{V} = \frac{\text{Voltage across capacitor}}{\text{Supply voltage}}$

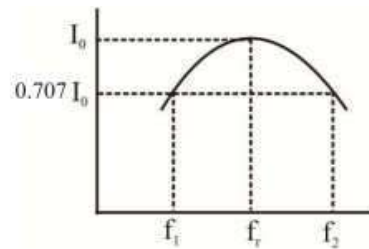
$$\text{or } V_C = Q.V$$

144. The difference between high cut-off frequency and low cut-off frequency is called .....

- (a) Band-width (b) Q-factor  
 (c) Selectivity (d) None of the above

R.R.B. Chandigarh Asst. Loco Pilot 14.09.2008

Ans : (a) The difference between high cut-off frequency and low cut off frequency is called band width.



$$\text{B.W.} = f_2 - f_1$$

The range of frequency in which the current is equal to 70.7% of the resonance current is called band width.

Where,  $f_2$  = High frequency

$$f_1 = \text{Low frequency } \text{B.W.} = f_2 - f_1$$

145. The value selectivity is-

- (a)  $\frac{f_r}{f_2 - f_1}$  (b)  $\frac{f_2 - f_1}{f_r}$   
 (c)  $f_r + (f_2 + f_1)$  (d) All the above

R.R.B. Muzaffarpur Asst. Loco Pilot 15.02.2009

Ans : (a) Selectivity (S) =  $\frac{f_r}{f_2 - f_1}$

$$S = \frac{f_r}{f_2 - f_1} = \frac{\text{Resonance frequency}}{\text{Bandwidth}}$$

$$\text{Quality factor } Q = \frac{f_r}{f_2 - f_1} = S$$

$$\text{Selectivity } S \propto Q$$

$$\text{Selectivity } S \propto \frac{1}{\text{Bandwidth}}$$

$$\text{Selectivity} \propto \frac{1}{\text{Response}}$$

146. On increasing the value of the band width, the value of selectivity is .....

- (a) Low (b) High  
 (c) Constant (d) None of the above

R.R.B. Bhubaneswar Asst. Loco Pilot 14.06.2009

Ans : (a) On increasing the value of the band width the value of selectivity is low.

$$\text{Selectivity} \propto \frac{f_r}{f_2 - f_1}$$

$$S = \frac{f_r}{\text{B.W.}} \text{ therefore } \downarrow S = \frac{1}{\text{B.W.}} \uparrow$$

- Quality factor  $Q = S = \frac{f_r}{f_2 - f_1} = \frac{\text{Resonance frequency}}{\text{Bandwidth}}$

$$\text{Selectivity} \propto \frac{1}{\text{Response}}$$

147. The value of the power factor is .....in the series resonance circuit.

- (a) Unity (b) Infinite  
 (c) Variable (d) None of the above



**Ans : (a)** The value of the power factor is unity in the series resonance circuit that is  $\boxed{\cos\theta = 1}$

Condition of series resonance

$$X_L = X_C$$

$$\text{Impedance } (Z) = \sqrt{R^2 + (X_L^2 - X_C)^2} = \sqrt{R^2 + 0^2}$$

$$\boxed{Z = R} \Rightarrow \boxed{Z_{\min} = R}$$

and power factor  $\cos\theta = \frac{R}{Z} = \frac{R}{R} = 1 \Rightarrow \boxed{\cos\theta = 1}$

**148. The value of the current flowing in the series resonance circuit is-**

- (a) High (b) Low  
(c) Constant (d) None of the above

**R.R.B. Gorakhpur Asst. Loco Pilot 11.10.2009**

**Ans : (a)** In the condition of series resonance, the value of impedance in the resonant circuit is low.

**Condition for series resonance circuit-**

$$X_L = X_C$$

$$\text{Impedance } Z = \sqrt{R^2 + (X_L - X_C)^2}$$

$$Z = \sqrt{R^2 + (X_L - X_L)^2} = \sqrt{R^2 + (0)^2} \quad \boxed{Z = R}$$

Hence, Impedance is equal to resistance, that is minimum.

$$\boxed{Z_{\min} = R}$$

And the value of current is maximum.

$$\boxed{I_{\max} = \frac{V}{Z_{\min}}}$$

**149. In the condition of resonance, the value of impedance in the series resonance circuit is**

- .....  
(a) Constant (b) Variable  
(c) Low (d) High

**R.R.B. Bhopal Asst. Loco Pilot 06.06.2010**

**Ans : (c)** In the series resonant circuit, the value of current is maximum and impedance is minimum, whereas in parallel resonant circuit the value of current is minimum and impedance is maximum.

**150. In parallel resonant circuit the imaginary value of .....is reduced to zero.**

- (a) Resistivity (b) Reactance  
(c) Susceptance (d) None of the above

**R.R.B. Jammu-Kashmir Asst. Loco Pilot 06.06.2010**

**Ans : (c)** In parallel resonant circuit the imaginary value of susceptance is made zero.

Admittance  $Y = G + jB$

$$Y = G + j(B_C - B_L) \text{ -----(1)}$$

Since for parallel resonance  $B_C = B_L$

Hence from equation (1)  $Y = G + j0$

$$\text{Admittance } \boxed{Y_{\min} = G}$$

Since the impedance  $\boxed{Z_{\max} = \frac{1}{Y_{\min}}}$  will be maximum.

**151. The value of current in parallel resonance circuit is-**

- (a) Maximum (b) Minimum  
(c) Admittance (d) None of the above

**R.R.B. Sikandrabad Asst. Loco Pilot 06.06.2010**

**Ans : (b)** The value of current in parallel resonance circuit is minimum.

Since, Admittance  $Y = G + jB$

$$Y = G + j.(B_C - B_L) \text{ ..... (1)}$$

Since, for parallel resonance  $B_C = B_L$

$$Y = G + j.0$$

$$\boxed{Y_{\min} = G}$$

Hence impedance will be maximum

$$\boxed{Z_{\max} = \frac{1}{Y_{\min}}}$$

Hence, the current will be minimum

$$\boxed{I_{\min} = \frac{V}{Z_{\max}}}$$

**152. In a parallel resonant circuit, the admittance change in pure.....**

- (a) Conductance (b) Resistivity  
(c) Capacitance (d) None of the above

**R.R.B. Mumbai Asst. Loco Pilot 15.07.2012**

**Ans : (a)** In a parallel resonant circuit, The admittance change in to conductance.

Since, admittance  $Y = G + jB$

$$Y = G + j (B_C - B_L) \text{ ..... (1)}$$

$\therefore$  the condition for parallel resonance  $B_C = B_L$  put in(1)

$$Y = G + j (B_C - B_L)$$

$$\boxed{Y_{\min} = G}$$

Where, G = conductance.

**153. Find the value of inductance required to make a 100 pF capacitor resonance at 10 MHz frequency-**

- (a)  $2.5 \times 10^{-3}$  (b)  $2.5 \times 10^{-4}$   
(c)  $2.5 \times 10^{-5}$  (d)  $2.5 \times 10^{-6}$

**R.R.B. Chandigarh Asst. Loco Pilot 15.07.2012**

**Ans : (d)** Given-  $f = 10\text{MHz}$   $C = 100\text{pF}$

$$X_L = X_C$$

$$2\pi fL = \frac{1}{2\pi fC}$$

$$L = \frac{1}{4\pi^2 f^2 C}$$

$$= \frac{1}{4 \times (3.14)^2 \times (10 \times 10^6)^2 \times 100 \times 10^{-12}}$$

$$= \frac{1 \times 10^{-4}}{4 \times 9.87 \times 10^{12} \times 10^{-12}}$$

$$= \frac{10^{-4}}{39.508} = 0.0253 \times 10^{-4}$$

$$= 2.5 \times 10^{-6} \text{ Henry}$$

**154. The impedance of a capacitor is represented as-**

- (a)  $Z_c = X_c + R$  (b)  $Z_c = X_c^2 + R^2$

- (c)  $Z_c = \sqrt{X_c^2 + R^2}$  (d)  $Z_c = \frac{1}{X_c^2 + R^2}$

**HAL Electrician 2015**

**Ans : (\*)** Impedance of a capacitor is represented by-

$$Z_c = \frac{1}{2\pi fC}$$

Where,  $X_C$  = Capacitive reactance  
 $f$  = frequency  
 $C$  = capacitor

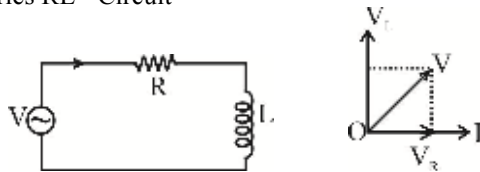
**155. In the RL circuit-**

- (a) Voltage leads current
- (b) Current leads voltage
- (c) Voltage is in phase with current
- (d) The voltage is 180° phase difference from the current.

**MES Electrician Tradesman 2015**

**Ans : (a)** In a series RL circuit the voltage leads the current.

Series RL - Circuit



$$V = iR + L \frac{di}{dt}$$

- In case of resistance, current and voltage are in the same phase. Whereas in case of pure inductance, voltage leads the current by 90°.

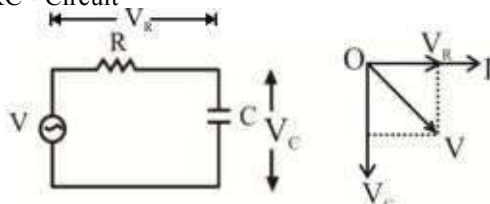
**156. In the series RC circuit-**

- (a) Voltage leads current
- (b) Current leads voltage
- (c) Voltage is in phase with current
- (d) The voltage is 180° phase difference from the current

**DMRC (Maintainer) Electrical 13.07.2014**

**Ans : (b)** In a series RC circuit, current leads the voltage.

Series RC - Circuit



In the case of a pure capacitor the current leads the voltage by 90°.

**157. In a series RLC circuit, the resultant reactance at a frequency higher than the resonant frequency is-**

- (a) Resistive
- (b) Inductive
- (c) Capacitive
- (d) None of the above.

**DMRC Maintainer Electronic 20.07.2014**

**Ans : (b)** In a series RLC circuit the resulting reactance is "inductive" at a frequency higher than the resonant frequency.

**In the series resonant circuit-**

- If  $f > f_r$  then  $X_L > X_C$  and circuit will be inductive nature.
- If  $f < f_r$  then  $X_C > X_L$  and circuit will be capacitive nature.

**158. Resonant circuit are used-**

- (a) Only in amplifiers
- (b) Only in oscillators
- (c) In amplifiers and oscillators
- (d) In rectifiers

**LMRC Maintainer Electrical 16.03.2016**

**Ans : (c)** Resonant circuits are used in amplifiers and oscillators etc.

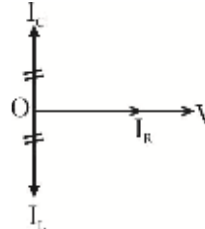
- In the state of resonance, the capacitive reactance of the circuit is equal to the inductive reactance.

**159. In a parallel resonant circuit, inductive current and capacitive current remain .....**

- (a) In the phase
- (b) at 180° phase difference
- (c) Either in phase or in phase difference.
- (d) at a phase difference of 80°

**LMRC Maintainer Electronic 16.03.2016**

**Ans : (b)** In a parallel resonant circuit, inductive current and capacitive current remain at 180° phase difference.



- In parallel resonant circuit the current is minimum and the impedance is maximum.

**160. In a parallel RLC circuit, the resultant reactance at a frequency higher than the resonant frequency is-**

- (a) Resistive
- (b) Inductive
- (c) Capacitive
- (d) None of the above

**LMRC Maintainer Electronic 16.03.2016**

**Ans : (c)** In a parallel RLC circuit the resultant reactance is capacitive at a frequency higher than the resonant frequency. That is-

If  $f \gg f_r$   $X_C > X_L$

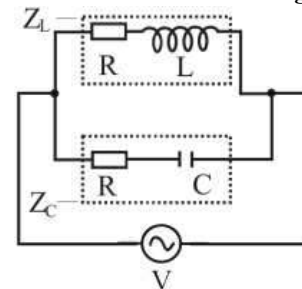
then  $I_C \gg I_L$

While in the series RLC resonance circuit-

If  $f \gg f_r$

then  $X_L \gg X_C$

**161. The circuit shown in the given figure is-**



- (a) Series resonant circuit
- (b) Parallel resonant circuit
- (c) Acceptor circuit
- (d) None of the above

**Noida Metro Maintainer Electrician 2017**

**Ans : (b)** In the given circuit, all the elements are connected in parallel. Therefore, the circuit is a parallel resonant circuit.

- In parallel resonance, the voltage is equal and the current is different.
- The impedance of the parallel resonant circuit is the maximum and the current is the minimum.

The parallel resonance circuit is also called the rejecter circuit. Because in the state of resonance there is  $Z_{\max}$  occurs.

**162. What is the formula used to find the resonant frequency of the parallel resonant circuit?**

$$(a) f_r = \frac{1}{2\pi\sqrt{L.C}} \quad (b) f_r = \frac{1}{2\pi}\sqrt{L.C}$$

$$(c) f_r = \frac{1}{2\pi}\sqrt{\frac{1}{L.C} - \frac{R^2}{L^2}} \quad (d) f_r = \frac{2\pi}{\sqrt{L.C}}$$

**Banglore Metro (BMRC) Electrician 2016**

**Ans : (a)** The formula used to find the resonance frequency of the parallel resonant circuit is-

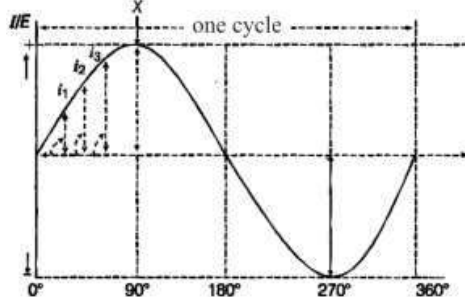
$$f_r = \frac{1}{2\pi\sqrt{L.C}}$$

Where, L = Inductance of coil

C = Capacitance of parallel capacitor

R = Resistance.

**163. What does 'X' represent in the picture below-**



- (a) Peak value (b) Amplitude  
(c) Peak to peak value (d) Instantaneous value

**ISRO Electronic Mechanic Technician-B 2016**

**Ans. (a)** Point 'X' represented the peak value shown in the above figure.

**164. What will be the time period of 2 kHz frequency?**

- (a) 0.2 mili-second (b) 0.5 mili-second  
(c) 5.0 mili-second (d) 50 mili-second

**R.R.B. Kolkata Asst. Loco Pilot 29.09.2002**

**Ans. (b)** Given-

$$f = 2 \text{ kHz}$$

$$T = ?$$

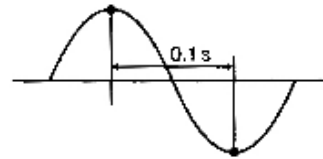
$$T = \frac{1}{f}$$

$$= \frac{1}{2 \times 10^3}$$

$$= 0.5 \times 10^{-3} \text{ Sec}$$

$$= 0.5 \text{ mili-second}$$

**165. What is the frequency of the wave shown in the figure?**



- (a) 2 Hz (b) 5 Hz  
(c) 10 Hz (d) 20 Hz

**R.R.B. Chennai/Bangalore Asst. Loco Pilot 27.10.2002**

**Ans. (b)** The time taken to complete one cycle is called time period (T).

- The number of cycles completed per second is called frequency (f).

$$\text{Therefore } f = \frac{1}{T} \text{ Hertz}$$

$$= \frac{1}{0.1 + 0.1} = \frac{1}{0.2}$$

$$= 5 \text{ Hz}$$

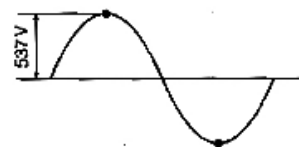
**166. Which supply source changes the polarity invariably?**

- (a) DC supply (b) AC supply  
(c) Dynamo (d) Battery

**R.R.B. Mumbai/Bhopal Asst. Loco Pilot 05.01.2003**

**Ans. (b)** The polarity of AC supply source varies with time as well as direction and magnitude. Whereas the polarity of DC supply remain constant.

**167. What is the effective value of wave shown in the figure?**



- (a) 380 V (b) 440 V  
(c) 537 V (d) 660 V

**R.R.B. Ranchi Asst. Loco Pilot 19.01.2003**

**Ans. (a)** Given,  $V_m = 537$  Volt

The effective value is called the root mean square value.

$$\text{Hence, R.M.S. Value} = \frac{V_m}{\sqrt{2}}$$

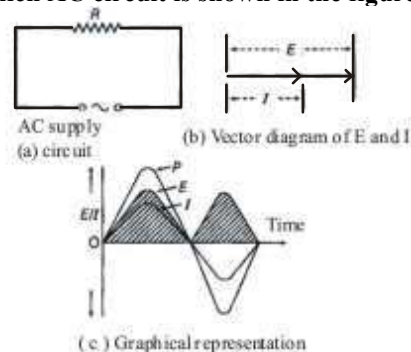
$$= 0.707 V_m$$

$$= 0.707 \times 537$$

$$= 379.65$$

$$\cong 380 \text{ V}$$

**168. Which AC circuit is shown in the figure below?**



- (a) Pure resistive circuit
- (b) Pure inductive circuit
- (c) Pure capacitive circuit
- (d) None of the above.

**R.R.B. Ranchi Asst. Loco Pilot 19.01.2004**

**Ans. (a)** The given circuit is pure resistive circuit consisting of voltage and current in same phase.

- In the pure inductive circuit, the voltage is leading by the current and in the capacitive circuit, the current is leading by the voltage.

**169. The property of the AC circuit, which opposes the change in value of the current, is called.**

- (a) Resistance
- (b) Reactance
- (c) Capacitance
- (d) Inductance

**RRB Asst. L.P. 23.01.2019, 8:30 AM-11:00 AM**

**ISRO 20.11.2016**

**R.R.B. Chandigarh Asst. Loco Pilot 25.05.2003**

**Ans. (d)** The property of the AC circuit, which opposes the change of value of the current, is called inductance.

The property of the AC circuit which opposes the change in the value of supply voltage is called capacitance.

**170. If there is a 90° phase difference between voltage and current in any AC circuit, then the power will be-**

- (a) Maximum
- (b) Minimum
- (c)  $1.1 \times V \times I$
- (d) Zero

**R.R.B. Gorakhpur Asst. Loco Pilot 12.10.2003**

**Ans. (d)** In a circuit with pure inductance, the average power for a whole cycle is zero. In a pure inductive circuit, the voltage is 90° leading from the current. In a half-cycle, the inductor takes energy from the supply and stores in the form of a magnetic field and in next half cycle returns to the supply source. Thus the inductor consume zero average power from the supply. We know that

$$P = VI \cos \phi$$

$$P = VI \cos 90^\circ \quad (\text{Given } \phi = 90^\circ)$$

$$P = 0 \quad (\cos 90^\circ = 0)$$

**171. The average value of alternating current for a sine wave is equal to .....**

- (a) Maximum values of  $0.536 \times$  current
- (b) Maximum value of  $0.636 \times$  current
- (c) Maximum values of  $0.707 \times$  current
- (d) Maximum value of  $0.737 \times$  current

**RRB Asst. L.P. 21.01.2019, 3:00 PM-4:30 PM**

**R.R.B. Bangalore Asst. Loco Pilot 25.01.2004**

**Ans. (b)** The average value of alternating current for a

pure sine wave is  $I_{av} = \frac{2I_m}{\pi} = 0.636 I_m$  ampere and similarly the average value of alternating voltage is

$$E_{av} = \frac{2E_m}{\pi} = 0.636 E_m$$

**172. What is the time period for a frequency of 50 Hz?**

- (a) 200 mili-second
- (b) 20 mili-second
- (c) 2 mili-second
- (d) 0.2 mili-second

**R.R.B. Ajmer Asst. Loco Pilot 23.05.2004**

**Ans. (b)** Given-

$$f = 50 \text{ Hz,}$$

$$\therefore f = \frac{1}{T}$$

$$\text{or } T = \frac{1}{f} = \frac{1}{50}$$

$$= 0.02 \text{ sec}$$

$$= 20 \text{ m-sec}$$

**173. The current in the inductive circuit respect to the voltage is-**

- (a) In phase
- (b) In leading
- (c) In lagging
- (d) In opposite phase

**R.R.B. Kolkata Asst. Loco Pilot 16.07.2006**

**R.R.B. Ajmer Asst. Loco Pilot 23.05.2004**

**Ans. (c)** In the inductive circuit, the current is lagging from the voltage and in the capacitive circuit, the current is leading by the voltage.

**174. The reactance of choke coil of 2 Henry at 100 Hz is-**

- (a) 100  $\Omega$
- (b) 216  $\Omega$
- (c) 718  $\Omega$
- (d) 1258  $\Omega$

**R.R.B. Ranchi Asst. Loco Pilot 04.09.2005**

**Ans. (d)** Given that,

$$f = 100 \text{ Hz}$$

$$L = 2 \text{ Henry}$$

$$\therefore X_L = 2\pi fL$$

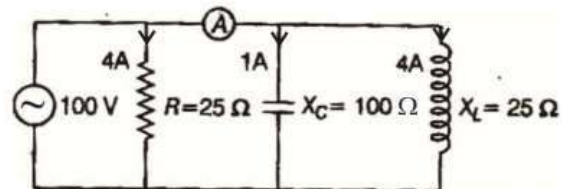
$$= 2 \times 3.1428 \times 100 \times 2$$

$$= 314.28 \times 4$$

$$= 1257.12$$

$$X_L \approx 1258 \Omega$$

**175. What is the reading of the current in the coil in the figure shown below?**



- (a) 9 A
- (b) 5 A
- (c) 4 A
- (d) 3 A

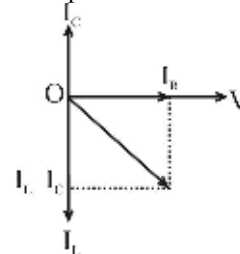
**R.R.B. Ranchi Asst. Loco Pilot 04.09.2005**

**Ans. (d)** Since the given circuit is a parallel circuit.

We know that  $I_R = 4 \text{ Amp}$

$$I_C = 1 \text{ Amp}$$

$$I_L = 4 \text{ Amp}$$



$$I_L - I_C = 3 \text{ Amp}$$

So the reading of the ammeter will be 3A. Therefore the reading of current in the coil will be 3A.

$$\text{Total current of the circuit, } I = \sqrt{(4)^2 + (3)^2}$$

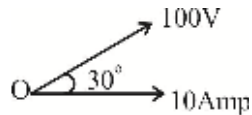
$$I = \sqrt{16+9} = \sqrt{25} = 5 \text{ Amp}$$

176. In a circuit, a current of 10A flow with a 30° lag, when the voltage applied is 100V, find the circuit resistance and reactance.

- (a) 50Ω, 3.7Ω                      (b) 20Ω, 2.5Ω  
 (c) 8.66Ω, 5Ω                      (d) 15Ω, 6.3Ω

R.R.B. Ajmer Asst. Loco Pilot 05.06.2005

Ans. (c) Given-



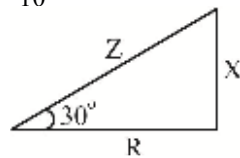
$$I = 10\text{A}$$

$$\phi = 30^\circ$$

$$V = 100\text{V}$$

$$R = ?, X_L = ?$$

$$\therefore Z = \frac{V}{I} = \frac{100}{10} = 10\Omega$$



$$R = Z \cos \phi$$

$$= 10 \times \cos 30^\circ$$

$$= 10 \times 0.866$$

$$\boxed{R = 8.66\Omega}$$

$$\Rightarrow X = Z \sin \phi$$

$$= 10 \times \sin 30^\circ$$

$$= 10 \times 0.5$$

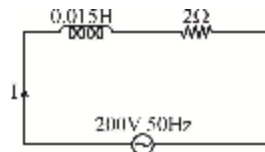
$$\boxed{X = 5\Omega}$$

177. In an inductive circuit with 0.015 Henry inductance, 2 Ohm resistance is connected in the series. Find (i) current (ii) Power-factor on connecting across 50Hz, 200 Volt supply.

- (a) 39A, 0.39                      (b) 49A, 0.49  
 (c) 72A, 0.72                      (d) 31A, 0.31

R.R.B. Mumbai Asst. Loco Pilot 05.06.2005

Ans. (a)



$$I = ?$$

$$\cos \phi = ?$$

$$\therefore X_L = 2\pi fL$$

$$= 2 \times 3.1428 \times 50 \times 0.015$$

$$= 4.7142\Omega$$

$$\therefore Z = \sqrt{R^2 + X_L^2}$$

$$= \sqrt{2^2 + (4.7142)^2}$$

$$= \sqrt{4 + 22.2236}$$

$$= \sqrt{26.2236}$$

$$= 5.12\Omega$$

$$\text{Now, } I = \frac{V}{Z} = \frac{200}{5.12}$$

$$= 39.06 \text{ Ampere}$$

$$\text{Power factor, } \cos \phi = \frac{R}{Z} = \frac{2}{5.12}$$

$$= 0.3906$$

178. In an AC capacitive circuit-

- (a) Current leads the voltage  
 (b) Current lags the voltage  
 (c) Current in phase with the voltage  
 (d) None of the above.

Ans. (a) In the capacitive AC circuit, the current is leading by the voltage and the current in the inductive AC circuit is lagging by the voltage.

- In the resistive circuit voltage and current are in same phase.

179. The formula to find the AC circuit's capacitive reactance 'X<sub>c</sub>' is .....

- (a)  $X_c = \sqrt{2\pi f C}$                       (b)  $X_c = 2\pi f C$   
 (c)  $X_c = \frac{1}{2\pi f C}$                       (d)  $X_c = \frac{1}{\sqrt{2\pi f C}}$

R.R.B. Kolkata Asst. Loco Pilot 04.11.2009

$$\text{Ans. (c) Capacitive reactance } (X_c) = \frac{1}{\omega C} = \frac{1}{2\pi f C} \Omega$$

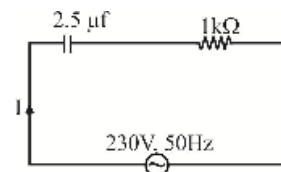
$$\text{Inductive reactance } (X_L) = 2\pi f L \Omega$$

180. The capacitance of a capacitor is 2.5μF and a resistor of value 1 kΩ is connected in series with it. The source voltage is 230V, 50Hz, Find the impedance and current of the circuit.

- (a) 172 Ohm, 0.5A  
 (b) 1619.5 Ohm, 0.142A  
 (c) 1961 Ohm, 0.72A  
 (d) 1582 Ohm, 0.3A

R.R.B. Kolkata Asst. Loco Pilot 06.02.2005

Ans. (b)



$$\therefore X_C = \frac{1}{2\pi f C}$$

$$= \frac{1}{2 \times 3.1428 \times 50 \times 2.5 \times 10^{-6}}$$

$$= \frac{10^6}{3.1428 \times 250}$$

$$= 1272.75 \Omega$$

$$\text{Now, } Z = \sqrt{R^2 + X_C^2}$$

$$= \sqrt{(10^3)^2 + (1272.75)^2}$$

$$= \sqrt{10^6 + 1619892.56}$$

$$= \sqrt{2619892.56}$$

$$Z = 1619.18 \Omega$$

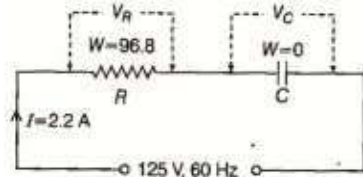
$$Z \approx 1619.5 \Omega$$

$$I = \frac{V}{Z} = \frac{230}{1619.18}$$

$$I = 0.14205$$

$$I = 0.142 \text{ A Ampere}$$

**181. A non-inductive resistor is connected in series with a capacitor having a voltage of 125 V at 60Hz. The current from the source voltage is 2.2A. The power loss in the resistor is 96.8W and the power loss in the capacitor is zero. Calculate resistance and capacitance.**



- (a)  $10 \Omega$   $250 \mu\text{F}$       (b)  $20 \Omega$   $50 \mu\text{F}$   
 (c)  $15 \Omega$   $275 \mu\text{F}$       (d)  $30 \Omega$   $330 \mu\text{F}$

**R.R.B. Kolkata Asst. Loco Pilot 06.02.2005**

**Ans. (b)** Find  $R = ?$       Given,  $P = 96.8 \text{ W}$   
 $C = ?$        $I = 2.2 \text{ A}$

$$\therefore P = VI = I^2 R = \frac{V^2}{R}$$

From,  $P = I^2 R$

or  $R = \frac{P}{I^2} = \frac{96.8}{(2.2)^2}$   
 $= \frac{96.8}{4.84}$   
 $= 20 \Omega$

$$Z = \sqrt{R^2 + X_C^2} \quad \begin{cases} V = IZ \\ Z = \frac{V}{I} = \frac{125}{2.2} = 56.82 \end{cases}$$

or  $X_C = \sqrt{Z^2 - R^2}$   
 $= \sqrt{(56.82)^2 - (20)^2}$   
 $= \sqrt{3228.5124 - 400}$   
 $= \sqrt{2828.5124}$   
 $X_C = 53.1837 \Omega$

$$\therefore X_C = \frac{1}{2\pi f C}$$

or  $C = \frac{1}{2\pi f X_C}$   
 $= \frac{1}{2 \times 3.1428 \times 60 \times 53.1837}$   
 $= \frac{1}{20057.4879}$

$$C \approx 50 \mu\text{F}$$

**182. When AC is passed through a resistor, which electrical power is converted in to heat?**

- (a) Reactive power ( $P_R$ )  
 (b) Transfer power  
 (c) Apparent power ( $P_A$ )  
 (d) True power ( $P_T$ )

**R.R.B. Mumbai Asst. Loco Pilot 05.06.2005**

**Ans. (d)** The component of current which is perpendicular to the applied voltage is the reactive component.

The resistor dissipates electrical power  $= I^2 R$  in Watts into heat in the form of true power

Therefore,

$$\text{Active component} = VI \cos \phi$$

$$\text{Reactive component} = VI \sin \phi$$

- The product of the rms value of voltage and current used in the circuit is equal to the apparent power of the circuit.
- The product of apparent power and power factor is called real power. It is always less than the apparent power.

**183. The formula for power factor of alternating current circuit can be determined.**

- (a)  $\cos \phi = \frac{R}{Z}$   
 (b)  $\cos \phi = \frac{\text{Real power}}{\text{Apparent power}}$   
 (c)  $\cos \phi = \frac{R}{\sqrt{R^2 + (X_L - X_C)^2}}$   
 (d) All of these

**R.R.B. Mumbai Asst. Loco Pilot 05.06.2005**

**R.R.B. Mumbai Asst. Loco Pilot 10.06.2008**

**Ans. (d)** All the above given options represent power factor. Power factor is the measure of how effectively the incoming power is used in an electrical system.

$$\cos \phi = \frac{\text{Real power}}{\text{Apparent power}}$$

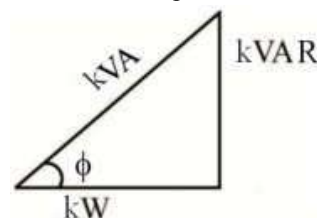
**184. Which of the following is unit of reactive power?**

- (a) VA      (b) kW  
 (c) kVAR      (d) kVA

**R.R.B. Guwahati Asst. Loco Pilot 22.01.2006**

**R.R.B. Ajmer Asst. Loco Pilot 23.05.2004**

**Ans. (c)** The unit of reactive power is kVAR.



**185. What is the power factor of a pure resistive circuit?**

- (a) 1.0 (b) 0.95  
(c) 0.9 (d) 0.85

**ISRO Electronic Mechanic 22-12-2012**

**R.R.B. Guwahati Asst. Loco Pilot 22.01.2006**

**Ans. (a)** The power factor of a pure resistive circuit is unity. The power factors of inductive or capacitive circuits are lagging, leading or less than unity.

**186. While finding the solution of an AC circuit, vector quantities are added or subtracted.**

**This is a method of solving vector quantities.....**

- (a) Vector method  
(b) Algebraic method  
(c) Numerical method  
(d) Parallelogram method

**R.R.B. Ajmer Asst. Loco Pilot 23.05.2004**

**Ans. (d)** While finding the solution of AC circuit, vector quantities are added or subtracted by Parallelogram method.

**187. Alternating current and voltage are represented by straight lines, magnitude and direction represented by arrow heads. What is this representation called?**

- (a) Scalar quantity  
(b) Vector quantity  
(c) Alternating magnitude  
(d) Phase magnitude

**R.R.B. Ajmer Asst. Loco Pilot 23.05.2005**

**Ans. (b)** Alternating current and voltage are represented by straight lines, magnitude and direction are represented by arrow heads. This representation is called vector quantity. Scalar quantity has only magnitude.

**188. The resultant reactance of R-L-C circuit is-**

- (a)  $X_L$  (b)  $X_C$   
(c)  $X_L + X_C$  (d)  $X_L - X_C$

**R.R.B. Guwahati Asst. Loco Pilot 22.01.2006**

**Ans. (d)** The resultant reactance of R-L-C circuit is  $X_L - X_C$

Where,

$X_L$  represents inductive reactance and  $X_C$  represents capacitive reactance.

$$X_L = 2\pi fL\Omega \quad X_C = \frac{1}{2\pi fC}\Omega$$

**189. The frequency at which  $X_L = X_C$  occurs is called-**

- (a) Natural frequency  
(b) Resonance frequency  
(c) Neutral frequency  
(d) Super frequency

**R.R.B. Kolkata Asst. Loco Pilot 16.07.2006**

**Ans. (b)** The frequency at which  $X_L = X_C$  occurs is called resonance frequency.

$$f_r = \frac{1}{2\pi\sqrt{LC}} \text{ Hz}$$

**190. If the resistance of a series R-L circuit is 5 ohms and inductive reactance is 12 ohms, then its impedance is-**

- (a) 2.4 Ohm (b) 7.0 Ohm  
(c) 13 Ohm (d) 17 Ohm

**R.R.B. Ahmadabad Asst. Loco Pilot 20.10.2006**

**Ans. (c)** Given,

$$R = 5\Omega$$

$$X_L = 12\Omega$$

$$\begin{aligned} \therefore Z &= \sqrt{R^2 + X_L^2} \\ &= \sqrt{5^2 + 12^2} \\ &= \sqrt{25 + 144} = \sqrt{169} \\ \boxed{Z} &= \boxed{13\Omega} \end{aligned}$$

**191. What will be the value of the resistance of that wire, whose  $50\Omega$  impedance is connected to 240V at 0.8 power factor?**

- (a)  $50\Omega$  (b)  $40\Omega$   
(c)  $6\Omega$  (d)  $48\Omega$

**ISRO Electronic Mechanic 22-12-2012**

**R.R.B. Ahmadabad Asst. Loco Pilot 17.10.2004**

**Ans. (b)** Given,

$$R = ?$$

$$Z = 50\Omega$$

$$\cos \phi = 0.8$$

$$V = 240 \text{ V}$$

We know that,  $\cos \phi = \frac{R}{Z}$

or  $R = Z \cos \phi$   
 $= 50 \times 0.8$

$$\boxed{R = 40\Omega}$$

**192. Capacitive reactance is .....to the frequency.**

- (a) Proportional to frequency  
(b) Inversely proportional to frequency  
(c) Directly proportional to the applied voltage  
(d) Inversely proportional to the applied voltage.

**RRB Asst. L.P.21.01.2019, 8:30-11:00 AM**

**ISRO Electronic Mechanic 21-02-2015**

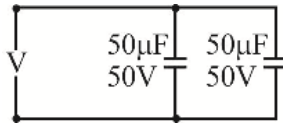
**R.R.B. Ajmer Asst. Loco Pilot 23.05.2004**

**Ans. (b)** Capacitive reactance is inversely proportional to frequency.

$$X_C = \frac{1}{2\pi fC}\Omega$$

$$X_C \propto \frac{1}{f}$$

193. The maximum value of applied voltage in the circuit shown in the figure will be-



- (a) 50 V
- (b) 250 V
- (c) 300 V
- (d) 200 V

R.R.B. Trivandrum Asst. Loco Pilot 20.06.2005

**Ans. (a)** The voltage remains the same in a parallel circuit while the current remains the same in a series circuit. Therefore the maximum value of supply voltage will be 50 volts.

194. If a contactor is designed for 220V DC, and is connected to a 220V AC source, then-

- (a) Too much current will flow through the coil and it will be destroyed.
- (b) Less current will flow through the coil and the operation of the contactor will not be ensured.
- (c) The coil will take the same current.
- (d) The contactor will work fine.

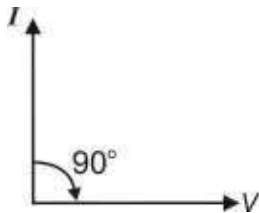
R.R.B. Trivandrum Asst. Loco Pilot 20.06.2003

**Ans. (b)** If a contactor is designed for 220V DC, its performance will not be correct if it is connected to 220V AC source.

In the coil, the resistance and the inductor are connected in series, hence due to the high value of the impedance, less current will flow in the coil.

In DC, the inductor is shorted, whereas in AC, the impedance value becomes higher due to on the inductor frequency.

195. The vector diagram of the circuit is shown in the figure below?

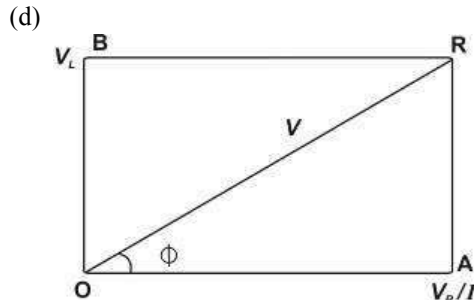
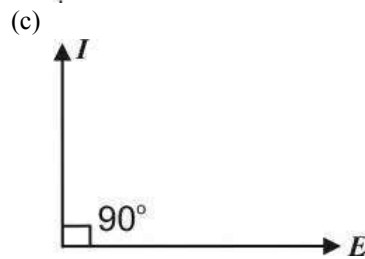
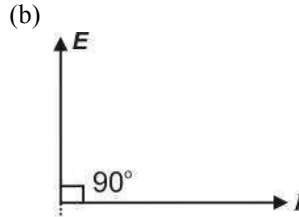
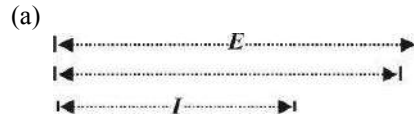


- (a) Pure C circuit
- (b) Series RL circuit
- (c) Series RLC circuit
- (d) Parallel RL circuit

R.R.B. Trivandrum Asst. Loco Pilot 20.06.2004

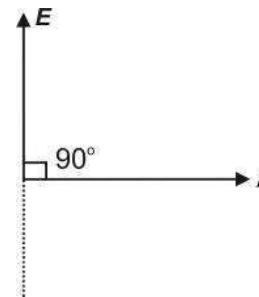
**Ans. (a)** The above given vector diagram represents a pure C circuit. In a pure C circuit the current leads the voltage by 90°. Whereas, in pure L circuit the current lags the voltage by 90°.

196. Which of the following diagrams is related to the inductive circuit?



R.R.B. Ajmer Asst. Loco Pilot 23.05.2004

**Ans. (b)**



In a pure inductive circuit the voltage leads the current by 90° and in a pure capacitive circuit the voltage lags the current by 90°.

197. In the 3-phase system, 3-phase voltage displaced by .....angle.

- (a) 90°
- (b) 120°
- (c) 180°
- (d) 270°

R.R.B. Ajmer Asst. Loco Pilot 23.05.2003

**Ans. (b)** In the 3-phase system, 3-phase voltage displaced by 120° angle.



1. The connector used for twisted pair cable is–

- (a) UTP (b) BNC  
(c) CNC (d) None of the above

ISRO URSC 18.04.2024, 1:00-2:30 PM  
ISRO Electronic Mechanic Technician-B 2016

**Ans. (a)** A twisted-pair cabling system is a cable consisting of one or several pairs of copper wires. These wires are twisted together and around each other and are insulated with a dielectric polymeric compound. Twisted pair cables are mainly of the following types–

- (i) Unshielded twisted pair cable (UTP)  
(ii) Shielded twisted pair cable (STP)  
(iii) Screened twisted pair cable (S<sub>C</sub>TP)

2. Which of the following statements is correct regarding FTP and SCTP cables?

I. FTP and SCTP cables use only external foil or braided-conductor shielding, giving them increased immunity against external EMI and RFI.

II. These cables do not provide any more protection against cross talk than similarly constructed UTP cables.

- (a) Both I and II (b) Neither I nor II  
(c) Only II (d) Only I

ISRO NRSC- 02.03.2024, 12:30-2:00PM

**Ans. (a)** : FTP and SCTP cables use only external foil or braided-conductor shielding, giving them increased immunity against external EMI and RFI.

These cables do not provide any more protection against cross talk than similarly constructed UTP cables.

Hence, both statement are correct regarding FTP and SCTP.

3. STP cables used a single type of shielding, providing the highest immunity to all types of interference. What does T stand for in STP?

- (a) Thermostate (b) Twisted  
(c) Triode (d) Turns

ISRO NRSC- 02.03.2024, 12:30-2:00PM

**Ans. (b)** : Full form of STP is shielded twisted pair. In STP cable T means twisted.

4. Which of the following cable consists of a hollow outer cylindrical conductor surrounding a single inner conductor, which is kept separated from it by an insulator?

- (a) Paper insulated cable  
(b) Coax cable  
(c) Arial bunched cable  
(d) X.L. PE cable

ISRO NRSC- 02.03.2024, 12:30-2:00PM

**Ans. (b)** : Coax cable or coaxial cable consists of a hollow outer cylindrical conductor surrounding a single inner conductor, which is kept separated from it by an insulator.

5. In wires, increase in gauge number means

- (a) Circular area increase and diameter decrease  
(b) Circular area decrease and diameter decrease  
(c) Circular area decrease and diameter increase  
(d) Circular area increase and diameter increase

ISRO IPRC-10.04.2022

**Ans. (b)** : In wire, increasing in gauge number means circular area and diameter of wire decreases. The gauge of a wire refers to its thickness. Each gauge is represented by number, with smaller number representing thicker wire gauges and higher number signifying thinner wires.

6. A coaxial cable has an inductance per unit length of 10 nH/m and a capacitance per unit length of 4 pF/m. What is the characteristic impedance of the cable?

- (a) 2.5 ohms (b) 50 ohms  
(c) 75 ohms (d) 250 ohms

ISRO VSSC-26.11.2023

**Ans. (b)** : Given that,

$$L = 10 \text{ nH/m}, 10 \times 10^{-9} \text{ H/m}$$

$$C = 4 \text{ pF/m}, 4 \times 10^{-12} \text{ F/m}$$

Characteristic Impedance  $(z_0) = \sqrt{\frac{L}{C}}$

$$= \sqrt{\frac{10 \times 10^{-9}}{4 \times 10^{-12}}} = \sqrt{\frac{10000}{4}}$$

$$z_0 = \frac{100}{2} = 50 \text{ ohms}$$

7. Which of the following are not correct for Multi-strand wires?

- (a) Better heat dissipation  
(b) More Flexible, helpful in routing  
(c) Easy for using in Breadboard wiring  
(d) Higher resistance compared to single stand

ISRO URSC-03.11.2022, 12:00-1:30 PM

**Ans. (c)** : Easy for using in Breadboard wiring are not correct for multi-strand wires.

● Multi-strand wiring is more flexible and less susceptible to cracking and metal fatigue than single stranded conductors.

● Multi-strand wires has better heat dissipation and higher resistance compared to single strand wires.

8. Which of the below properties are used to classify Cables:

- (1) Wire Gauge (2) Signal Type  
(3) Insulation Strength (4) Colour  
(a) 1, 2, 4 (b) 2, 3, 4  
(c) 1, 2, 3 (d) 1, 3, 4

ISRO URSC-03.11.2022, 12:00-1:30 PM

**Ans. (c) :** Wire gauge, signal type and insulation strength properties are used to classify cables. Colour is not properties of cables.

- Cables are used to transmit larger amounts of electrical power or signals over longer distance. They are often more robust than wires and are designed to withstand environmental factors such as moisture, heat, and physical wear and tear.

9. **With the reference of cable, what is full form of FRC?**

- (a) Full rolling cable (b) Flat ribbon cable  
(c) Fat ribbon cable (d) Fast realing cable

**RRB Asst. L.P. 21.01.2019, 3:00 PM-04:30 PM**

**Ans. (b) :** The full form of FRC is Flat Ribbon cable.

■ Flat ribbon cables are commonly used in computers to interconnects the internal and external devices such as hard drives, CD drives and floppy drives.

10. **Which one of the following is not a conformal coating material?**

- (a) Silicon Resin  
(b) Polyparaxylylene  
(c) Polyurethane Resin  
(d) Polytetrafluoroethylene

**ISRO Electronic Mechanic 02-06-2019**

**Ans. (d) :** Polytetrafluoroethylene is not a conformal coating material. It is used as a non-stick coating for pans and other cookware.

**Conformal coating material**– Conformal coating material is a thin polymer film that conforms to the contours of a printed circuit board to protect the components of the board. The film is typically applied at 25-250 μm and conforms to the shape of the board and its components, covering and protecting solder joints. Silicon resin, polyparaxylylene and polyurethane resin is a example of conformal coating material.

11. **Which of the following insulators has a better capability to withstand high temperature?**

- (a) Teflon  
(b) Polyvinyl Chloride  
(c) Vulcanised Insulated Rubber  
(d) Paper

**[ISRO VSSC Technician. 02.06.2019]**

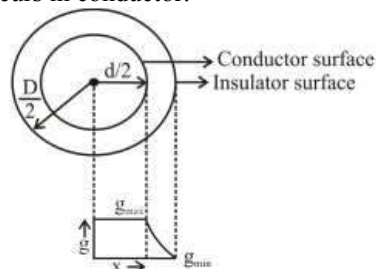
**Ans. (a) :** Teflon is an insulating material which has a better capability to withstand high temperature. A thermal insulator is a poor conductor of heat and has low thermal conductivity.

12. **The maximum value of potential gradient in a cable occurs in**

- (a) Conductor (b) Insulation  
(c) Outer sheath (d) None of these

**ISRO VSSC 22.12.2012**

**Ans. (a) :** The maximum value of potential gradient in a cable occurs in conductor.



$$\text{Potential gradient (g)} = \frac{V}{x \log_e \frac{D}{d}} \text{ volt / m}$$

Where, V → Potential difference between conductor and sheath. Potential gradient will be maximum when x is minimum.

$$g_{\max} = \frac{2V}{d \log_e \frac{D}{d}} \text{ volt / m}$$

$$g_{\min} = \frac{2V}{D \log_e \frac{D}{d}} \text{ volt / m}$$

■ For most economical conductor size in a cable-

$$\frac{g_{\max}}{g_{\min}} = \frac{D}{d} = e = 2.718$$

13. **Which among the following is the best conductor of electricity?**

- (a) Copper (b) Silver  
(c) Aluminium (d) Iron

**R.R.B. Kolkata Asst. Loco Pilot 16.07.2006**

**Ans. (b) :** Silver is a best conductor of electricity. It has an electrical conductivity of  $6.30 \times 10^7$  S/m. It is used to make connection points of relays, contactors, starters etc.

Order of conductivity of heat is given below-  
Silver > Copper > Gold > Aluminium > Zinc > Brass > Water > Rubber > wood.

14. **The current carrying capacity of cable is depends on-**

- (a) Thickness of the wire  
(b) Number of wires  
(c) Both (a) and (b)  
(d) None of these

**R.R.B. Malda Asst. Loco Pilot 16.07.2006**

**Ans. (c) :** The current carrying capacity of cable is depend on both thickness of the wire and number of wires. Because as the thickness of the wire increases, the resistance decreases.

$$R = \rho \frac{l}{A}$$

Where, R = Resistance of wire  
ρ = Resistivity  
l = Length of wire  
A = Area of cross-section

15. **Which wire is used for testing of electronic components?**

- (a) Multi-core wire  
(b) Hook-up wire  
(c) Flexible ribbon type wire  
(d) Flexible wire

**R.R.B. Gorakhpur Asst. Loco Pilot 08.10.2006**

**Ans. (d) :** Flexible wire is used for testing of electronic components. A flexible wire is measured by diameter. According to the gauge diameter of the wire, it will be measured by a gauge number.