



**PINNACLE**

**1st  
edition**

# **RRB ALP & Technicians**

**30 Sets**

Exam conducted during 9th August- 31st August 2018

## **Solved Papers (PYP)**

**With detailed explanation & short Tricks**

**English Medium**

Piracy Check



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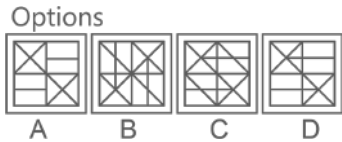
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## RRB ALP & Technicians 09/08/2018 (Morning)

**Q.1.** From the options given, select the rotated version of the following image.



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

**Q.2.** The SI unit of resistance is:

(a) Coulomb (b) Newton  
(c) Ohm (d) Joule

**Q.3.** Negative acceleration is in the opposite direction of:

(a) velocity (b) force  
(c) momentum (d) distance

**Q.4.** 1 kWh = ?

(a)  $3.6 \times 10^{-5}$  J (b)  $3.6 \times 10^5$  J  
(c)  $3.6 \times 10^{-6}$  J (d)  $3.6 \times 10^6$  J

**Q.5.** Which of the following is the last element in Newlands Law of Octaves classification ?

(a) Radium (b) Iron  
(c) Thorium (d) Rhodium

**Q.6.** Who is the current (as of February 2018) President of the Indian Olympic Association?

(a) Abhinav Bindra  
(b) Narinder Dhruv Batra  
(c) Sharad Pawar  
(d) Prannoy Roy

**Q.7.** Which of the following is not a Triangular number?

(a) 3 (b) 15 (c) 10 (d) 5

**Q.8.** Which gas is released when water is added to bleaching powder?

(a) Oxygen (b) Chlorine  
(c) Hydrogen (d) Carbon dioxide

**Q.9.** Which of the following is true?

(a)  $\frac{29}{6} > \frac{43}{12}$  (b)  $\frac{29}{6} < \frac{43}{12}$   
(c)  $\frac{29}{6} = \frac{53}{12}$  (d)  $\frac{29}{6} = \frac{43}{12}$

**Q.10.** In the following series, one term is missing as shown by the question mark (?). Select the missing term from given options.

ST, TU, UV, VW, ?

(a) WX (b) WV (c) WY (d) WZ

**Q.11.** Tapas, Avi and Rishi shared a cake.

Tapas had  $\frac{1}{2}$  of it, Rishi had  $\frac{1}{3}$  of it and Avi had the rest. What was Avi's share of the cake?

(a)  $\frac{2}{6}$  (b)  $\frac{1}{6}$  (c)  $\frac{3}{5}$  (d)  $\frac{3}{6}$

**Q.12.** Which of the following numbers will have an irrational square root ?

(a) 1024 (b) 2048 (c) 2401 (d) 4096

**Q.13.** Asexual reproduction differs from sexual reproduction in that in asexual reproduction, \_\_\_\_\_

(a) the nuclei of gametes fuse  
(b) the gametes are produced in reproduction  
(c) the new organisms are genetically identical to the parent  
(d) the offspring shows variations

**Q.14.** Select the most appropriate term for the following set of items.



(a) Books (b) Marriage  
(c) Celebration (d) Meeting

**Q.15.** At 9.5% simple interest per annum a sum of money became ₹ 942 in 6 years. The sum initially invested was:

(a) 675 (b) 626 (c) 600 (d) 650

**Q.16.** The reflector of a searchlight is a:

(a) cylindrical mirror (b) convex mirror  
(c) concave mirror (d) plane mirror

**Q.17.** Nodes of Ranvier are microscopic gaps found within :

(a) chondroblasts (b) gland cells  
(c) osteoblasts (d) myelinated axons

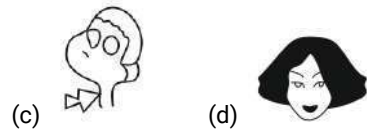
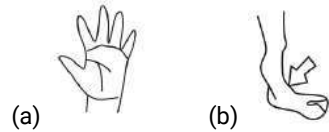
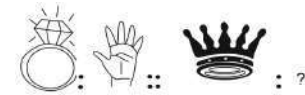
**Q.18.** Umar and Avinash started a partnership with investments of ₹ 10,000 and ₹ 15,000, respectively but due to a financial emergency the latter had to withdraw his investment after 8 months.

In what ratio should the profit of the first twelve months be shared among the duo  
(a) 2 : 3 (b) 1 : 1 (c) 3 : 2 (d) 1 : 2

**Q.19.** By which of the following processes are metals of high reactivity extracted from purified molten ore?

(a) Reduction by an appropriate reducing agent  
(b) Roasting  
(c) Electrolysis  
(d) Calcination

**Q.20.** Select the option that is related to the third figure in the same way as the second figure is related to the first figure.



**Q.21.** Find a two digit number which is exactly three times the product of its digits?

(a) 12 (b) 48 (c) 24 (d) 36

**Q.22.** As of February 2018, who owns the Kolkata - based IPL team 'Kolkata Knight Riders' ?

(a) Subrata Roy (b) Aamir Khan  
(c) Sourav Ganguly (d) Shah Rukh Khan

**Q.23.** Consider the given question and decide which of the following statements is/are sufficient to answer the question. Is X-5 even? X is a real number.

**Statements :**

1. X -15 belongs to integer

2. X -10 is an odd integer

(a) Statement 1 alone is sufficient while statement 2 alone is insufficient  
(b) Neither statement 1 nor 2 is sufficient  
(c) Statement 2 alone is sufficient while statement 1 alone is insufficient  
(d) Both statements 1 and 2 are sufficient

**Q.24.** By which legislation were India and Pakistan divided into two independent nations?

(a) Pakistan Partition Act 1947  
(b) Indian Partition Act 1947  
(c) Pakistan Independence Act 1947  
(d) Indian Independence Act 1947

**Q.25.** Consider the given statement true and decide which of the conclusions logically follow(s) from the information given in the statement.

**Statement :** The population in metro cities is increasing tremendously which leads to the shortage of living space and a drop in living conditions of the people.

**Conclusions :**

1. Government should re-plan city development.  
2. Government should demolish illegal buildings and build cottages for people.  
(a) Only conclusion 2 follows.  
(b) Only conclusion 1 follows.  
(c) Neither conclusion 1 nor 2 follows.  
(d) Both conclusions 1 and 2 follow.

**Q.26.** Which of the numbers given below is the square root of 15376?

- (a) 124 (b) 134 (c) 122 (d) 128

**Q.27.** Select the option that depicts the correct mirror image of the given word when the mirror is placed horizontally below the word.

HEALTHY

- (a) YHTLAEH (b) YHTLAEH  
(c) YHTJAEH (d) HEVTLHY

**Q.28.** Consider the given statement and decide which of the given assumptions is/are implicit in the statement.

**Statement:** Teachers must attend workshop.

**Assumptions:**

- (I) Workshop updates teachers.  
(II) Workshops kill time.  
(a) Only assumption (II) is implicit.  
(b) Both assumptions (I) and (II) are implicit.  
(c) Neither assumption (I) nor (II) is implicit.  
(d) Only assumption (I) is implicit.

**Q.29.** When a number of resistors are connected in series in a circuit, the value of current:

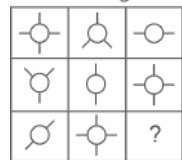
- (a) decreases (b) remains the same  
(c) increases (d) becomes half

**Q.30.** A convex mirror of focal length  $f$  (in air) is immersed in a liquid ( $\mu = 4/3$ ) The focal length of the mirror in liquid will be:

- (a)  $(\frac{7}{3})f$  (b)  $f$  (c)  $(\frac{4}{3})f$  (d)  $(\frac{3}{4})f$

**Q.31.** Select the Answer Figure that fits in the blank space in the given Problem Figure.

Problem Figure



Answer Figure



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

**Q.32.** How many atoms are present in a  $(\text{NH}_4)_2\text{SO}_4$  molecule?

- (a) 14 (b) 12 (c) 15 (d) 13

**Q.33.** If the difference between the mode and median is 2, then the difference between the median and mean is: (in the given order)

- (a) 1 (b) 2 (c) 4 (d) 3

**Q.34.** Consider the given argument and

decide which of the given assumptions is/are implicit in the argument.

**Argument:** The campaign of 'Swachh Bharat', keep your cities clean, started by the apartment association didn't bring much response from its residents.

**Assumptions:**

1. Residents do not wish to keep their apartment clean.  
2. The association had failed in the campaign.  
(a) Only assumption 2 is implicit.  
(b) Neither 1 nor 2 is implicit.  
(c) Both 1 and 2 are implicit  
(d) Only assumption 1 is implicit.

**Q.35.** Momentum is measured as the product of:

- (a) Mass and velocity  
(b) Mass and force  
(c) Mass and inertia  
(d) Mass and acceleration

**Q.36.** Consider the given question and decide which of the following statements is sufficient to answer the question.

How was the sale of the company ABC ?

**Statements :**

1. The company ABC sold 75,000 units of soaps each at 70/-.  
2. ABC has no other products in the production line.  
(a) 1 alone is sufficient while 2 alone is not sufficient to answer the question.  
(b) 2 alone is sufficient while 1 alone is not sufficient to answer the question.  
(c) Neither 1 nor 2 is sufficient to answer the question.  
(d) Both 1 and 2 are sufficient to answer the question.

**Q.37.** Who is the author of the book 'The Association of Small Bombs', which is currently shortlisted for the International Dublin Literary Award?

- (a) Namitha Ghokhale (b) Arundhati Roy  
(c) Karan Mahajan (d) Chetan Bhagat

**Q.38.** The interest earned on ₹ 1,600 at the rate of 5% simple interest per annum for 6 years would be:

- (a) 496 (b) 480 (c) 450 (d) 2080

**Q.39.** Fill in the blank with the most appropriate option.

Plants that do not have a differentiated plant body belong to the group \_\_\_\_\_

- (a) Phanerogams (b) Pteridophyta  
(c) Bryophyta (d) Thallophyta

**Q.40.** If  $9 \times 6 = 45$ ,  $7 \times 4 = 33$  and  $6 \times 4 = 20$  then what is the value of  $5 \times 3$  ?

- (a) 24 (b) 16 (c) 13 (d) 10

**Q.41.** A ladder 13 m long reaches a

window which is 12 m above the ground on the side of a street. Keeping its foot at the same point, the ladder is turned to the other side of the street to reach a window 5m high, then the width of the street is:

- (a) 14 m (b) 16 m (c) 15 m (d) 17 m

**Q.42.** An increase in the price of which of these products will have a ripple effect in increasing the prices of many products, thereby resulting in inflation?

- (a) Medicines (b) Smartphones  
(c) Petroleum (d) Automobiles

**Q.43.** A train takes 10 seconds to cross a bridge of length 100 m travelling at 90 kmph. Find the length of the train in metres.

- (a) 140 (b) 150 (c) 130 (d) 120

**Q.44.** A 4.0 kg object is moving horizontally with a speed of 5.0 m/s. To increase its speed to 10 m/s, the amount of net work required to be done on this object is:

- (a) 75 J (b) 150 J (c) 50 J (d) 100 J

**Q.45.** Seven years from now Virat will be twice as old as Mohinder. Five years ago Mohinder's age was one year less than  $\frac{2}{5}$  of Virat's age. What is Virat's present age ?

- (a) 51 years (b) 55 years  
(c) 53 years (d) 57 years

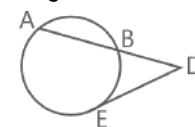
**Q.46.** Who is the Chairman of the Economic Advisory Council to the Prime Minister (PMEAC) as of February 2018 ?

- (a) Amartya Sen (b) Najma Heptulla  
(c) Bibek Debroy (d) Amit Mitra

**Q.47.** Which of the following acids is present in Red Ants ?

- (a) Formic acid (b) Malic acid  
(c) Tannic acid (d) Oxalic acid

**Q.48.** In the circle above, chord  $\overline{AB}$  is extended to meet the tangent  $\overline{DE}$  at D. If  $\overline{AB} = 12$  cm and  $\overline{DE} = 8$  cm, find the length of  $\overline{BD}$



- (a) 6 cm (b)  $4\sqrt{6}$  cm (c) 4 cm (d) 5 cm

**Q.49.** Name the metal that can be easily cut with a knife:

- (a) Sodium (b) Gold  
(c) Copper (d) Aluminium

**Q.50.** Looking at the portrait of a girl, Shesha, a girl, said, "Her mother is my

maternal grandfather's only daughter who has only one daughter and no sons". How is Shesha related to the girl in the portrait?

- (a) Shesha is the girl in the portrait  
(b) Niece  
(c) Sister  
(d) Aunt

**Q.51.** Consider the given question and decide which of the following statements is sufficient to answer the question. Is Raju fond of travelling?

**Statements:**

1. Raju has seen East, West, North and Southern parts of India.

2. Raju likes to be in the company of his friends.

- (a) Statement 1 alone is sufficient but statement 2 alone is not sufficient to answer the question.  
(b) Both statements taken together are sufficient to answer the question, but neither statement alone is sufficient.  
(c) Statements 1 and 2 together are not sufficient, and additional data is needed to answer the question.  
(d) Statement 2 alone is sufficient but statement 1 alone is not sufficient to answer the question.

**Q.52.** Who is the MD and CEO of Allahabad Bank as of March 2018?

- (a) Shikha Sharma  
(b) Chitra Ramakrishna  
(c) Usha Ananthasubramanian  
(d) Arundhati Bhattacharya

**Q.53.** Consider the given question and decide which of the following statements is/are sufficient to answer the question. Between X and Y who is the better dancer?

**Statements:**

1. X had given more dance auditions.

2. Y had given more stage performances.

- (a) Neither statement 1 nor 2 is sufficient  
(b) Statement 2 alone is sufficient while statement 1 alone is insufficient  
(c) Statement 1 alone is sufficient while statement 2 alone is insufficient  
(d) Both statement 1 and 2 are sufficient

**Q.54.** Select the related word pair from the following options.

Goose : Geese :: \_\_\_\_\_

- (a) Pant: Pants (b) Shirts : Shirt  
(c) Socks : Sock (d) Jacket: Jacket

**Q.55.** ABC\$+#DEF&=?GHI!2\*@

Find the missing term using the above sequence:

ABC : @\*2 :: \$#E : \_\_\_\_\_

- (a) ?H! (b) !H? (c) HH! (d) !HG

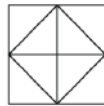
**Q.56.** In the morning X and Y are walking towards each other in a park. When they meet each other, Y's shadow falls straight in front of X. In which direction was X facing?

- (a) West (b) South (c) North (d) East

**Q.57.** In a class, there were 9 boys and some girls. In a test the mean score obtained by the boys was 12 while that obtained by the girls was 14. If the overall average was 13.1, what was the total number of students in the class?

- (a) 21 (b) 19 (c) 22 (d) 20

**Q.58.** How many triangles are present in the following figure?



- (a) 13 (b) 12 (c) 11 (d) 10

**Q.59.** Which of the following is a Saprotroph?

- (a) Pigeon (b) Man  
(c) Mushroom (d) Algae

**Q.60.** A swimming pool is filled in 10 hours by three tankers A, B and C. The tanker C is Twice as fast as B and B is twice as fast as A. How much time will tanker A alone take to fill the swimming pool?

- (a) 40 hours (b) 80 hours  
(c) 90 hours (d) 70 hours

**Q.61.** The number of neutrons in an atom is equal to the:

- (a) Atomic number  
(b) Mass number  
(c) Number of electrons  
(d) Mass number - atomic number

**Q.62.** The volume of a right circular cone, whose radius of the base is the same as one-third of its altitude, and the volume of a sphere are equal. The ratio of the radius of the cone to the radius of the sphere is:

- (a) 1 : 1 (b)  $\sqrt[3]{4} : \sqrt[3]{3}$   
(c)  $\sqrt[3]{3} : \sqrt[3]{2}$  (d)  $\sqrt[3]{4} : 1$

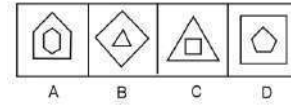
**Q.63.** Pir Panjal Railway Tunnel is located in \_\_\_\_\_

- (a) Jammu and Kashmir  
(b) Himachal Pradesh  
(c) Uttarakhand  
(d) Sikkim

**Q.64.** The ratio of the numbers of blue to red balls in a bag is constant. When there were 44 red balls, the number of blue balls was 36. If the number of blue balls is 54, how many red balls will be in the bag?

- (a) 62 (b) 68 (c) 66 (d) 64

**Q.65.** Select the figure that does NOT belong in the following group.



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

**Q.66.** Who is the author of the speculative fiction book 'Half of What I Say'?

- (a) Anil Menon (b) K.R. Meera  
(c) Namita Gokhale (d) Shashi Tharoor

**Q.67.** In Mendeleev's periodic table, the properties of the elements are considered a periodic function of their:

- (a) Atomic number (b) Ionization enthalpy  
(c) Atomic size (d) Atomic mass

**Q.68.** Select the most appropriate term for the given set of items.



- (a) Fine arts (b) Pictures  
(c) Technology (d) Culture

**Q.69.** Three years from now Dharitri's age will be eight years less than twice Eunice's age. The sum of their present ages is 61 years. What is Dharitri's present age?

- (a) 43 years (b) 36 years  
(c) 41 years (d) 39 years

**Q.70.** Type '1' workers can do three times the work of Type '2' workers. Twelve Type '1' workers can complete a task in 10 days. How many days would it have taken 4 Type '1' and 8 Type '2' workers to complete the same task?

- (a) 17 (b) 20 (c) 18 (d) 16

**Q.71.** Consider the given statement and decide which of the given assumptions is/are implicit in the statement.

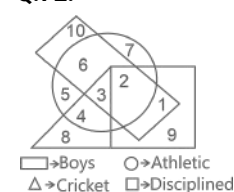
**Statement :** Honesty is the best policy.

**Assumptions:**

- (I) Honest people are policy makers.  
(II) Each policy must contain honesty.

- (a) Only assumption (I) is implicit.  
(b) Both assumptions (I) and (II) are implicit.  
(c) Only assumption (II) is implicit.  
(d) Neither assumption (I) nor (II) is implicit.

**Q.72.**



According to the given Venn diagram, which number represents 'Boys who participate in athletics and also play cricket'?

- (a) 11 (b) 2 (c) 1 (d) 3

**Q.73.** Who is the newly appointed Governor of Tamil Nadu as of February 2018?

- (a) Subramanian Swamy  
(b) Banwarilal Purohit  
(c) K Rosaiah  
(d) Satyapal Malik

**Q.74.** The number of symbols that are preceded by a number in the given expression is \_\_\_\_\_

R+JM2\$#QR?\*O@7F3

- (a) 4 (b) 1 (c) 3 (d) 2

**Q.75.** Consider the given statements true and decide which of the given conclusions can definitely be drawn from the given statements.

**Statements:**

- Some fruits are vegetables.
- Some vegetables are not edible.

**Conclusions:**

- Some fruits are not edible.
  - Some vegetables are fruits.
- (a) Conclusion 2 is correct.  
(b) Conclusion 1 is correct.  
(c) Neither conclusion 1 nor 2 is correct.  
(d) Both conclusions 1 and 2 are correct.

**Answer Key :-**

1.(c)	2.(c)	3.(a)	4.(d)
5.(c)	6.(b)	7.(d)	8.(b)
9.(a)	10.(a)	11.(b)	12.(b)
13.(c)	14.(c)	15.(c)	16.(c)
17.(d)	18.(b)	19.(c)	20.(d)
21.(c)	22.(d)	23.(c)	24.(d)
25.(b)	26.(a)	27.(d)	28.(d)
29.(b)	30.(b)	31.(c)	32.(c)
33.(a)	34.(a)	35.(a)	36.(d)
37.(c)	38.(b)	39.(d)	40.(b)
41.(d)	42.(c)	43.(b)	44.(b)
45.(b)	46.(c)	47.(a)	48.(c)
49.(a)	50.(a)	51.(a)	52.(c)
53.(b)	54.(a)	55.(b)	56.(d)
57.(d)	58.(b)	59.(c)	60.(d)
61.(d)	62.(b)	63.(a)	64.(c)
65.(d)	66.(a)	67.(d)	68.(c)
69.(d)	70.(c)	71.(d)	72.(d)
73.(b)	74.(b)	75.(a)	

**Solutions :-**

**Sol.1.(c) D.** The rotated version of the following image is



**Sol.2.(c) Ohm. Resistance:** It is a measure of the opposition to current flow in an electrical circuit.  $R = V/I$ . Some other units: Charge (Coulomb), Force (Newton) and Work (Joule).

**Sol.3.(a) Velocity. Acceleration:** The rate of change of velocity. It can have positive or negative values. **Acceleration (a) =  $\frac{\text{Change in velocity } (\Delta v)}{\text{time}(t)}$** , **Unit - (m/s<sup>2</sup>).**

**Types: Uniform Acceleration** - If the speed of an object increases at a constant rate, it is experiencing a uniform acceleration. **Non-uniform Acceleration** - An object is considered to be non-uniformly accelerated if the speed of the object fluctuates in different amounts over equally long intervals.

**Sol.4.(d)  $3.6 \times 10^6$  J. Power (P):** The rate of work done by the electric energy. SI unit - watt (W). 1 Unit of electricity = 1 kWh = 1000 Watt-hour =  $3.6 \times 10^6$  J. 1 Watt: The energy consumption rate of 1 joule per second.

**Sol.5.(c) Thorium (Th): Atomic number 90.** 56 known elements were arranged by **Newland** in the order of increasing atomic masses in 1864. He observed that the properties of every eighth element are similar to the properties of the first element. **First element**-Hydrogen (H). **Example:** Sodium (Na,11) having the similar properties to lithium (Li, 3). **Elements and Atomic number: Radium (Ra, 88), Iron (Fe, 26) and Rhodium (Rh, 45).**

**Sol.6.(b) Narinder Dhruv Batra.** The Indian Olympic Association was established in 1927. It is registered as a Non-Profit Organisation under the Societies Registration Act of 1860.

**Sol.7.(d) 5.** Formula for calculating nth triangular number is,  $X_n = n(n+1)/2$  Hence 1, 3, 6, 10, 15 are the first, second, third, fourth and fifth triangular numbers respectively but 5 is not.

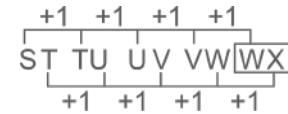
**Sol.8.(b) Chlorine (Cl) : Atomic Number 17. Bleaching powder (Calcium hypochlorite,  $\text{Ca}(\text{ClO})_2$ )** used as a bleaching agent of impurities in water. When it reacts with water, it hydrolyses to

hypochlorous acid (HOCl), which hydrolyzes further to Hydrochloric Acid (HCl), releasing the strong smell due to Chlorine. This Chlorine acts as a disinfectant. It is a pale yellowish powder and soluble in water.

**Sol.9.(a) LCM of 6 and 12 = 12**

$$\text{Now, } \frac{29}{6} \times 12 = 58 \text{ and } \frac{43}{12} \times 12 = 43 \\ \Rightarrow \frac{29}{6} > \frac{43}{12}$$

**Sol.10.(a)**



**Sol.11.(b)** Let the total no of cakes be 6 i.e. LCM of (2,3)

$$\text{No of cakes that Tapas had} = \frac{1}{2} \times 6 = 3$$

$$\text{No of cakes that Rishi had} = \frac{1}{3} \times 6 = 2$$

$$\text{Remaining cakes} = 6 - (3 + 2) = 1$$

$$\text{Avi's share of the cake} = \frac{1}{6}$$

**Sol.12.(b)** As we know, perfect square no ends with (1, 4, 5, 6, 9).

Now, from the given option, we can clearly see that 2048 has irrational square roots.

**Sol.13.(c) The new organisms are genetically identical to the parent.**

**Sexual Reproduction:** It is the combination of reproductive cells from two individuals to form a third unique offspring. **Asexual Reproduction:** In which a new offspring is produced by a single parent. The new individuals produced are genetically and physically identical to each other. **Types - Binary Fission:** The parent cell divides into two cells. **Example - Amoeba and Euglena.** **Budding:** Hydra is an organism that reproduces by budding. **Fragmentation:** The parent body divides into several fragments and each fragment develops into a new organism. **Vegetative Propagation:** Occurs through their vegetative parts such as leaves, roots, stems, and buds.

**Sol.14.(c)** The given picture depicts celebration.

**Sol.15.(c)** Let the principal be 100% Amount on certain sum after 6 year at 9.5% =  $100 + (6 \times 9.5)\% = 157\%$  which corresponds to ₹942

So,

$$100\% \text{ corresponds to } \frac{942}{157} \times 100 = ₹600$$

**Sol.16.(c) Concave Mirror:** Reflecting surface is toward the center of the curvature. It is also known as a converging mirror. Image formed - Real, Virtual, Erect and Inverted. Uses: Shaving mirrors, Headlights and Solar furnaces. Convex Mirror: Reflecting surface is away from the center of the curvature. It is also known as a diverging mirror. Image formed - Virtual and Erect. Uses: Rear-view mirrors in vehicles, Security purposes in buildings and ATMs. Plane Mirror: It is a mirror with a flat (planar) reflective surface. Image formed - Virtual and Erect, Images cannot be projected or focused on a screen. Uses: Torch Lights, Looking Glasses, Solar Cooker.

**Sol.17.(d) The myelinated axons** are characterised by a covering of a fatty layer called the myelin sheath secreted by the Schwann cells. The myelin sheath is non-conducting. Therefore, small gaps are left between Schwann cells along the entire length of the axons. These gaps are called Nodes of Ranvier. They allow saltation of the nerve impulse. **Chondroblasts** (cells): Play an important role in the formation of cartilage. **A gland** is a group of cells or a secreting organ that excretes a chemical substance. **Osteoblasts** are cells with a single nucleus that synthesise bone.

**Sol.18.(b)** Required profit ratio  
 $= 10,000 \times 12 : 15,000 \times 8 = 30 : 30 = 1 : 1$

**Sol.19.(c) Electrolysis.** Metals of high reactivity such as Magnesium (Mg), Calcium (Ca) and Sodium (Na) are extracted from purified molten ore by the Electrolysis process. In the Electrolysis process, electric current is passed through the molten state of metal ores. In this process metals are deposited over the cathode. **Calcination** is mostly used in the oxidation of carbonates. **Roasting** is a method that is used for converting sulphide ores.

**Sol.20.(d) Logic :** - From the figure we can say that as the diamond ring is worn in the hands, similarly the crown is worn on the head.

**Sol.21.(c)** On checking the given options one by one, we get option (c) satisfies the given condition.  
 $24 = 3(2 \times 4)$   
 $24 = 24$  (LHS = RHS)

**Sol.22.(d) Shah Rukh Khan.** Indian Premier league (IPL) Team and its Owner : Mumbai Indians (Mukesh Ambani), Delhi Capitals (Parth Jindal),

Rajasthan Royals (Manoj Badale), Sunrisers Hyderabad (Kalanithi Maran), etc.

**Sol.23.(c) Statement 1 :**

$X - 15 = \text{Integer}$   
 $\Rightarrow X$  is also an integer.

**Statement 2 :**

$X - 10 = \text{odd integer}$   
 $\Rightarrow X$  is also an integer  
 $\Rightarrow (X - 5)$  is even.

Statement 2 is alone sufficient while statement 1 is alone insufficient.

**Sol.24.(d) Indian Independence Act 1947—**

It was enacted by the British Parliament and proclaimed India to be a free and independent nation. On 18 July 1947, the Indian Independence Act got royal assent and on 15 August 1947, India and Pakistan were formed. The Indian National Congress, Muslim League, and Sikh community reached an agreement with Lord Mountbatten (Mountbatten Plan or 3rd June plan). India continues to celebrate 15th August as its Independence day, while Pakistan chose to celebrate 14th August as its Independence day as per their cabinet decisions.

**Sol.25.(b)** Here in the statement it does not mention the existence of illegal buildings. So, conclusion 2 is invalid and does not follow.

Since in the statement it is given the issue of living space in the city, it can be concluded that the Government should re-plan city development.

Hence, only conclusion 1 follows.

**Sol.26.(a)**

The square root of 15376 = 124

**Sol.27.(d)**

HEVΓIHX

**Sol.28.(d)** Workshop increases practical knowledge so it is beneficial for teachers to attend the workshop, so statement 1 is implicit. Workshop does not kill time. So, statement 2 is not implicit.

**Sol.29.(b) Remains the same. Resistors :**

A component of a circuit that resists the flow of electrical current. **Parallel Circuit:** When resistors are connected with several conducting paths between the sources of emf. In a parallel connection, the voltage remains the same across all resistors, but the current will be different.

**Total Resistance**  $\left(\frac{1}{R}\right) = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$

**Series Circuit:** When resistors are connected with only one conducting path

they are said to be connected in series. The same current flows through the all resistances but the voltage drop will be different and proportional to the resistance. **Total Resistance (R) = R<sub>1</sub> + R<sub>2</sub> + R<sub>3</sub>**

**Sol.30.(b) f.** The focal length of a mirror does not depend on the refractive index of the medium. On immersing a mirror in water, the focal length of the mirror remains unchanged because the focal length of the mirror depends on radius of curvature which is unchanged. So the focal length of the mirror is "f".

**Sol.31.(c)** From the given figure we can say that figure (a) is the right answer.

**Sol.32.(c) 15. Number of elements in Ammonium Sulphate (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub>:**

Hydrogen -  $4 \times 2 = 8$ , Nitrogen - 2, Oxygen - 4 and Sulphur - 1. It is an inorganic salt. **Characteristics:** No smell, dissolves easily in water. **Appearance:** Fine white crystalline solid or hygroscopic granules. **Uses:** As a fertilizer, reagent, insecticide, food additive and disinfectant.

**Sol.33.(a)** Mode - Median = 2

Mode = 2 + Median ... (eq. 1)

As we know,

Mode = 3 Median - 2 Mean

By putting the value of mode from eq. (1)

$2 + \text{Median} = 3 \text{Median} - 2 \text{Mean}$

$\Rightarrow 2 \text{Median} - 2 \text{Mean} = 2$

Median - Mean = 1

**Sol.34.(a) Assumptions 1 :** - It is not the truth that the residents of the apartment don't want to keep their apartment clean. But the campaign is about the whole India. So assumption 1 is not implicit.

**Assumptions 2 :-** The apartment association didn't get much response from the residents of the apartment, which means the head of association failed in the campaign. So assumption 2 is implicit.

**Sol.35.(a) Mass and Velocity.**

**Momentum:** Product of the mass of a particle and its velocity. It is a vector quantity (has both magnitude and direction). **Example:** A baseball flying through the air, A bullet fired from a gun.  $p = mv$ , SI units ( kg-m/s.). **Isaac Newton's second law of motion** states that the **rate of change of momentum** of a body is directly proportional to the force applied on it and this change in momentum takes place in the direction of the applied force. Product of **mass**



**and acceleration** is called Force. Formula:  $F = ma$ . It is also a vector quantity.

**Sol.36.(d)** From 1, Sale of the company ABC =  $75,000 \times 70 = ₹52,50,000$

From 2, we know that the company deals only in soaps.

This implies that sale of soaps is the total sale of the company, which is 52,50,000.

Therefore, we can clearly see that Both 1 and 2 are sufficient to answer the question.

**Sol.37.(c) Karan Mahajan. Chetan Bhagat books:** "Half Girlfriend", "Five Point Someone" and "Revolution 2020".

**Namitha Ghokhale:** "A Himalayan Love Story (1996)", "Paro: Dreams of Passion (1984)". **Arundhati Roy:** "The God of Small Things", "Ministry of Utmost Happiness", "The Cost of Living", "Capitalism: A Ghost Story", "An Ordinary Person's Guide to Empire".

**Sol.38.(b)**

Required SI =  $1600 \times 5 \times 6\% = ₹480$

**Sol.39.(d) Thallophyta.** This group includes those plants whose body is not well differentiated. (Thallus = undifferentiated). The plants coming under this group are called algae which are mostly aquatic. Examples: Spirogyra, Ulothrix, Cladophora, and Chara etc.

**Sol.40.(b) Logic :-**

$$9^2 - 6^2 = 81 - 36 = 45$$

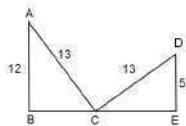
$$7^2 - 4^2 = 49 - 16 = 33$$

$$\text{and, } 6^2 - 4^2 = 20$$

Similarly,

$$5^2 - 3^2 = 25 - 9 = 16.$$

**Sol.41.(d)**



Let BE be the width of street

$$\begin{aligned} \text{In } \triangle ABC, BC &= \sqrt{13^2 - 12^2} \\ &= \sqrt{169 - 144} = \sqrt{25} = 5 \text{ m} \end{aligned}$$

$$\begin{aligned} \text{In } \triangle CDE, CE &= \sqrt{13^2 - 5^2} = \sqrt{169 - 25} \\ &= \sqrt{144} = 12 \text{ m} \end{aligned}$$

So, the width of ladder =  $5 + 12 = 17 \text{ m}$

**Sol.42.(c) Petroleum.** Inflation is a general rise in the price level of an economy over a period of time. Petroleum is a raw material that has usage in other products. Higher oil prices contribute to inflation directly and by increasing the cost of inputs. Oil prices

indirectly affect costs such as transportation. Increases in oil prices can reduce households' demand for goods and services. Smartphones, Automobiles and medicines are final products which are directly consumed by the people and do not affect the supply chain.

**Sol.43.(b)** Let the length of train be  $x$  ATQ,

$$100 + x = 10 \times 90 \times \frac{5}{18}$$

$$100 + x = 250$$

$$x = 250 - 100 = 150 \text{ m}$$

**Sol.44.(b) 150 J.**

$$\text{Net work required} = \frac{1}{2} \times 4(10^2 - 5^2)$$

$$= 2(100 - 25) = 2 \times 75 = 150 \text{ J.}$$

**Sol.45.(b)** Let the present age of Mohinder and Virat be  $x$  and  $y$  yrs respectively

$$\text{ATQ, } y + 7 = 2(x + 7)$$

$$y + 7 = 2x + 14$$

$$y - 2x = 7 \text{ ----- (1)}$$

$$\text{And, } (x - 5) = \frac{2}{5}(y - 5) - 1$$

$$x - 4 = \frac{2}{5}(y - 5)$$

$$5x - 20 = 2y - 10$$

$$5x - 2y = 10 \text{ ----- (2)}$$

Adding eqn (1)  $\times 2$  and (2) we have :

$$x = 24 \text{ yrs and } y = 55 \text{ yrs}$$

So, Virat's present age = 55 yrs

**Sol.46.(c) Bibek Debroy.** EAC-PM is a non - constitutional, non-statutory, independent body constituted to give advice on economic and related issues to the Government of India, specifically to the Prime Minister.

**Sol.47.(a) Formic acid** (HCOOH, also found in bee stings). Uses: As a preservative and antibacterial agent. Malic acid (C<sub>4</sub>H<sub>6</sub>O<sub>5</sub>) is a dicarboxylic acid. Found in Apple, grapes, watermelons, cherries, and vegetables such as carrots and broccoli. Used as a food additive. Tannic acid (C<sub>76</sub>H<sub>52</sub>O<sub>46</sub>) is found in the nutgalls formed by insects on the twigs of certain oak trees. It has numerous phenol groups and hence is a weak acid. Uses: In the dyeing process for cellulose fibres, to stop bleeding. Oxalic acid (C<sub>2</sub>H<sub>2</sub>O<sub>4</sub>) is a dicarboxylic acid also known as Ethanedioic acid. Found in Tomato, Spinach, cocoa, nuts, and seeds. Uses - Cleaning Agent, Industrial uses and Medicinal uses.

**Sol.48.(c)** Let BD be  $x$  cm Using tangent secant theorem,  $8^2 = x(12 + x)$

$$64 = 12x + x^2 \Rightarrow x^2 + 12x - 64 = 0$$

$$\Rightarrow x^2 + 16x - 4x - 64 = 0$$

$$\Rightarrow x(x + 16) - 4(x + 16) = 0$$

$$\Rightarrow (x + 16)(x - 4) = 0$$

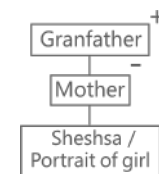
$$x = -16 \text{ or } 4$$

So, the length of BD = 4 cm

**Sol.49.(a) Sodium (Na):** Atomic number - 11, It was discovered by Humphry Davy. It is a very reactive metal which reacts with oxygen and moisture in the air if kept open. It is stored in kerosene. **Uses :** In improving the structure of certain alloys; soaps, purification of molten metals and sodium vapour lamps. **Gold** (Au, Atomic number 79), **Copper** (Cu, 29) and Aluminium (Al, 13).

**Sol.50.(a)**

Her mother is my maternal grandfather's only daughter which means the girl is either Sheesha herself or her sister. Who has only one daughter and no sons which means Sheesha's mother has only one daughter. So the portrait is of Sheesha herself.



**Sol.51.(a)** Raju has seen east ,west , north south that means he has seen all the parts of India. So it is obvious that he is fond of travelling. But we are not sure if he travels alone or with his friends.

So statement 1 is alone sufficient to give the answer but statement 2 is not sufficient.

**Sol.52.(c) Usha Ananthasubramanian.** Allahabad Bank is a nationalized bank, founded in Allahabad in 1865 with its headquarters in Kolkata, West Bengal, India.

**Sol.53.(b)** The number of dance auditions given by X or Y does not give the information about who is the better dancer because it does not give any information about the result. So, statement 1 is not sufficient.

The number of stage performances given by Y is more than X. So it is clear that the selector has chosen Y over X . So Y is a better dancer than X. So, statement 2 is sufficient .Hence, statement 2 is alone sufficient and while statement 1 alone is insufficient.

**Sol.54.(a)** As the plural of Goose is Geese similarly the plural of Pant is Pants.

**Sol.55.(b) Logic:-**

ABC\$+#DEF&amp;=?GHI!2\*#@

A → first from the left end , @ → first from the right end.

B → second from the left end , \* → second from the right end

C → third from the left end , ! → third from the right end

Similarly, ABC\$+#DEF&amp;=?GHI!2\*#@

\$ → fourth from the left end , ! → fourth from the right end

# → sixth from the left end , H → sixth from the right end

E → eighth from the left end , ? → eighth from the right end.

!H? is the correct answer.

**Sol.56.(d)** As it is morning, the sun will be in the east. The shadow will be on the west.

It is given that X and Y walk towards each other, and the shadow of Y falls in front of X, X is towards the west of Y and is facing Y.

So, X is facing the east direction.

**Sol.57.(d)** Let the no of girls be x

$$ATQ, \frac{9 \times 12 + x \times 14}{x+9} = 13.1$$

$$108 + 14x = 13.1(x+9)$$

$$108 + 14x = 13.1x + 117.9$$

$$0.9x = 9.9 \Rightarrow x = 11$$

So, the total no of students = 11 + 9 = 20

**Sol.58.(b)**

There are 12 triangles in the figure.

**Sol.59.(c) Mushroom. Saprotrophs** take their food in solution form, from dead and decaying matter. **Examples** : Bacteria, fungi, Indian pipe, Corallorhiza orchids, Mushrooms and molds Mycorrhizal fungi and fungus-like organisms. **Pigeons are** omnivorous, **Algae** are autotrophs and **Man** is omnivorous.**Sol.60.(d)** The ratio of the efficiency of A,B and C = 1 : 2 : 4

$$\text{Total work} = (1 + 2 + 4) \times 10 = 70 \text{ unit}$$

Time taken by A alone to complete the whole work =  $\frac{70}{1} = 70$  hrs**Sol.61.(d) Mass number - atomic number. Atomic Number (Z):** the number of protons present in the nucleus. **Mass Number (A):** The total number of protons and neutrons present in a nucleus. (A - Z = Number of neutrons). **Electrons (e)** -ve charge, **Proton (P)** +ve charge and **Neutrons (N)** Neutral charge, are three main types of particles that make up atoms.**Sol.62.(b)**

$$\text{Radius of cone} = \frac{1}{3} \times \text{Height of cone}$$

ATQ,

Volume of cone = Volume of sphere

$$\frac{1}{3} \times \pi \times r^2 \times 3r = \frac{4}{3} \pi R^3$$

$$\Rightarrow r^3 = \frac{4}{3} R^3 \Rightarrow \frac{r^3}{R^3} = \frac{4}{3}, \frac{r}{R} = \frac{\sqrt[3]{4}}{\sqrt[3]{3}}$$

**Sol.63.(a) Jammu and Kashmir. Pir****Panjal Railway Tunnel** - It is also known as **Banihal railway tunnel**. It is a railway tunnel measuring 11.2 km long. The tunnel link, which is the only broad gauge mountain railway in India, stretches through the Pir Panjal mountain range between Quazigund and Baramulla.**Other tunnels in Jammu and Kashmir: Shyama Prasad Mukherjee Tunnel** (9 km long) located in the lower Himalayan mountain range, between Udhampur and Ramban. **Nandni Tunnels** (1.4 km) located on Jammu-Srinagar National Highway in Udhampur district. **Jawahar Tunnel** (2.85 km) located between Srinagar and Jammu.**Sol.64.(c)** Ratio of the no of blue balls to red balls = 36 : 44 = 9 : 11

$$\text{No of red balls} = \frac{54}{9} \times 11 = 66$$

**Sol.65.(d)** Figure B does not belong to the group because in every figure the inner figure consists of +1 side than the outer figure and it is not followed in figure B.**Sol.66.(a) Anil Menon books:** "The Beast with Nine Billion Feet". **K.R. Meera:** "Ave Maria" and "Aarachaar". **Namita Gokhale:** "Things to Leave Behind", "The Book of Shadows" and "Paro: Dreams of Passion". **Shashi Tharoor:** "The Great Indian Novel" and "An Era of Darkness: The British Empire in India".**Sol.67.(d) Atomic mass. Mendeleev's periodic table** (only 63 elements were known): Elements were arranged on the basis of atomic mass and chemical properties. He was unable to locate hydrogen in the periodic table. 1st and last element of his periodic table, Hydrogen (H) and Uranium (U).**Sol.68.(c)**

Computers, Compact disks and cameras are related to the technology.

**Sol.69.(d)** Let the present age of Dharitri and Eunice be x and y respectively

ATQ,

$$x + y = 61 \text{ and, } (x + 3) = 2(y + 3) - 8$$

$$x + 3 = 2y + 6 - 8 \Rightarrow x - 2y = -5$$

$$\Rightarrow x + y - 3y = -5 \Rightarrow 61 - 3y = -5$$

$$3y = 66 \Rightarrow y = 22$$

So the age of Dharitri = 61 - 22 = 39 yrs

**Sol.70.(c)** The ratio of the efficiency of type1 and type 2 workers = 3 : 1

Total work = 12 × 3 × 10 = 360 unit

Work done by 4 type1 worker + 8 type 2 workers in a day = 4×3 + 8×1 = 20 unit

So, the time taken by (4 type1 worker + 8 type2 workers) to complete the whole

$$\text{work} = \frac{360}{20} = 18 \text{ days}$$

**Sol.71.(d)** The statement does not give information about honest people or policy makers.

So, assumption 1 is not implicit.

The statement does not tell the need for every policy to include honesty.

So, assumption 2 is not implicit.

Neither assumption 1 nor 2 is implicit.

**Sol.72.(d)**

From the given figure we can tell the number of people who play cricket and also participate in athletics are 3.

**Sol.73.(b) Banwarilal Purohit.** Article 155 - The Governor of a State is appointed by the President by warrant under his hand and seal. The Governor holds office during the pleasure of Presidents.**Sol.74.(b) R+JM2\$#QR?\*O@7F3**

There is only 1 symbol which is preceded by a number.

**Sol.75.(a)**

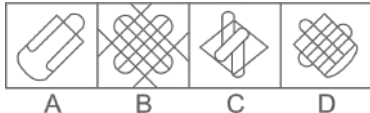
Conclusion 2 is correct.

# RRB ALP & Technicians 09/08/2018 (Afternoon)

**Q.1.** Which of the following metals is stored in kerosene oil?

- (a) Gold (b) Sodium  
(c) Copper (d) Platinum

**Q.2.** The below figure is embedded in one of the answer figures. Choose the correct figure containing the below figure.



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

**Q.3.** Two pipes, when working one at a time, can fill a cistern in 3 hours and 4 hours, respectively while a third pipe can drain the cistern empty in 8 hours. All the three pipes were opened together when the cistern was  $\frac{1}{12}$  full. How long did it take for the cistern to be completely full?

- (a) 2 hour 10 minutes  
(b) 2 hours  
(c) 1 hour 45 minutes  
(d) 2 hour 11 minutes

**Q.4.** The focal length of a concave mirror with a radius of curvature of 20.0 cm is:

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

**Q.5.** An object with a mass of 22 kg moving with a velocity of 5 m/s possesses a kinetic energy of:

- (a) 275J (b) 2750J (c) 1100J (d) 110J

**Q.6.** If you look into a mirror and find that the image (your reflexion) is smaller than you, then the type of the mirror is:

- (a) concave mirror (b) convex mirror  
(c) plano-concave mirror (d) plane mirror

**Q.7.** The 'Kathopanishad' captures the conversation between a young boy named Nachiketetas and a god. Which of the following gods is talking to Nachiketetas?

- (a) Lord Yama (b) Lord Indra  
(c) Lord Karthikeya (d) Lord Shiva

**Q.8.** To draw a pair of tangents to a circle which are inclined to each other at an angle of  $75^\circ$ , it is required to draw tangents at the end points of those two radii of the circle, the angle between whom is

- (a)  $105^\circ$  (b)  $65^\circ$  (c)  $95^\circ$  (d)  $75^\circ$

**Q.9.** The resistance of a conductor is inversely proportional to its :

- (a) area of cross section (b) length  
(c) temperature (d) resistivity

**Q.10.** There are saplings of 361 Mango trees and Neem trees in a garden. The ratio of the number of Mango trees to that of Neem tree saplings is 8 : 11, then how many Neem tree saplings are in the garden?

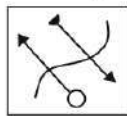
- (a) 57 (b) 209 (c) 152 (d) 171

**Q.11.** If  $3x^2 + ax + 4$  is perfectly divisible by  $x - 5$ , then the value of a is:

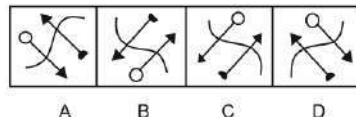
- (a) -5 (b) -15.8 (c) -15.6 (d) -12

**Q.12.** Choose the correct water image of the problem figure.

Problem Figure



Answer Figure

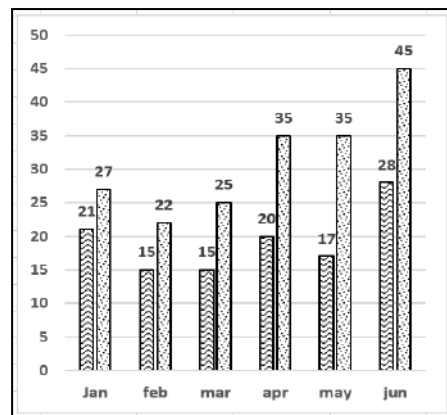


- (a) D (b) C (c) B (d) A

**Q.13.** Which of the following is essential for the synthesis of thyroxine?

- (a) Potassium (b) Calcium  
(c) Iodine (d) Sodium

**Q.14.**



The given data shows the registration of bikes and total vehicles (in thousands) for 6 months in 2017 in City X.

Note: In the chart, the first number represents bikes and the second number represents total vehicles.

Based on the given data, from January to April 2017, the increase in the registration of vehicles other than bikes is \_\_\_\_\_.

- (a) 9000 (b) 8500 (c) 9050 (d) 8000

**Q.15.** Which was the first country to introduce GST in its system?

- (a) Germany (b) Australia  
(c) Canada (d) France

**Q.16.** The mean height of 25 boys in a class is 150cm, and the mean height of 35 girls in the same class is 145 cm. The combined mean height of 60 students in the class is \_\_\_\_\_ (approximately)

- (a) 147 (b) 145 (c) 146 (d) 143

**Q.17.** Who among the following laid the foundation of chemical sciences by establishing two important laws of chemical combination ?

- (a) Ernest Rutherford  
(b) Democritus  
(c) Antoine L. Lavoisier  
(d) Joseph L. Proust

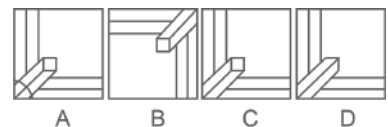
**Q.18.**  $\frac{2}{3}$  of a milk-water mixture was milk. There was 21 litres of the mixture. If 4 litres of water is added to it, the percentage of milk in the new mixture will be:

- (a) 44 (b) 11 (c) 56 (d) 14

**Q.19.** Which of the Answer Figures is the correct water image for the given Problem figure?



Answer Figures



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

**Q.20.** The following table gives the details of the number of students in Class 10 section A and B who had taken mid-term and final exams.

The percentage of students in section A is \_\_\_\_\_ (round to one decimal).

Result	Sec A	Sec B
Total number of students who failed in both exams	28	23
Total number of students who failed in mid-term but passed in finals	14	12
Total number of students who passed in mid-term but failed in finals	6	17
Total number of students who passed in both the exams	64	55

- (a) 51 (b) 51.1 (c) 51.2 (d) 51.3

**Q.21.** Consider the argument and decide which of the given assumptions is/are implicit.

**Argument :** The BEST bus travels company has decided to increase its

fare by 10%.

**Assumptions :**

1. Passengers may opt for other buses costing less than the BEST bus travels company.

2. The demand for the buses by passengers may remain unchanged even after the fare hike.

- (a) Neither 1 nor 2 is implicit  
(b) Only assumption 1 is implicit  
(c) Both 1 and 2 are implicit  
(d) Only assumption 2 is implicit

**Q.22.** To convert temperature from Celsius to Kelvin scale, you must:

- (a) add 273 to the given temperature  
(b) divide the given temperature by 273  
(c) subtract 273 from the given temperature  
(d) multiply the given temperature by 273

**Q.23.** Elements A, B and C occur as Dobereiner's triads. If the atomic mass of A is 7 and that of C is 39, what will be the atomic mass of B?

- (a) 20 (b) 23 (c) 40 (d) 12

**Q.24.** A battlefield always has:

- (a) Arrows (b) Soldiers  
(c) Elephants (d) Chariots

**Q.25.** If the number 1 on the clock is replaced by the letter 'M', the number 2 is replaced by 'N' and so on, then when the time is 21:00 p.m. the hour hand will be at \_\_\_\_\_ letter.

- (a) T (b) S (c) V (d) U

**Q.26.** The 2016 Olympics was held in which city?

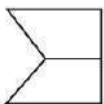
- (a) Rio de Janeiro (b) Mexico City  
(c) Paris (d) London

**Q.27.** Choose the correct analogous word pair from the given alternatives.  
Carpenter : Hammer

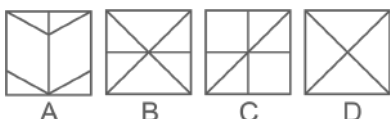
- (a) Crane : Builder (b) Plumber : Wrench  
(c) Computer : Writer (d) Axe : Logger

**Q.28.** The following figure is embedded in one of the four answer figures. Which figure contains the problem figure?

Question Figure



answer Figure



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

**Q.29.** Which eminent Hindi writer was

chosen for the Vyas Samman 2017 for her work 'Dukham Sukham'?

- (a) Meena Kandasamy (b) Jhumpa Lahiri  
(c) Namita Gokhale (d) Mamta Kalia

**Q.30.** Which of the numbers given below is NOT rational?

- (a)  $\sqrt[3]{64}$  (b)  $\sqrt{8}$  (c)  $\sqrt[3]{8}$  (d)  $\sqrt{64}$

**Q.31.** A sum of money was invested at the rate of 7.5% simple interest per annum for 4 years. If the investment was for 5 years, the interest earned would have been ₹ 375 more. What was the initial sum invested?

- (a) ₹4,500 (b) ₹5,000 (c) ₹4,750 (d) ₹3,750

**Q.32.** Consider the given statements as true and decide which of the given conclusions can definitely be drawn from the given statements.

**Statements:** People think that paying tax to the government is a burden and waste. Hence, they avoid paying tax or don't pay tax promptly.

**Conclusions:**

1. Government should create awareness among the people that paying tax helps to build nation.

2. Tax should be increased so that more money is collected.

- (a) Both 1 and 2 follow.  
(b) Only conclusion 1 follows.  
(c) Neither 1 nor 2 follows.  
(d) Only conclusion 2 follows.

**Q.33.** Which Indian Chief Minister's father was a 'Maharaja'?

- (a) Chandrababu Naidu  
(b) Devandra Fadnavis  
(c) K. Chandrasekhar Rao  
(d) Amarinder Singh

**Q.34.** The surface areas of three faces of a cuboid sharing a vertex are  $20m^2$ ,  $32m^2$  and  $40m^2$ . What is the volume of the cuboid?

- (a)  $184m^3$  (b)  $92m^3$   
(c)  $\sqrt{3024} m^3$  (d)  $160m^3$

**Q.35.** Metals reacts with acids to give:

- (a) A salt and Hydrogen  
(b) A salt and base  
(c) A salt and water  
(d) A salt and Chlorine

**Q.36.** Find the missing term in the letter series.

BGL, DIN, \_\_\_\_\_, HMR

- (a) GLQ (b) FPK (c) FKP (d) EJO

**Q.37.** Chlorine gas is used in the manufacture of:

- (a) Bleaching powder (b) Washing soda  
(c) Baking soda (d) Baking powder

**Q.38.** Which of the following is a reducible fraction?

- (a)  $\frac{105}{112}$  (b)  $\frac{91}{15}$  (c)  $\frac{41}{17}$  (d)  $\frac{79}{26}$

**Q.39.** If  $a + b + c = 0$ , then  $(a^3 + b^3 + c^3)^2 = ?$

- (a)  $3a^2b^2c^2$  (b)  $9abc$  (c)  $27abc$  (d)  $9a^2b^2c^2$

**Q.40.** If  $\cot^4\theta + \cot^2\theta = 3$ , then  $\operatorname{cosec}^4\theta - \operatorname{cosec}^2\theta = ?$

- (a) 1 (b) 0 (c) 2 (d) 3

**Q.41.** Choose the correct alternative which will complete the series.

ACT, EGG, INK, \_\_\_\_\_

- (a) BYE (b) DIP (c) FUN (d) OLD

**Q.42.** Solve the following:

$$-\frac{1}{4} \{-45 - (-96) \div (-32)\} = ?$$

- (a) -10.5 (b) 10.5 (c) -12 (d) 12

**Q.43.** Three-fifths of my current age is the same as five-sixths of that of one of my cousins'. My age ten years ago will be his age four years hence. My current age is \_\_\_\_\_ years.

- (a) 60 (b) 45 (c) 50 (d) 55

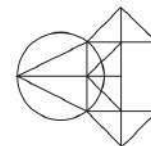
**Q.44.** 'Food' is related to 'Refrigerator' in the same way as 'Clothes' is related to \_\_\_\_\_

- (a) Material (b) Closet (c) Garage (d) Fold

**Q.45.** A body of mass 2 kg is thrown upward with initial velocity of  $20m/s$ . After 2 seconds, its kinetic energy will be: ( $g = 10 m/s^2$ )

- (a) 200J (b) 400J (c) 0J (d) 100J

**Q.46.** How many triangles are present in the following figure?



- (a) 12 (b) 15 (c) 14 (d) 13

**Q.47.** ₹ 750 invested for 3 months gave an interest of ₹ 18. What was the simple rate of interest per annum?

- (a) 9.6% (b) 2.4% (c) 12% (d) 7.2%

**Q.48.** Consider the argument and decide which of the given assumptions is/are implicit.

**Argument :** Public smoking is an offense under the law.

**Assumption :**

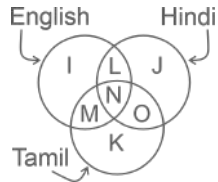
1. Smoking is injurious to the health of the person who smoke.

2. Smoke is injurious even to others health in the public places.

- (a) Both 1 and 2 are implicit  
(b) Neither 1 nor 2 is implicit

- (c) Only assumption 2 is implicit  
(d) Only assumption 1 is implicit

**Q.49.** The given Venn diagram represents the students who can speak different languages. According to it, the total number of students who can speak exactly two languages is\_\_\_\_\_.



- (a)  $L + M + O + N$  (b)  $N + L$   
(c)  $L + O$  (d)  $L + M + O$

**Q.50.** Who won the 2017 Hridaynath Mangeshkar Award?

- (a) Asha Bhosle (b) Anupam Kher  
(c) Shabana Azmi (d) Javed Akhtar

**Q.51.** A body of 4.0 kg is lying at rest. Under the action of a constant force, it gains a speed of 5 m/s. The work done by the force will be\_\_\_\_\_.

- (a) 30 J (b) 50 J (c) 40 J (d) 20 J

**Q.52.** The girth of the stem or root in plants increases due to:

- (a) Extra meristem  
(b) Apical meristem  
(c) Lateral meristem  
(d) Intercalary meristem

**Q.53.** Which state government has made yoga guru Ramdev Baba as the brand ambassador of Yoga and Ayurveda?

- (a) Himachal Pradesh (b) Rajasthan  
(c) Uttar Pradesh (d) Haryana

**Q.54.** The Dadasaheb Phalke Award is awarded for significant public achievement in which field?

- (a) Literature (b) Films  
(c) Sports (d) Journalism

**Q.55.** Odisha often faces natural disasters due to\_\_\_\_\_.

- (a) rainfall (b) earthquakes  
(c) cyclones (d) drizzle

**Q.56.** 'Madhya Pradesh' is related to 'Diamond' in the same way as 'Karnataka' is related to\_\_\_\_\_.

- (a) Copper (b) Platinum (c) Silver (d) Gold

**Q.57.** Consider the given question and decide which of the following statements is sufficient to answer the question.

Who among P, Q, R, S and T is lightest in weight?

**Statements :**

1.  $Q \text{ weight} < P$  and  $S \text{ also } S \text{ weight} > T$

2.  $R \text{ weight} > Q$  but  $< T$

- (a) Neither statement 1 nor 2 is sufficient

- (b) Statement 2 alone is sufficient while statement 1 alone is insufficient  
(c) Statement 1 alone is sufficient while statement 2 alone is insufficient  
(d) Both statement 1 and 2 are sufficient

**Q.58.** Which of the following serves as a nutritive tissue for the growing embryo?

- (a) Zygote (b) Endosperm  
(c) Ovary (d) Ovule

**Q.59.** The two sides holding the right-angle in a right-angled triangle are 3 cm and 4 cm long. The area of its circumcircle will be:

- (a)  $5\pi \text{ cm}^2$  (b)  $6.75\pi \text{ cm}^2$   
(c)  $7\pi \text{ cm}^2$  (d)  $6.25\pi \text{ cm}^2$

**Q.60.** Select the odd figure out of the following figure series.



- (a) 2 (b) 1 (c) 4 (d) 5

**Q.61.** The main cause of rancidity in foods is the\_\_\_\_\_ of fats and oils.

- (a) oxidation (b) reduction  
(c) hydrolysis (d) clarification

**Q.62.** The value of

$$-261 + (-380) - (-521) + 821 - (-121)$$

- (a) 800 (b) 825 (c) 833 (d) 822

**Q.63.** Which of the following never occurs singly in nature?

- (a) Inertia (b) Force  
(c) Velocity (d) Momentum

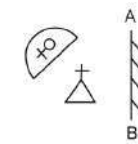
**Q.64.** Sharan and Mayukh, working together, can complete a task in 18 days. However, Mayukh works alone and leaves after completing one-third of the task. Then, Sharan takes over and completes the remaining work by himself. As a result, the duo could complete the task in 40 days. How many days would Sharan alone have taken to do the job if Mayukh had worked faster than Sharan?

- (a) 30 (b) 45 (c) 24 (d) 72

**Q.65.** Name the Indian paralympic high jumper who won gold at the Rio Paralympics. He was awarded the Padma Shri in 2017.

- (a) Mariyappan Thangavelu  
(b) Varun Bhati  
(c) Narender Ranbir  
(d) Devendra Jhajharia

**Q.66.** Choose the correct mirror image of the problem figure if the mirror is placed to the right of the figure.



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

**Q.67.** If the atomic number of Krypton is 36, then its electronic configuration is:

- (a) 2, 18, 16 (b) 2.18, 8, 8  
(c) 2, 8, 18, 8 (d) 2, 8, 20, 6

**Q.68.** Decide which of the conclusions logically follow(s) from the information given in the statement.

**Statements:** Politicians marry only beautiful girls. X is beautiful.

**Conclusions:**

1. X will marry a politician

2. X won't marry a politician

- (a) Only conclusion 1 follows  
(b) Either 1 or 2 follows  
(c) Only conclusion 2 follows  
(d) Both 1 and 2 follow

**Q.69.** In a computer game, a builder can build a wall in ten hours while a destroyer can demolish such a wall completely in fourteen hours. Both the builder and the destroyer were initially set to work together on level ground. But after 7 hours the destroyer was taken out. What was the total time (in hours) taken to build the wall?

- (a) 35 (b) 24 (c) 17 (d) 15

**Q.70.** Which of the fractions given below, when added to  $\frac{5}{8}$  gives 1?

- (a)  $\frac{5}{2}$  (b)  $\frac{6}{16}$  (c)  $\frac{6}{3}$  (d)  $\frac{6}{24}$

**Q.71.** Mr. X starts from point 'A' travels 80 km towards west, takes a left turn, travels 50km and reaches point 'B'. What is the shortest distance between points 'A' and 'B'?

- (a)  $10\sqrt{39}$  (b)  $10\sqrt{98}$  (c)  $10\sqrt{93}$  (d)  $10\sqrt{89}$

**Q.72.** Which of the following gases is not generated in a biogas plant?

- (a) CO (b) CO<sub>2</sub> (c) CH<sub>4</sub> (d) H<sub>2</sub>S

**Q.73.** Select the odd figure out of the given series.



- (a) d (b) c (c) b (d) a

**Q.74.** If \_\_\_\_\_ is involved, even greater diversity will be generated.

- (a) binary fission  
(b) vegetative propagation  
(c) sexual reproduction  
(d) asexual reproduction

**Q.75.** Solve the following :

$$27 - [38 - \{46 - (15 - 13 - 2)\}]$$

- (a) 30 (b) 31 (c) 35 (d) 29

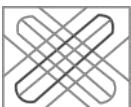
**Answer Key :-**

1.(b)	2.(d)	3.(b)	4.(c)
5.(a)	6.(b)	7.(a)	8.(a)
9.(a)	10.(b)	11.(b)	12.(b)
13.(c)	14.(a)	15.(d)	16.(a)
17.(c)	18.(c)	19.(d)	20.(b)
21.(c)	22.(a)	23.(b)	24.(b)
25.(d)	26.(a)	27.(b)	28.(c)
29.(d)	30.(b)	31.(b)	32.(b)
33.(d)	34.(d)	35.(a)	36.(c)
37.(a)	38.(a)	39.(d)	40.(d)
41.(d)	42.(d)	43.(c)	44.(b)
45.(c)	46.(c)	47.(a)	48.(c)
49.(d)	50.(d)	51.(b)	52.(c)
53.(d)	54.(b)	55.(c)	56.(d)
57.(d)	58.(b)	59.(d)	60.(d)
61.(a)	62.(d)	63.(b)	64.(b)
65.(a)	66.(d)	67.(c)	68.(b)
69.(d)	70.(b)	71.(d)	72.(a)
73.(b)	74.(c)	75.(c)	

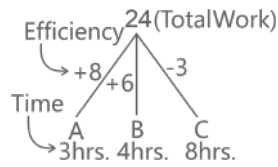
**Solutions:-**

**Sol.1.(b)** Sodium (Na), Potassium (K), Lithium (Li) and Cesium (Cs) metals are stored in kerosene oil as they can react in air or water. These metals are highly reactive to oxygen, carbon dioxide and moisture present in the air. If it is kept in the open air, it easily reacts with the oxygen and catches fire. Reaction -  $2\text{Na}$  (Sodium) +  $2\text{H}_2\text{O}$  (Water)  $\rightarrow$   $2\text{NaOH}$  (Sodium Hydroxide) +  $\text{H}_2$  (Hydrogen). Hydrogen gas is formed during the reaction.

**Sol.2.(d)**



**Sol.3.(b)**



Efficiency = A + B - C = 8 + 6 - 3 = 11 unit  
Now, the remaining capacity of cistern

$$= \frac{11}{12} \times 24 = 22 \text{ unit}$$

Time taken by three pipes to fill the

$$\text{cistern} = \frac{22}{11} = 2 \text{ hrs}$$

**Sol.4.(c) 10cm.** The radius of curvature is twice the focal length. In other words, focal length is half of the radius of curvature.

$$\text{Focal length (f)} = \frac{\text{Radius of curvature (R)}}{2}$$

$$\text{Given that } R = 20\text{cm so, } f = \frac{20}{2} = 10\text{cm.}$$

**Sol.5.(a) 275 J.**

$$\text{The Kinetic energy (K.E.)} = \frac{1}{2} \times mv^2$$

Where m = mass of the object,

v = Velocity of an object.

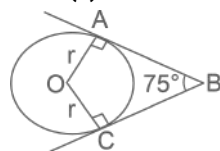
Given that, m = 22 kg, v = 5 m/s.

$$\text{So, K.E} = \frac{1}{2} \times 22 \times 5 \times 5 \Rightarrow \text{K.E} = 275 \text{ J.}$$

**Sol.6.(b)** Convex mirror (Fish eye mirror or diverging mirror): It is that mirror whose reflecting surface is away from the centre of the curvature. Image formed - Virtual and erect. Uses - Rear-view mirrors in vehicles, Security purposes in buildings and ATMs. Concave Mirror - It is that mirror whose reflecting surface is toward the centre of the curvature. It is also known as a converging mirror. Image formed - Real, virtual, erect and inverted. Uses - Shaving mirrors, Headlights and Solar furnaces. Plane Mirror - It is a mirror with a flat (planar) reflective surface. Image formed - Virtual and erect, Images cannot be projected or focused on a screen. Uses - Torch Lights, Solar Cooker.

**Sol.7.(a)** Lord Yama. The Katha Upanishad is one of the primary Upanishads in the Krishna Yajurveda. It narrates the story of Nachiketa, a little boy who meets Yama, the God of Death. Their conversation explores deep philosophical topics, including the nature of man, knowledge, the soul (Atman), and liberation (moksha).

**Sol.8.(a)**



As we know, the sum of the angles of a quadrilateral is  $360^\circ$

$$\begin{aligned} \angle \text{AOC} &= 360^\circ - (75^\circ + 90^\circ + 90^\circ) \\ &= 360^\circ - 255^\circ = 105^\circ \end{aligned}$$

**Sol.9.(a)** Area of cross section. Resistance of the conductor is proportional to the length of wire and inversely proportional to the area of cross-section.

Resistance of the conductor

$$R = \rho \frac{l}{A}, R \propto \frac{l}{A}.$$

Where  $\rho$  is the resistivity of the conductor, l is its length and A is the cross sectional area of the conductor. Electrical Resistivity is a measure of how strongly it opposes the flow of current. It is denoted by the symbol " $\rho$ " (rho) and is measured in ohm-metres ( $\Omega \cdot \text{m}$ ).

**Sol.10.(b)**

Let the number of mango trees and neem plants be  $8x$  and  $11x$  respectively.

As per the question,

$$8x + 11x = 361$$

$$19x = 361 \Rightarrow x = 19$$

Hence, total number of neem plants

$$= 11 \times 19 = 209$$

**Sol.11.(b)**

Using remainder theorem we have

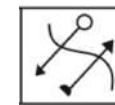
$$f(x) = 3x^2 + ax + 4 = 0$$

$$f(5) = 3 \times 5^2 + 5a + 4 = 0$$

$$75 + 5a + 4 = 0$$

$$\Rightarrow 79 = -5a \Rightarrow a = -\frac{79}{5} = -15.8$$

**Sol.12.(b)**



**Sol.13.(c) Iodine (I).** It helps in the synthesis of thyroxine (T4, thyroid hormone). The deficiency of Iodine can cause hypothyroidism, developmental brain disorders and goitre. Thyroid hormones are essential for normal brain development. Calcium (Ca) is used in synthesis of cell walls as calcium pectate in the middle lamella. Potassium (K) - type of electrolyte helps nerves to function and muscles to contract.

**Sol.14.(a)**

$$\begin{aligned} \text{Total number of vehicle other than bikes} \\ \text{registered in jan 2017} &= 27,000 - 21,000 \\ &= 6,000 \end{aligned}$$

$$\begin{aligned} \text{Total number of vehicle other than bikes} \\ \text{registered in April 2017} &= 35,000 - 20,000 \\ &= 15,000 \end{aligned}$$

Required increase in the registration of vehicles other than bikes

$$= 15,000 - 6,000 = 9,000$$

**Sol.15.(d) France (1954).** Goods and Services Tax (GST) is a comprehensive indirect tax levied on the supply of goods and services in India. It was implemented on July 1, 2017, replacing various indirect taxes like the Central Excise Duty, Service Tax, Value Added Tax (VAT), and others. GST is a destination-based tax, meaning it is levied at the point of consumption rather than at the point of origin. The tax is implemented through the 101st Constitutional Amendment Act. Article 279A of the Constitution empowers the President to constitute a joint forum of the Centre and States namely, Goods & Services Tax Council.

**Sol.16.(a)**

$$\begin{aligned} \text{Sum of height of boys} &= 25 \times 150 = 3750 \\ \text{Sum of height of girls} &= 35 \times 145 = 5075 \end{aligned}$$

$$\text{Combined mean} = \frac{3750 + 5075}{60} = 147$$

**Sol.17.(c) Antoine L. Lavoisier** (Father of Modern Chemistry) - He gave the Law of conservation of mass. Ernest Rutherford - discovered alpha and beta rays, and proposed the laws of radioactive decay. The Theory of Democritus states that everything is composed of "atoms", which are physically, but not geometrically, indivisible. Joseph Louis Proust - law of constant composition.

**Sol.18.(c)** Quantity of milk in the mixture

$$= 21 \times \frac{2}{3} = 14 \text{ litres}$$

Quantity of water in the mixture

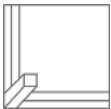
$$= 21 - 14 = 7 \text{ litres}$$

Quantity of water in the new mixture

$$= 7 + 4 = 11 \text{ litres}$$

Required percentage of milk

$$= \frac{14}{14 + 11} \times 100 = \frac{14}{25} \times 100 = 56 \text{ litres}$$

**Sol.19.(d)****Sol.20.(b)**

Total no. of students in section A

$$= 28 + 14 + 6 + 64 = 112$$

Total no. of students in section B

$$= 23 + 12 + 17 + 55 = 107$$

Total number of students = 112 + 107

$$= 219$$

$$\text{Required percentage} = \frac{112}{219} \times 100 = 51.1\%$$

**Sol.21.(c)** If one bus increases the bus fare then people will automatically prefer another bus with cheaper rates. So

statement 1 is implicit.

Some people may continue to travel by BEST buses so statement 2 is also implicit.

**Sol.22.(a) Add 273 to the given temperature.**

Conversion of Celcius into Fahrenheit

$$= C \left( \frac{9}{5} \right) + 32.$$

Conversion of Kelvin to Fahrenheit

$$= (K - 273) \times \frac{9}{5} + 32.$$

**Sol.23.(b)** 23. Dobereiner's law of triads - The atomic mass of the middle element of a triad is the arithmetic mean of the atomic masses of the other two elements. He identified 3 triads - 1st {Lithium (Li), Sodium (Na), Potassium (K)}, 2nd {Calcium (Ca), Strontium (Sr), Barium (Ba)}, 3rd {Chlorine (Cl), Bromine (Br), Iodine (I)}.

Given, Atomic mass of A = 7,

Atomic mass of C = 39.

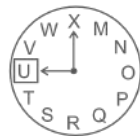
So,

$$\text{Atomic mass of B} = \frac{A + C}{2} = \frac{7 + 39}{2} = 23$$

**Sol.24.(b)** A person going in the battlefield should have a Weapon but the battlefield always has soldiers.

**Sol.25.(d)**

In the 12 hour clock 21:00 means 9pm.



**Sol.26.(a) Rio de Janeiro.** India won 2 medals at 2016 Olympics, One Silver medal (P V Sindhu - badminton), One Bronze medal (Sakshi Malik - Wrestling). Olympics Year - City : 2008 Olympics - Beijing (China), 2012 Olympics - London (U.K), 2020 Olympics - Tokyo. 2024 Olympics to be held in Paris, France.

**Sol.27.(b)** As the carpenter needs a hammer to work similarly the plumber needs a wrench.

**Sol.28.(c)**

**Sol.29.(d) Mamta Kalia.** Books written by Mamta kalia : 'Daud', 'Narak Dar Narak', 'Tribute to Papa and Other Poems', 'Ek Patni Ke Notes'.

**Sol.30.(b)** The given no's are :

$$\sqrt[3]{64} = 4, \sqrt{8} = 2\sqrt{2}, \sqrt[3]{8} = 2, \sqrt{64} = 8$$

So, we can clearly see that  $\sqrt{8}$  is irrational no.

**Sol.31.(b)** Let the principal be 100% Extra SI earned for 1 year i.e. (5 - 4 year) at the rate of 7.5% = 7.5% which corresponds to ₹375

Then,

$$100\% \text{ corresponds} = \frac{375}{7.5} \times 100 = ₹5,000$$

**Sol.32.(b)** If the government creates awareness among people that the tax is helpful in building a nation then people will automatically understand that paying tax is not a burden or waste of money. So conclusion 1 follows.

Increasing tax won't help to collect money. So conclusion 2 does not follow.

**Sol.33.(d) Amrinder Singh** is the son of the last Maharaja of the princely state of Patiala Yadavindra singh. He served in the Indian Army from 1963 to 1966. Chandrababu Naidu - longest served Chief Minister of Andhra Pradesh. K. Chandrasekhar Rao - 1st Chief Minister of Telangana.

**Sol.34.(d)** Volume of cuboid = l × b × h

According to the question,

$$(L \times B)(B \times H)(H \times L) = (L \times B \times H)^2$$

$$= 20 \times 32 \times 40 = 25600 \text{ m}^2$$

$$L \times B \times H = \sqrt{25600} = 160$$

$$\text{So, the Volume of cuboid} = 160 \text{ m}^3$$

**Sol.35.(a) A salt and Hydrogen.** When Sodium (Na) reacts with hydrochloric acid (HCl) then sodium chloride (NaCl) and hydrogen gas (H<sub>2</sub>) forms. Example (Double displacement reaction) - 2 Na (s) + 2 HCl (aq) → 2 NaCl (s) + H<sub>2</sub> (g). Zn (Zinc) + 2HCl (Hydrochloric acid) → ZnCl<sub>2</sub> (Zinc Chloride) + H<sub>2</sub> (Hydrogen). Non-metals do not react with acids because non-metals are themselves acceptors of electrons.

**Sol.36.(c) Logic :-**

For the first letter → B + 2 = D, D + 2 = F, F + 2 = H

For the second letter → G + 2 = I, I + 2 = K, K + 2 = M

For the third letter → L + 2 = N, N + 2 = P, P + 2 = R

FKP is the right answer.

**Sol.37.(a) Bleaching powder** (Calcium hypochlorite, Ca(ClO)<sub>2</sub>) - Used as a bleaching agent of impurities in water, Releasing the strong smell due to Chlorine. Chlorine (Cl) - Discovered by Carl Wilhelm Scheele, Second lightest

member of the halogen elements (Group 17) of the periodic table. It is toxic, corrosive, greenish yellow gas that is irritating to the eyes and the respiratory system. Washing Soda - Sodium Carbonate decahydrate ( $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ ). Baking Soda - Sodium bicarbonate ( $\text{NaHCO}_3$ ).

**Sol.38.(a)** The reducible fraction among the given fractions is  $\frac{105}{112} = \frac{15}{16}$

**Sol.39.(d)**

$$a^3 + b^3 + c^3 = 3abc \text{ (when } a + b + c = 0\text{)}$$

$$\text{So, } (a^3 + b^3 + c^3)^2 = (3abc)^2 = 9a^2b^2c^2$$

**Sol.40.(d)**  $\cot^4\theta + \cot^2\theta = 3$

$$\Rightarrow \cot^2\theta (\cot^2\theta + 1) = 3$$

$$\Rightarrow \cot^2\theta \times \text{cosec}^2\theta = 3$$

$$\text{Now, } \text{cosec}^4\theta - \text{cosec}^2\theta$$

$$= \text{cosec}^2\theta (\text{cosec}^2\theta - 1)$$

$$= \text{cosec}^2\theta \times \cot^2\theta = 3$$

**Sol.41.(d)** Here the word starts with a vowel in alphabetical order. So the next word will be OLD.

Vowel Alphabets  
ACT EGG INK OLD

**Sol.42.(d)**  $-\frac{1}{4} \{-45 - (-96) \div (-32)\}$

$$= -\frac{1}{4} \{-45 - 3\} = -\frac{1}{4} \times -48 = 12$$

**Sol.43.(c)** Let my and my cousin's current age are x and y respectively

$$\text{ATQ, } \frac{3}{5}x = \frac{5}{6}y$$

$$\Rightarrow \frac{x}{y} = \frac{5}{6} \times \frac{5}{3} = \frac{25}{18}$$

$$\text{Also, } (x - 10) = (y + 4)$$

$$x - y = 14$$

$$\Rightarrow (25 - 18) \text{ unit} = 14$$

$$7 \text{ unit} = 14 \Rightarrow 1 \text{ unit} = 2$$

$$\text{So, my current age is} = 25 \times 2 = 50 \text{ yrs}$$

**Sol.44.(b)** 'Food' is kept in 'Refrigerator', in the same way 'Clothes' is kept in 'closet'.

**Sol.45.(c) 0 J.** Kinetic energy of an object is the measure of the work an object can do by the virtue of its motion.

Newton's first equation of motion,

$$v = u + at$$

Where

v = Final velocity, u = initial velocity,

a = acceleration and t = time

taken.

Body is moving upward, a = -g,

where g = acceleration due to gravity.

So, v = u - gt.

Given,

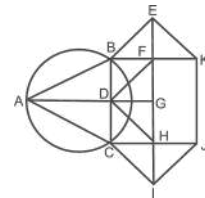
$$u = 20 \text{ m/s, } t = 2 \text{ sec and } g = 10 \text{ m/s}^2.$$

$$\text{We get, } v = 20 - 10 \times 2 = 0,$$

$$\text{Kinetic Energy (K.E.)} = \frac{1}{2}mv^2$$

$$= \frac{1}{2} \times 2 \times 0^2 = 0$$

**Sol.46.(c)**



There are 14 triangles in the given figure.

ADB, ADC, ABC, BEF, FEK, BEK, DFG, DGH, BFD, DCH, FDH, CHI, HIJ, CIJ

**Sol.47.(a)**  $\text{SI} = \frac{P \times R \times T}{100}$

$$\Rightarrow 18 = \frac{750 \times R \times 3}{12 \times 100} \Rightarrow 18 = \frac{15R}{8}$$

$$R = \frac{18 \times 8}{15} = \frac{48}{5} = 9.6\%$$

**Sol.48.(c)**

Argument is talking about smoking in public so assumption 1 is not implicit. Smoking in public affects other people's health too. So assumption 2 is implicit.

**Sol.49.(d)**

Total number of students who can speak exactly two languages = L + M + O

**Sol.50.(d) Javed Akhtar.** The award was established in 2011 by Hridayesh Art, a Mumbai-based socio-cultural organization. The award is named after Hridaynath Mangeshkar, an India music director. It comprises a cash prize of Rs. 1 lakh and a memento.

**Sol.51.(b) 50 J.** Work energy theorem - Sum of work done by all the forces acting on a body is equal to the change in the kinetic energy of the body.

**Example -**

Work done by all the forces =  $K_f - K_i$

$$W = \frac{1}{2}mv^2 - \frac{1}{2}mu^2 = \Delta K,$$

Where v = final velocity, u = initial velocity and m = mass of the body.

Given, Mass (m) = 4.0 kg

Final Velocity (v) = 5 m/s

initial velocity (u) = 0 m/s

According to the work-energy theorem,

Work done = Change in K.E.,

$W = \Delta \text{K.E.}$  Since initial speed is zero, the initial Kinetic Energy will also be zero.

$$\text{Work done (W)} = \text{Final K.E.} = \frac{1}{2}mv^2$$

$$W = \frac{1}{2} \times 4 \times 5^2 \Rightarrow W = 2 \times 25 = 50 \text{ J.}$$

**Sol.52.(c) Lateral meristem.**

Meristematic tissue - Growing regions of the plants. Types : Apical Meristems - These tissues are found in root and stem apex and it is responsible for the initial growth of the plants. Intercalary meristems - found at the base of nodes or internodes in some plants. They are responsible for the growth in the intercalary regions, such as the elongation of grass blades at their base.

**Sol.53.(d) Haryana.** Yoga is essentially a spiritual discipline based on an extremely subtle science, which focuses on bringing harmony between mind and body. The word 'Yoga' is derived from the Sanskrit root 'Yuj', meaning 'to join' or 'to yoke' or 'to unite'. The International Day of Yoga has been celebrated across the world annually on June 21 since 2015.

**Sol.54.(b) Film.** Dadasaheb Phalke (Father of Indian Cinema) made the first Indian feature film Raja Harishchandra in 1913. Dadasaheb Phalke Award was introduced by the government in 1969 and it was awarded for the first time to Devika Rani (the first lady of Indian cinema). Literature Awards - Jnanpith Award, Vyaas Samman. Sports Awards - Rajiv Gandhi Khel Ratna Award (Now Major Dhyan Chand Khel Ratna), Dronacharya Award. Journalism Awards - Pulitzer Prize, Ramnath Goenka award.

**Sol.55.(c) Cyclones** are large-scale weather systems characterized by rotating winds and low-pressure centres. Andhra Pradesh, Odisha, Tamil Nadu, West Bengal, Pondicherry on the East Coast, and Gujarat on the West Coast are more vulnerable to cyclone disasters. Rainfall refers to the amount of precipitation (water in the form of rain) that falls from the atmosphere to the Earth's surface. Earthquakes are natural geological events that occur due to the sudden release of energy in the Earth's crust. Drizzle is a light and fine precipitation consisting of very small water droplets that fall from the clouds.

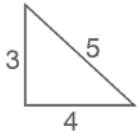
**Sol.56.(d)** Kolar, Hassan, Dharwad, and Raichur districts of Karnataka are the largest producer of gold in India.

**Sol.57.(d)** By statement 1  $\rightarrow Q \text{ weight} < P$  and S also S weight  $> T$   
 $\Rightarrow Q < P, S \text{ and } S > T$   
 From statement 2 we get  
 $Q < R < T$   
 After joining both the statement we get  
 $Q < R < T < P, S$



**Sol.58.(b) Endosperm.** It is a tissue that surrounds the embryo in the seeds of angiosperms and provides nutrition to it in the form of starch and protein. **Ovary** - a female reproductive organ that produces female gametes and after fertilization, it develops to become a fruit. **Ovule** - Present inside the ovary that develops into female reproductive cells and after fertilization, it develops into a seed. **Zygote** - fertilized egg formed by the fusion of a sperm cell and an egg cell during sexual reproduction.

**Sol.59.(d)**



$$\text{Circumradius} = \frac{\text{hypotenuse}}{2}$$

$$= \frac{5}{2} = 2.5 \text{ cm}$$

The area of its circumcircle  
 $= \pi \times 2.5^2 = 6.25\pi \text{ cm}^2$

**Sol.60.(d)** A, F, I, Z are drawn using three lines but L has only two lines. So, L is an odd figure.

**Sol.61.(a) Oxidation. Rancidity** -

Condition in which incomplete oxidation or hydrolysis of fats and oils takes place that spoils the food. It occurs when food is exposed to light, air, moisture or to any bacterial action. Oxidation and Reduction reactions - The chemical reactions which involve the transfer of electrons from one chemical substance to another. Hydrolysis is a chemical reaction in which a compound is broken down by reacting with water. **Clarification** - It usually applies to the removal of small concentrations of solid particles from fluids.

**Sol.62.(d)**

$$-261 + (-380) - (-521) + 821 - (-121)$$

$$= -261 - 380 + 521 + 821 + 121$$

$$= -641 + 1463 = 822$$

**Sol.63.(b) Force (F)** - It is an external agent capable of changing a body's state of rest or motion, SI unit - Newton. Inertia is the property of a body by virtue of which the body opposes the change in its initial state of rest or motion with uniform speed on a straight line. SI unit -  $\text{kg}\cdot\text{m}^2$ . Momentum is defined as the product of mass and velocity of the body and is the measure of the amount of motion contained in a body. SI unit -  $\text{kg}\cdot\text{ms}^{-1}$ . Velocity (V) is defined as the displacement of the object in a unit time

interval. SI unit - m/s.

**Sol.64.(b)** Total work = 360 unit

Let the efficiency of Sharan and Mayukh be x and y respectively

Efficiency of Sharan and Mayukh i.e.

$$(x + y) = \frac{360}{18} = 20 \text{ unit}$$

Time taken by Mayukh to complete  $\frac{1}{3}$  of

$$\text{the task} = \frac{360 \times \frac{1}{3}}{y} = \frac{120}{y} \text{ days}$$

Time taken by Sharan to complete the

$$\text{remaining work} = \frac{240}{x} \text{ days}$$

$$\text{ATQ, } \frac{120}{y} + \frac{240}{x} = 40$$

$$= 120\left(\frac{1}{y} + \frac{2}{x}\right) = 40$$

$$= \left(\frac{1}{20-x} + \frac{2}{x}\right) = \frac{1}{3}$$

$$= \frac{x + 40 - 2x}{x(20-x)} = \frac{1}{3}$$

$$= \frac{40-x}{20x-x^2} = \frac{1}{3}$$

$$= 120 - 3x = 20x - x^2$$

$$= x^2 - 23x + 120 = 0$$

$$= x^2 - 15x - 8x + 120 = 0$$

$$= x(x-15) - 8(x-15) = 0$$

$$\Rightarrow (x-15)(x-8) = 0$$

$x = 8$  (Mayukh had worked faster than Sharan)

So, Time taken by Sharan alone to

$$\text{complete the whole work} = \frac{360}{8} = 45 \text{ days}$$

**Sol.65.(a) Mariyappan Thangavelu.** The Paralympic Games are a multi-sport event for athletes with disabilities, including physical, sensory, and intellectual impairments. The first Paralympic Games were held in Rome in 1960. The International Paralympic Committee (IPC) is the global governing body for para-sports.

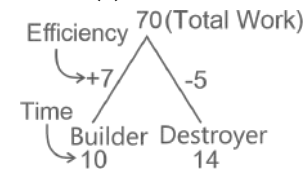
**Sol.66.(d)**



**Sol.67.(c)** 2,8,18,8. Krypton (Kr) - It belongs to group 18 (noble gas) elements. Electronic configuration - The arrangement of electrons in orbitals around an atomic nucleus. Maximum number of electrons in a subshell or an atom is determined by  $2n^2$  where n is the number of shells. Electrons per shell - 2 (K), 8 (L), 18 (M), 32 (N). Krypton is used commercially as a filling gas for energy-saving fluorescent lights.

**Sol.68.(b)** X is beautiful and she can marry a politician or not. It is completely her choice. So either 1 or 2 follows.

**Sol.69.(d)**



Efficiency of both of them =  $7 - 5 = 2$  unit  
 Work done by both in 7 hrs  
 $= 2 \times 7 = 14$  unit  
 Remaining work =  $70 - 14 = 56$  unit which is completed by builder

$$\text{Required time} = \frac{56}{7} = 8 \text{ hrs}$$

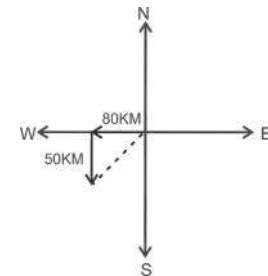
So, total time required =  $8 + 7 = 15$  hrs

**Sol.70.(b)** Let the fraction be x

$$\text{ATQ, } x + \frac{5}{8} = 1$$

$$x = 1 - \frac{5}{8} = \frac{3}{8} \text{ or } \frac{6}{16}$$

**Sol.71.(d)**



$$\text{Shortest distance} = (80)^2 + (50)^2$$

$$= 6400 + 2500$$

$$\text{Shortest distance} = 8900 = 10\sqrt{89}$$

**Sol.72.(a) CO** (Carbon Monoxide). It is highly toxic in nature. It is produced by incomplete combustion of fuels. It combines with hemoglobin present in blood and forms carboxyhemoglobin complex. Biogas - The organic matter breakdown to produce the mixture of different gases. It is a renewable form of energy and can be produced from raw materials like agriculture waste, manure, municipal waste, plant waste etc. It primarily consists of Methane ( $\text{CH}_4$ ), Carbon dioxide ( $\text{CO}_2$ ), Hydrogen sulfide ( $\text{H}_2\text{S}$ ) and moisture ( $\text{H}_2\text{O}$ ).

**Sol.73.(b)**



All the figures are rotating in anticlockwise direction except C.

**Sol.74.(c) Sexual Reproduction** - It is the combination of reproductive cells from two individuals to form a third unique offspring. It involves the fusion of sperm

and egg which contains a different combination of genes of the parent organism. Asexual Reproduction - In which a new offspring is produced by a single parent. The new individuals produced are genetically and physically identical to each other. Types : Binary Fission - The parent cell divides into two daughter cells, each identical to the parent, resulting in the formation of genetically identical offspring. Example - Amoeba and Euglena. Vegetative Propagation - Occurs through their vegetative parts such as leaves, roots, stems, and buds.

**Sol.75.(c)**

$$27 - [38 - \{46 - (15 - 13 - 2)\}]$$

$$= 27 - [38 - \{46 - (15 - 15)\}]$$

$$= 27 - [38 - \{46 - 0\}]$$

$$= 27 - [38 - 46] = 27 - (-8) = 35$$

## RRB ALP & Technicians 09/08/2018 (Evening)

**Q.1.** Tooth decay starts when the pH of the mouth is lower than:

- (a) 5.4 (b) 5.7 (c) 5.5 (d) 5.6

**Q.2.** If in a certain code, UNGIMMICKY is written as MIGNUYKCIM, then how will COMPLEXITY be written as in the same code?

- (a) LPMOYCTIXE (b) LPMOOCYTXE  
(c) LPOMCYTXE (d) LPMOCYTXE

**Q.3.** Who is the current director of Research and Analysis Wing (RAW), India's foreign intelligence service?

- (a) Anil Kumar Dhasmana  
(b) Kiran Bedi  
(c) Ajit Doval  
(d) Dineshwar Sharma

**Q.4.** Who is the only Indian economist to have won the Nobel prize?

- (a) Abhijit Banerjee (b) Amartya Sen  
(c) Amit Mishra (d) Avinash Dixit

**Q.5.** Select the time that would depict the correct mirror image of 9 : 30 on a clock.

- (a) 6 : 30 (b) 4 : 30 (c) 2 : 30 (d) 7 : 30

**Q.6.** Solve the following:

$$22 - \left(\frac{1}{4}\right)\{-5 - (-48) \div (-16)\}$$

- (a) 24 (b) 22 (c) 21 (d) 0

**Q.7.** Consider the given question and decide which of the following statements is sufficient to answer the question.

What is the average daily wage of X, Y and Z?

**Statements :**

- Y's salary is half of (X + Z)
  - X and Y together earn ₹ 40 more than Z and Z earns ₹ 500
- (a) 2 alone is sufficient while 1 alone is insufficient  
(b) 1 alone is sufficient while 2 alone is insufficient  
(c) Both 1 and 2 are sufficient  
(d) Neither 1 nor 2 is sufficient

**Q.8.** The difference between the place values of 9 and 5 in the number 428693745 is:

- (a) 90995 (b) 89995 (c) 99995 (d) 8995

**Q.9.** A raised hammer possesses:

- (a) Kinetic energy  
(b) Mechanical energy  
(c) Muscular energy  
(d) Potential energy

**Q.10.** What will be the value of the kinetic energy ( $E_k$ ) of a moving body with mass

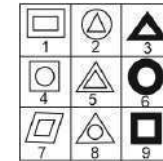
m, if its speed is doubled from v to 2v?

- (a)  $\frac{1}{2} E_k$  (b)  $4E_k$   
(c) There will be no change in  $E_k$  (d)  $2E_k$

**Q.11.** Which of the following is NOT a property of acids?

- (a) Acids turn blue litmus red  
(b) Acids have sour taste  
(c) Acids form salts with bases  
(d) Acids have bitter taste

**Q.12.** If three groups could be formed using the given figures only once, these groups would be



- (a) (1, 5, 7), (2, 6, 8) and (3, 4, 9)  
(b) (1, 5, 7), (2, 4, 9) and (3, 6, 8)  
(c) (1, 5, 7), (2, 4, 8) and (3, 6, 9)  
(d) (1, 5, 8), (2, 4, 7) and (3, 6, 9)

**Q.13.** Dipali bought a set of cups for 375, but then had to sell it later to clear old stocks for 345. What is the percentage of loss that she incurred?

- (a) 7 (b) 8 (c) 16 (d) 14

**Q.14.** Consider the given argument and decide which of the given assumptions is (are) implicit.

**Argument :**

Due to the water crisis in the city, the authority had asked all the citizens to reduce their water consumption by 25%.

**Assumptions :**

- Many citizens may reduce their water consumption.
  - Many activists may protest to this advisory by the authority.
- (a) Only assumption 2 implicit.  
(b) Neither 1 nor 2 is implicit.  
(c) Both 1 and 2 are implicit.  
(d) Only assumption 1 implicit.

**Q.15.** \_\_\_\_\_ forms a common passage for both urine and sperms in human males.

- (a) Urethra (b) Oviduct  
(c) Ureter (d) Vas deferens

**Q.16.** The maximum number of electrons that can be accommodated in M shell is:

- (a) 18 (b) 2 (c) 8 (d) 32

**Q.17.** Which of the following is an amphoteric oxide?

- (a) Carbon dioxide (b) Magnesium oxide  
(c) Iron (II) oxide (d) Aluminium oxide

**Q.18.** The fraction from the ones listed below that will NOT lead to a recurring

decimal is:

- (a)  $\frac{4}{56}$  (b)  $\frac{7}{56}$  (c)  $\frac{6}{56}$  (d)  $\frac{8}{56}$

**Q.19.** What happens as we go down the group in the periodic table?

- (a) The number of shells decreases  
 (b) The number of valence electrons decreases  
 (c) The number of shells increases  
 (d) Atomic size decreases

**Q.20.** What is a tissue ?

- (a) Cells which are similar in origin, but dissimilar in form and function  
 (b) Cells which are similar in origin, form and function  
 (c) Cells which are dissimilar in origin, but are similar in form and function  
 (d) Cells which are dissimilar in origin, form and function

**Q.21.** 28% of a number is 35. What is the number?

- (a) 125 (b) 80 (c) 120 (d) 108

**Q.22.** Which north-eastern state of India has signed up to host the 39th National Games in the year 2022?

- (a) Meghalaya (b) Mizoram  
 (c) Tripura (d) Manipur

**Q.23.** Consider the given question and decide which of the following statements is sufficient to answer the question.

How is Swati related to Namita?

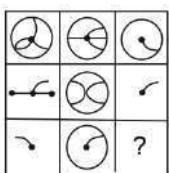
**Statements :**

I. Swati's husband is the only son of Namita's mother.

II. Swati's brother and Namita's husband are cousins.

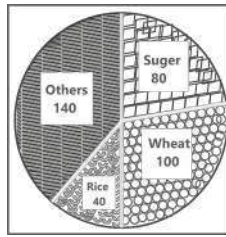
- (a) Either I or II is sufficient to answer the question.  
 (b) II alone is sufficient while I alone is not sufficient to answer the question.  
 (c) I alone is sufficient while II alone is not sufficient to answer the question.  
 (d) Both I and II are sufficient to answer the question.

**Q.24.** Select the option that correctly fits in the blank space in the given figure.



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

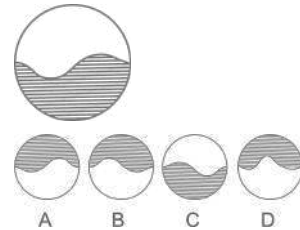
**Q.25.** The given pie chart represents the annual yield of certain crops in tons.



If the total production is 9000 tons, then the yield of rice is \_\_\_\_\_ tons

- (a) 2000 (b) 3000 (c) 1000 (d) 1500

**Q.26.** Choose the correct water image of the given problem figure.



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

**Q.27.** According to an early Indian philosopher everything is made up of \_\_\_\_\_ basic elements.

- (a) 4 (b) 2 (c) 3 (d) 5

**Q.28.** The Arjuna Awards given by the Government of India is for public achievement in which of the following fields ?

- (a) Literature (b) Economics  
 (c) Poverty Eradication (d) Sports

**Q.29.** Find the L.C.M of  $\frac{4}{5}$ ,  $\frac{2}{3}$  and  $\frac{5}{7}$

- (a) 30 (b) 40 (c) 20 (d) 25

**Q.30.** The number of symbols that are preceded by a letter and not followed by a number in the following expression is \_\_\_\_\_

A\$1%MB#6&NC=3!OD+KP

- (a) 2 (b) 1 (c) 4 (d) 3

**Q.31.** Which Indian author has chronicled life in the Kumaon hills in the book 'Things to Leave Behind'?

- (a) Shashi Tharoor (b) Vikram Seth  
 (c) Namita Gokhale (d) Anosh Irani

**Q.32.** Complete the series given in the Problem Figure with an appropriate option from the Answer Figures.

**Problem Figure**



**Answer Figures**



- (a) 3 (b) 1 (c) 2 (d) 4

**Q.33.** To dispose of the old stocks, a person sold a tea set for ₹ 3,420, which was 43% below the cost price. In order to make a profit of 10% the seller should have sold the set for ₹ \_\_\_\_\_ more.

- (a) ₹ 1,812.60 (b) ₹ 3,180  
 (c) ₹ 2,580 (d) ₹ 2,664.42

**Q.34.** Consider the given question and decide which of the following statements is sufficient to answer the question.

Which of these natural numbers X, Y, Z, U, and V are even numbers?

**Statements :**

1. X, Y, Z, U, and V are consecutive numbers.

2. Z is an odd number.

- (a) Both statement 1 and 2 together are sufficient  
 (b) Statement 2 alone is sufficient while statement 1 alone is insufficient  
 (c) Statement 1 alone is sufficient while statement 2 alone is insufficient  
 (d) Neither statement 1 nor 2 is sufficient

**Q.35.** A current (I) flows through a resistor. A source maintains a potential difference of V across the resistor. The energy supplied by the source in time t is:

- (a)  $\frac{VI}{t}$  (b) VI (c) VI t<sup>2</sup> (d) VI t

**Q.36.** The boiling point of an alcohol is 78 °C. What is the temperature in Kelvin scale?

- (a) 78K (b) 341K (c) 373K (d) 351K

**Q.37.** Select the missing word pair based on the given related pair.

Buy : bought :: \_\_\_\_\_

- (a) Ran : Run (b) Sang : Sing  
 (c) Tore : Tear (d) Shut : Shut

**Q.38.** In which city is St. Peter's Basilica, one of the most famous churches in Christianity, located?

- (a) Vatican (b) Lisbon (c) Madrid (d) Pisa

**Q.39.** Working together, pipes A and B can fill an empty tank in 10 hours. They worked together for 4 hours and then B stopped and A continued filling the tank till it was full. It took a total of 13 hours to fill the tank. How long would it take A to fill the empty tank alone ?

- (a) 16 hours (b) 13 hours  
 (c) 15 hours (d) 12 hours

**Q.40.** When  $X^2 + ax + b$  is divided by  $(x - 1)$  the remainder is 15 when  $x^2 + bx + a$  is divided by  $(x + 1)$  the remainder is -1 then the value of  $a^2 + b^2$  is:

- (a) 20 (b) 100 (c) 16 (d) 8

**Q.41.** Consider the given statement true

and decide which of the given conclusions can definitely be drawn from the given statements.

**Statement :**

People complain that bus tickets are not available during festival seasons.

**Conclusions :**

1. People should be advised not to travel during festival seasons.
  2. The government should bring in more buses during festival seasons.
- (a) Only conclusion 1 follows.  
 (b) Neither 1 nor 2 follows.  
 (c) Only conclusion 2 follows.  
 (d) Both 1 and 2 follow.

**Q.42.** If the resistance of a conductor is doubled, the current gets halved. This is because:

- (a)  $I = \frac{R}{V} n$       (b)  $I = V - R$   
 (c)  $I = VR$       (d)  $I = \frac{V}{R}$

**Q.43.** What are the receptors for detecting taste called?

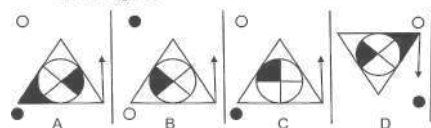
- (a) Gustatory receptors  
 (b) Olfactory receptors  
 (c) Sensory receptors  
 (d) Chemical receptors

**Q.44.** Choose the correct mirror image of the problem figure when the mirror is placed to the right of the figure.

Problem Figure



Answer Figures:



- (a) B    (b) A    (c) D    (d) C

**Q.45.** The ratio of sand to gravel in a mixture is 17 : 8 while that between gravel and cement is 6 : 17. What is the ratio of sand to cement in the mixture?  
 (a) 3 : 4    (b) 17 : 17    (c) 289 : 48    (d) 8 : 6

**Q.46.** As of February 2018, who is the Chief Minister of Telangana, who is also the first Chief Minister of Telangana?

- (a) Kadiyam Srihari  
 (b) K Chandrasekhar Rao  
 (c) T Rajaiah  
 (d) Chandrababu Naidu

**Q.47.** The value of universal gravitation constant (G) was determined by:

- (a) Antoine L Lavoisier  
 (b) Henry Cavendish  
 (c) Isaac Newton

(d) John Dalton

**Q.48.** If a body takes 't' seconds to go once round the circular path of radius 'r', the velocity 'v' is given by:

- (a)  $V = \frac{t}{2\pi r}$       (b)  $V = \frac{\pi r}{2t}$   
 (c)  $V = \frac{2\pi r}{t}$       (d)  $V = \frac{2\pi r^2}{t}$

**Q.49.** In the given equation, LHS = RHS only when we interchange numbers \_\_\_\_\_ on the same side.

- $5 + 3 \times 6 - 4 \div 2 = 4 \times 3 - 10 \div 2 + 7$   
 (a) 4 and 7      (b) 5 and 2  
 (c) 3 and 7      (d) 6 and 4

**Q.50.** Find the position of the image formed by a concave mirror when the object is placed between P and F?

- (a) Between F and C    (b) Beyond C  
 (c) At infinity      (d) Behind the mirror

**Q.51.** If  $123 \times 356 = 43788$  then  $1.23 \times 0.356 = ?$

- (a) 4.3788      (b) 0.043788  
 (c) 0.43788      (d) 437.88

**Q.52.** Select the missing term based on the given related pair.

MAKING : KGMANI :: CAPETO : \_\_\_\_\_

- (a) POACTE      (b) POCAET  
 (c) POCATE      (d) POTECA

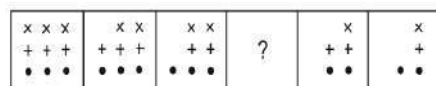
**Q.53.** Who is the famous Indian actress who stars in the 'Quantico' TV series on American Broadcasting Corporation?

- (a) Deepika Padukone  
 (b) Priyanka Chopra  
 (c) Malaika Arora  
 (d) Alia Bhatt

**Q.54.** A Train leaves Kazipet at 5 a.m. and reaches Bangalore at 3 p.m. Another train leaves Bangalore at 7 a.m. and reaches Kazipet at 5p.m. When do the two trains meet? Assume that the trains travel at equal uniform speeds.

- (a) 11 a.m.      (b) 10 a.m.  
 (c) 12 noon      (d) 1 p.m.

**Q.55.** Select the option that will correctly fit in the blank space in the given figure series.



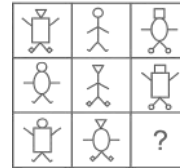
- (a)      (b)   
 (c)      (d)

**Q.56.** As of February 2018, who owns the Hyderabad-based IPL team 'SunRisers Hyderabad'?

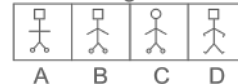
- (a) Kalanidhi Maran  
 (b) Chandrababu Naidu  
 (c) Chiranjeevi  
 (d) Deccan Chronicle Newspaper

**Q.57.** Complete the Problem Figure with an appropriate option from the Answer Figures.

Problem Figures



Answer Figures



- (a) B    (b) D    (c) A    (d) C

**Q.58.** Consider the given argument and decide which of the given assumptions is (are) implicit.

**Argument :**

All girls love reading novels.

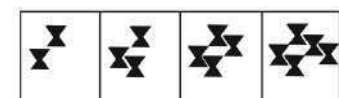
**Assumptions :**

1. Novels are the only reading materials.
  2. No girl loves to read other materials.
- (a) Both assumptions 1 and 2 are implicit.  
 (b) Only assumption 2 is implicit.  
 (c) Only assumption 1 is implicit.  
 (d) Neither assumption 1 nor 2 is implicit.

**Q.59.** A copper wire when bent in the form of a square encloses an area of 121 cm<sup>2</sup>. If the same wire is bent into the form of a circle, find the area of the circle: ( use  $\pi = \frac{22}{7}$  )

- (a) 150 cm<sup>2</sup>      (b) 153cm<sup>2</sup>  
 (c) 154cm<sup>2</sup>      (d) 155cm<sup>2</sup>

**Q.60.** Select the option that would come next in the following figure series.



- (a) D    (b) C    (c) A    (d) B

**Q.61.** The sum of the present ages of two cousins is 46 years. Eight years ago, the elder one was twice as old as the younger one. What is the present age of the elder cousin?

- (a) 30 years      (b) 28 years  
 (c) 26 years      (d) 22 years

**Q.62.** Identify a type of asexual reproduction which involves reproduction through parts of a plant such as roots, stem and leaves?

- (a) Vegetative propagation
- (b) Fragmentation
- (c) Fission
- (d) Budding

**Q.63.** On which dates of December, 2018 will be Wednesdays?

- (a) 4, 11, 18 and 25
- (b) 6, 13, 20 and 27
- (c) 3, 10, 17 and 24
- (d) 5, 12, 19 and 26

**Q.64.** Four numbers, when arranged in ascending order, are w, x, y and z. The average of the smallest three numbers is 18, while the average of the largest three was 22. What is the range of the data ?

- (a) 10
- (b) 11
- (c) 12
- (d) 13

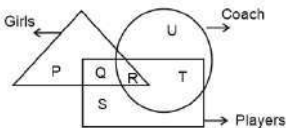
**Q.65.** In the process of \_\_\_\_\_, the iron is protected by a coating of zinc.

- (a) greasing
- (b) galvanization
- (c) alloying
- (d) anodizing

**Q.66.** If  $\tan\theta = \frac{7}{24}$  then find the value of p such that  $\frac{\tan\theta - \sec\theta}{\sin\theta} = \frac{-p}{28}$

- (a) 50
- (b) 75
- (c) 100
- (d) 25

**Q.67.** In the following Venn diagram which region represents the coach who is also a player but not a girl?



- (a) R
- (b) U
- (c) T
- (d) S

**Q.68.**

1	?	3
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Find the missing digit if it has 11 and 13 as factors?

- (a) 2
- (b) 8
- (c) 6
- (d) 4

**Q.69.** If  $a - \frac{1}{a} = 1$  then  $a^2 + \frac{1}{a^2} = ?$

- (a) 2
- (b) 1
- (c) 3
- (d) 4

**Q.70.** \$M@A#N2B4O&3C5P+D2

Using the above sequence find the characters that do NOT belong to the group:

- AO+, MB5, N32, \$2P
- (a) N32
- (b) \$2P
- (c) MB5
- (d) AO+

**Q.71.** Consider the given statement and decide which of the given assumption(s) is (are) implicit.

**Statement :**

Shyam tells Gita, "The ways to reach Sri

Lanka is through air and water".

**Assumptions :**

- 1. Gita likes to travel to Sri Lanka.
- 2. Shyam is fond of advising people.
- (a) Only assumption 2 is implicit.
- (b) Both assumptions 1 and 2 are implicit.
- (c) Neither assumption 1 nor 2 is implicit.
- (d) Only assumption 1 is implicit.

**Q.72.** The square root of 3249 is:

- (a) 63
- (b) 57
- (c) 59
- (d) 67

**Q.73.** Travelling at  $\frac{4}{5}$ th of his usual speed, a man is 15 minutes late. What is his usual time to cover the same distance?

- (a) 15 minutes
- (b) 45 minutes
- (c) 1 hour
- (d) 75 minutes

**Q.74.** The first Partition of Bengal took place in the year \_\_\_\_\_

- (a) 1904 AD
- (b) 1905 AD
- (c) 1903 AD
- (d) 1906 AD

**Q.75.** A person holding a pen in his left hand sees his reflection in the mirror holding the pen in his right hand. This is due to which of the following phenomena?

- (a) Total internal reflection
- (b) Refraction
- (c) Diffused reflection
- (d) Lateral inversion

**Answer Key :-**

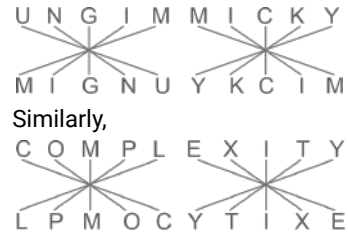
1.(c)	2.(d)	3.(a)	4.(b)
5.(c)	6.(a)	7.(a)	8.(b)
9.(d)	10.(b)	11.(d)	12.(c)
13.(b)	14.(d)	15.(a)	16.(a)
17.(d)	18.(b)	19.(c)	20.(b)
21.(a)	22.(a)	23.(a)	24.(a)
25.(c)	26.(d)	27.(d)	28.(d)
29.(c)	30.(b)	31.(c)	32.(c)
33.(b)	34.(a)	35.(d)	36.(d)
37.(d)	38.(a)	39.(c)	40.(b)
41.(c)	42.(d)	43.(a)	44.(b)
45.(a)	46.(b)	47.(b)	48.(c)
49.(d)	50.(d)	51.(c)	52.(c)
53.(b)	54.(a)	55.(c)	56.(a)
57.(a)	58.(d)	59.(c)	60.(b)
61.(b)	62.(a)	63.(d)	64.(c)
65.(b)	66.(b)	67.(c)	68.(d)
69.(c)	70.(b)	71.(c)	72.(b)

73.(c)	74.(b)	75.(d)	
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**Solutions :-**

**Sol.1.(c) 5.5. pH** is a measure of how basic or acidic a substance is. pH is defined by the following equation,  $pH = -\log [H^+]$ , where  $[H^+]$  denotes the molar hydrogen ion concentration. **pH level:** More than 7 - basic, Less than 7 - acidic, **Equal to 7 - Neutral.**

**Sol.2.(d)**



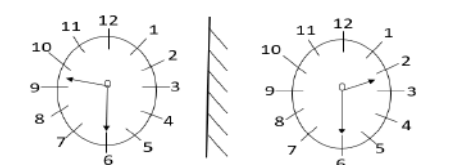
**Sol.3.(a) Anil Kumar Dhasmana.**

Founded - 1968. First director - Rameshwar Nath Kao. Headquarter - New Delhi. **Motto** - dharmo rakshati rakshitah. Ajit Doval - National Security Advisor of India. Dr. Kiran Bedi - India's First Woman IPS.

**Sol.4.(b) Amartya Sen** (Nobel Prize - Economics, 1998). **Awards:** Bharat Ratna (1999) and Peace Prize of the German Book Trade (2020). **Abhijit Banerjee** {American Citizen (Nobel Prize - Economics, 2019)}. **First Indian** who won the Nobel prize - Rabindranath Tagore (Literature, 1913). Other Indian Nobel Prize winners: **C. V. Raman** (Physics, 1930), **Har Gobind Khorana** (Physiology or Medicine, 1968), **Kailash Satyarthi** (Peace, 2014).

**Sol.5.(c)** 2:30 will be the time that would depict the correct mirror image of 9:30.

**Sol.6.(a)**  $22 - (\frac{1}{4}) \{-5 - (-48) \div (-16)\}$



$$= 22 - (\frac{1}{4}) \{-5 - 3\}$$

$$= 22 - (\frac{1}{4}) \times (-8) = 22 - (-2) = 24$$

**Sol.7.(a)** From statement 1:

$$\text{Salary of Y} = \frac{1}{2} \times \text{salary of (X + Z)}$$

From statement 2 :

$$\text{Salary of Z} = ₹500$$

$$\text{Salary of (X + Y)} = 500 + 40 = ₹540$$

So, the average wages of X, Y, Z

$$= \frac{540 + 500}{3} = \frac{1040}{3} = ₹346.66$$

Clearly, we can see that only statement 2 is sufficient while 1 alone is insufficient.

**Sol.8.(b)** Place value of 9 in the given no =  $9 \times 10000 = 90000$

Place value of 5 in the given no = 5

So, the required difference =  $90,000 - 5 = 89995$

**Sol.9.(d) Potential energy** - It is the energy possessed by the body due to its position or configuration. **Examples** - Water stored in a dam, a wound spring of a watch, a stretched bow and arrow. **Kinetic energy** is the energy an object has because of its motion. **Mechanical energy** is the sum of potential energy and kinetic energy. SI unit of Energy - Joule.

**Sol.10.(b)  $4E_k$ .** Kinetic energy is the energy possessed due to the motion.

Kinetic energy:

$$K.E., E_k = \frac{1}{2} \times m \times v^2$$

Where K.E. = Kinetic Energy, m = mass of the object, v = Velocity of an object

Given,  $v' = 2v$

$$K.E = \frac{1}{2} \times m \times (2v)^2$$

$$K.E = \frac{1}{2} \times m \times 4v^2 = 4 \left( \frac{1}{2} m v^2 \right)$$

$$K.E = 4 E_k$$

Therefore, the kinetic energy of the object will become 4 times when the speed becomes twice.

**Sol.11.(d) Acids have a bitter taste.**

**Properties of Acids:** Acids have sour taste, have Ability to conduct electricity, pH less than 7, corrosive in nature, mostly present in liquid or gaseous forms, Most acids can be diluted with water to reduce the intensity of their acidity, react with active metals to yield hydrogen gas.

**Sol.12.(c)** (1,5,7), (2,4,8) and (3,6,9)

Explanation : In group (1,5,7) - There is similar figure inside and outside.

In group(2,4,8) - There are different figure inside and outside.

In group (3,6,9) - They are the single definite figure.

**Sol.13.(b)** Required loss%

$$= \frac{375 - 345}{375} \times 100 = \frac{30}{375} \times 100 = 8\%$$

**Sol.14.(d)** According to the given argument, as there is a water crisis, it is a sensible step to reduce water consumption by 25%. So assumption 1 implicit. But there is no talk about protest

in argument so assumption 2 does not follow.

**Sol.15.(a) Urethra** - It is a tube that carries urine from the Urinary bladder. In females, urethra contains only urine, while in males, it carries both urine and sperms. The **ureters** carry urine from the kidneys to the bladder. The **oviduct** (fallopian tube) is a long muscular tube that carries eggs from the ovary to the uterus. The **vas deferens** (sperm duct) transports mature sperm to urethra before ejaculation.

**Sol.16.(a) 18.** The maximum number of electrons that can be accommodated in the outermost orbit is 8. It can be calculated by  $2n^2$  where  $n = 1, 2, 3, 4$  for K, L, M, N shells respectively. **K shell** - maximum 2 electrons. **L shell** - maximum 8 electrons. **N shell** - maximum 32 electrons.

**Sol.17.(d) Aluminium oxide ( $Al_2O_3$ )** is amphoteric in nature. It is a white odourless crystalline powder and Water insoluble. **Amphoteric oxides** are the oxides that behave as both acidic and basic oxides. **Other examples** included zinc oxide (ZnO), Tin oxide ( $SnO_2$ ), Lead oxide (PbO) and Ferric oxide ( $Fe_2O_3$ ). **Acidic Oxides:** Carbon dioxide ( $CO_2$ ), Sulphur trioxide ( $SO_3$ ). **Basic Oxides:** Calcium oxide (CaO), Magnesium oxide (MgO), Sodium oxide ( $Na_2O$ ).

**Sol.18.(b)** The given fraction is :

$$\frac{4}{56} = 0.\overline{0714285}, \frac{7}{56} = 0.125, \frac{6}{56} = 0.107\overline{14285}, \frac{8}{56} = 0.\overline{142857}$$

Clearly, we can see that  $\frac{7}{56}$  will not lead to a recurring decimal.

**Sol.19.(c) The number of shells increases.** Go top to bottom of a group in the periodic table: Size of atom (increases), electronegativity (decreases), Electron affinity (decreases). Left to right across a period: Size of atom (decreases), electronegativity (increases), number of valence electrons (increases), and Electron affinity (increases).

**Sol.20.(b) Cells which are similar in origin, form and function.** Groups of tissues make organs. The study of tissue - **Histology. Histopathology** - Study of disease-related tissue. There are 4 basic types of tissue: Connective tissue, Epithelial tissue, Muscle tissue, and Nervous tissue.

**Sol.21.(a)** Let the no be x

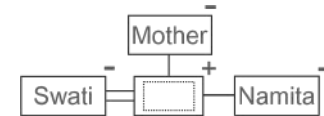
According to the question,

$$\Rightarrow 28\% \text{ of } x = 35$$

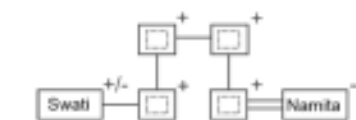
$$\Rightarrow \frac{28x}{100} = 35 \Rightarrow x = \frac{35 \times 100}{28} = 125$$

**Sol.22.(a) Meghalaya.** National Games of India : First event - 1924; 37th National Games was hosted in Goa in 2023.

**Sol.23.(a)** Statement (1) -

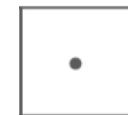


Statement (2) -



As we can see that Either I or II is sufficient to answer the question.

**Sol.24.(a)**



C is the correct image.

**Sol.25.(c)** Total production of rice

$$= \frac{9000}{360} \times 40 = 1000 \text{ tons}$$

**Sol.26.(d)**



**Sol.27.(d) 5. Panch Tatva** - Air, Earth, Fire, Sky and Water. The ancient Indian Philosopher Acharya Kanada (Kashyap) proposed that **paramanu (atom)** is an indestructible particle of matter. He described the universe with **six** categories - Dravya (Substance), Guna (Quality), Karman (Motion), Samanya (Universal), Visesa (Particular), Samavaya (Inherence).

**Sol.28.(d) Sports.** Sports Awards (Established year)- Arjuna Award (1961), Khel Ratna Award ((1991-92), Rajiv Gandhi Khel Ratna Award renamed to Major Dhyani Chand Khel Ratna Award (2021)), Dronacharya Award (1985). **Highest Indian Literature Awards:** Gyanpeeth Award (1961), Sahitya Akademi Fellowship (1968), Sahitya Akademi Award (1954), Vyas Samman (1991), The Hindu Literary Prize (2010).

**Sol.29.(c)** LCM of the given fraction

$$= \frac{LCM \text{ of } (4,2,5)}{HCF \text{ of } (5,3,7)} = \frac{20}{1} = 20$$

**Sol.30.(b)** A\$1%MB#6&NC=3!OD+KP

**One** such symbol exists that is preceded by a letter and not followed by a number.

**Sol.31.(c) Namita Gokhale.** Her other works - "Paro: Dreams of Passion", "A Himalayan Love Story", "The Book of Shadows", "The Habit of Love". **Shashi Tharoor** - "The Great Indian Novel", "India: From Midnight to the Millennium", "The Battle of Belonging", "Ambedkar: A Life". **Vikram Seth** - "A Suitable Boy", "The Golden Gate", "An Equal Music", "From Heaven Lake: Travels Through Sinkiang and Tibet", "Two Lives: A Memoir".

**Sol.32.(c)**



**Sol.33.(b)** Let the CP of tea set be  $x$

ATQ,  $x \times 57\% = ₹3420$

Then,  $x \times 110\% = \frac{3420}{57} \times 110 = ₹6600$

Required Amount =  $6600 - 3420 = ₹3180$

**Sol.34.(a)** From statement 1  $\rightarrow$

We know that in consecutive natural number we get even number alternatively  
From statement 2  $\rightarrow$  If Z is odd number therefore X and V are also odd numbers then Y and U are even numbers.

So, we can conclude that Both statement 1 and 2 together are sufficient

**Sol.35.(d) V I t.** Electric power is the rate at which electric energy (E) is transferred in an electric circuit per unit time (t).

$$P = VI$$

Therefore

$$P = E/t$$

$$VI = E/t$$

$$E = VI t$$

Therefore, the energy supplied in a circuit is given by  $E = V \times I \times t$

(where V = voltage, I = current, t = time)

**Sol.36.(d) 351K.** The relationship between Kelvin scale and Celsius scale of temperature can be written as:  
Temperature on kelvin scale = Temperature on Celsius scale + 273  
Temperature on kelvin scale =  $78 + 273$   
Temperature on kelvin scale = 351 K

**Sol.37.(d)** As Bought is the 2nd form of the verb Buy similarly Shut is the 2nd

form of the verb Shut.

**Sol.38.(a) Vatican.** St. Peter's Basilica is a church built in the Renaissance style located in the Vatican City west of the **Tiber River. Churches and their location** - Saint Mark's Basilica (Venice, Italy), La Sagrada Familia (Barcelona, Spain), Liverpool Cathedral (Liverpool, England). **Famous Churches in India** - Mylapore's Santhome Basilica (Chennai, Tamil Nadu), St Francis Church (Kerala), Basilica of Bom Jesus (Goa), St Paul Cathedral (West Bengal), Medak Cathedral (Telangana).

**Sol.39.(c)** Let the total work = 130 unit i.e.LCM of 10 and 13

$$\text{Efficiency of } (A + B) = \frac{130}{10} = 13 \text{ unit}$$

$$\text{Work done by } (A + B) \text{ in 4 hrs} = 13 \times 4 = 52 \text{ unit}$$

$$\text{Remaining work} = 130 - 52 = 78 \text{ unit}$$

which is completed by A in 9 hrs

Then, time taken by A alone to complete

$$\text{the whole work} = \frac{9}{78} \times 130 = 15 \text{ hrs}$$

**Sol.40.(b)** When  $x^2 + ax + b$  is divided by  $(x - 1)$  the remainder is 15

Using remainder theorem, we have :

$$\Rightarrow 1^2 + a + b = 15$$

$$\Rightarrow a + b = 14 \text{ ----- (1)}$$

When  $x^2 + bx + a$  is divided by  $(x + 1)$  the remainder is -1

Again, Using remainder theorem.

we have :

$$\Rightarrow (-1)^2 - b + a = -1 \Rightarrow 1 + a - b = -1$$

$$\Rightarrow a - b = -2 \text{ ----- (2)}$$

Solving eqn(1) and (2) we have :

$$\Rightarrow a = \frac{14 - 2}{2} = \frac{12}{2} = 6, b = 14 - 6 = 8$$

$$a^2 + b^2 = 6^2 + 8^2 = 36 + 64 = 100$$

**Sol.41.(c)** According to the statement, we conclude that Only conclusion 2 follows because the government should bring more buses during festival seasons But conclusion 1 does not follow.

$$\text{Sol.42.(d) } I = \frac{V}{R}$$

Using Ohm's law, the potential difference (V) across the conductor is directly proportional to the current (I) passing through it.

$$V = IR$$

Where, R = Resistance of the conductor.

$$I = V/R \text{ ----- (1)}$$

So, if the resistance becomes doubled then current become half because current is inversely

proportional to resistance (as shown in equation 1).

**Sol.43.(a) Gustatory receptors** - Sense flavours on the tongue. **Taste receptors** recognize five basic tastes (Salty, sour with the help of **ion channels** and Sweet, bitter and umami with the help of **G protein-coupled taste receptors**). **Olfactory receptors** (smell receptors) are protein receptor molecules that bind to odour molecules and detect the smell. **Sensory receptors** occur in specialized organs such as the eyes, ears, nose, and mouth, as well as internal organs.

**Sol.44.(b)**



**Sol.45.(a)** According to the question,

Ratio  $\rightarrow$  Sand : Gravel : Cement

$$17 : 8 : 8$$

$$6 : 6 : 17$$

$$\hline 102 : 48 : 136$$

Final ratio  $\rightarrow 51 : 24 : 68$

Now Ratio of Sand and Cement = 3 : 4

**Sol.46.(b) K Chandrasekhar Rao** was the first Chief Minister of Telangana. **Telangana** state was Founded: 2 June 2014. State Bird, Palapitta (Indian Roller or Blue Jay), State Animal - Jinka (Deer), State Tree - Jammi Chettu (Prosopis Cineraria), State Flower - Tangedu (Tanner's Cassia).

**Sol.47.(b) Henry Cavendish. John Dalton** - (Modern atomic theory, study colour blindness). **Isaac Newton** - Universal law of gravity, Newton's laws of motion, (In 1686 in his book 'Principia Mathematica Philosophiae Naturalis) - Newton's Law of Inertia, Newton's Law of Acceleration, Newton's Law of Action and Reaction)). **Antoine L Lavoisier** (law of conservation of mass).

**Sol.48.(c) V =  $\frac{2\pi r}{t}$ .** If an object moves

in a circular path with a uniform speed, then the object is said to be in Circular motion. Velocity is defined as the displacement of an object in unit interval time.

Velocity (v) = displacement / time.

For a circular motion, Velocity (v) = circumference of a circular path / time  
As, Circumference of the circle =  $2\pi r$   
Where r = radius of the circular path.

$$\therefore v = \frac{2\pi r}{t}$$

Therefore, the velocity of an object moving in circular path of radius r is

$$\text{given by } v = \frac{2\pi r}{t}$$

**Sol.49.(d)** In this type of questions we will check options one by one and doing so option d gets satisfied.

$$5 + 3 \times 6 - 4 \div 2 = 4 \times 3 - 10 \div 2 + 7$$

After Interchanging 6 and 4 of same side we get

$$5 + 3 \times 4 - 6 \div 2 = 4 \times 3 - 10 \div 2 + 7$$

$$5 + 12 - 3 = 12 - 5 + 7 \Rightarrow 14 = 14$$

**Sol.50.(d) Behind the mirror.** Position of Object (Position of Image, Nature of Image) in Concave Mirror: **Object At infinity** (At focus, Real and inverted), **Object Between infinity and C** (Between F and C, Real and inverted), **Object At C** (At C, Real and inverted), **Object Between C and F** (Beyond C, Real and inverted), **Object At F** (At infinity, Real and inverted), **Object Between F and P** (Behind mirror, Virtual and erect).

**Sol.51.(c)**

value of  $1.23 \times 0.356$  will be 0.43788

**Sol.52.(c)**

MAKING CAPETO  
KGMANI Similarly, POCATE

**Sol.53.(b) Priyanka Chopra.** Her other famous series : Citadel (2023).

**Sol.54.(a)** Let the speed of trains A and B be  $x$  km/hr

Then distance between stations =  $10x$  km

So, the relative speed of train when travels in opposite direction =  $2x$  km/hr

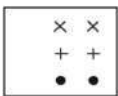
Distance covered by train A in 2 hrs =  $2x$

Remaining distance =  $10x - 2x = 8x$

Time of meeting =  $\frac{8x}{2x} = 4$  hrs

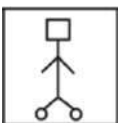
So, the required time =  $7 + 4 = 11$  a.m

**Sol.55.(c)**



**Sol.56.(a) Kalandhi Maran.** The league was founded by the BCCI in 2007-08. First edition winner - Rajasthan Royals.

**Sol.57.(a)**



**Sol.58.(d)** According to the statement, we conclude that neither assumption 1 nor 2 is implicit. Because novels are the only reading material is not really true

and all girls love reading novels but they may like reading something else.

**Sol.59.(c)** Area of square =  $a^2 = 121 \text{ cm}^2$

Then,  $a = 11 \text{ cm}$

Perimeter of square =  $11 \times 4 = 44 \text{ cm}$

ATQ,

Perimeter of square = perimeter of circle

$$\Rightarrow 44 = 2 \times \frac{22}{7} \times r$$

$$\Rightarrow 44 = \frac{44}{7} \times r \Rightarrow r = 7 \text{ cm}$$

So, area of circle =  $\frac{22}{7} \times 7 \times 7 = 154 \text{ cm}^2$

**Sol.60.(b)**



**Sol.61.(b)** Let the age of elder and younger cousin be  $x$  and  $y$  respectively

ATQ,

$$x + y = 46 \text{ .....(1)}$$

$$\text{And, } (x - 8) = 2(y - 8)$$

$$\Rightarrow x - 8 = 2y - 16 \Rightarrow x - 2y = -8$$

$$\Rightarrow x + y - 3y = -8 \Rightarrow 46 - 3y = -8 \text{ (from eq. 1)}$$

$$\Rightarrow 3y = 54 \Rightarrow y = 18 \text{ yrs}$$

So, the present age of elder cousin

$$= 46 - 18 = 28 \text{ yrs}$$

**Sol.62.(a) Vegetative propagation** is an asexual process of plant reproduction that occurs in its leaves, roots and stem.

**Fragmentation** is a type of asexual reproduction in which an organism simply breaks into individual pieces at maturity. **Budding** is an asexual method of creating new organisms. A small portion of the parent's body is used to create a new organism. **Fission** occurs when a neutron slams into a larger atom, forcing it to excite and split into two smaller atoms.

**Sol.63.(d)**

Formula for calculating day of any date

0 = Sunday, 1 = Monday... 6 = Saturday

A = century code (4,2,0,6 for remainder 1,2,3,0) dividing by first two digit of the year by 4

B = last two digits of year

C = number of leap years fallen in that century before that date.

D = month code (respective code of the months are 0,3,3,6,1,4,6,2,5,0,3,5)

E = date

Day = remainder of  $(A + B + C + D + E)$  when divided by 7.

By hit and trial method, option (d) gives

For 5 December 2018,

A = 6 B = 18 C = 4 D = 5 E = 5

According to formula,

$$\text{Remainder} = \left( \frac{A + B + C + D + E}{7} \right)$$

$$= \frac{38}{7} = 3$$

3 stands for Wednesday

Therefore, **5, 12, 19 and 26** will be wednesdays.

**Sol.64.(c)**

$$x + y + z = 22 \times 3 = 66 \text{ ..... (1)}$$

$$w + x + y = 18 \times 3 = 54 \text{ ..... (2)}$$

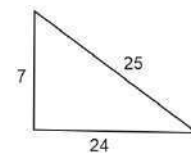
By subtracting equ. (2) from (1)

$$\text{Range of the data} = z - w = 66 - 54 = 12$$

**Sol.65.(b) Galvanization** is the process of applying a protective zinc coating to iron or steel, to prevent rusting. **Greasing:** Process which aims at reducing friction between two moving pieces by injecting a fluid or grease to separate them. **Alloys** are combinations of metals and other elements. **Anodizing** is an electrochemical process that converts the metal surface into a decorative, durable, corrosion-resistant, anodic oxide finish.

$$\text{Sol.66.(b) } \tan \theta = \frac{P}{B} = \frac{7}{24}$$

So, we have given triangle :



$$\sec \theta = \frac{25}{24}, \sin \theta = \frac{7}{25}$$

$$\Rightarrow \frac{\tan \theta - \sec \theta}{\sin \theta} = \frac{-p}{28}$$

$$\Rightarrow \frac{\frac{7}{24} - \frac{25}{24}}{\frac{7}{25}} = \frac{-p}{28}$$

$$\Rightarrow \frac{-18 \times 25}{24 \times 7} = \frac{-p}{28} \Rightarrow \frac{-75}{28} = \frac{-p}{28}$$

So,  $p = 75$

**Sol.67.(c)** From the venn diagram the letter which represents the coach who is also a player but not a girl is T.

**Sol.68.(d)** missing number is 4

Therefore, the number is 143, also  $143 = 11 \times 13$

$$\text{Sol.69.(c) } a^2 + \frac{1}{a^2}$$

$$= \left( a - \frac{1}{a} \right)^2 + 2 = 1^2 + 2 = 3$$

**Sol.70.(b) \$M@A#N2B40&3C5P+D2**

In , AO+, MB5, N32 all letters and symbols have 5 letters or symbols between them. But \$2P has gapping of 5 letters between \$ and 2 while 7 letters gapping between 2 and P



**Sol.71.(c)**

1. Gita likes to travel to Sri Lanka. This assumption is not true as it is not given in the statement.  
 2. Shyam is fond of advising people. This assumption is also not true as it is not given in the statement.  
 Neither assumption 1 nor 2 is implicit.

**Sol.72.(b)**

$$\begin{array}{r|l} 5 & 3249 & 57 \\ \hline 5 & 25 & \\ \hline 107 & 749 & \\ & 749 & \\ \hline & 0 & \end{array}$$

So, square root of 3249 = 57

**Sol.73.(c)** Speed  $\propto \frac{1}{\text{Time}}$  (when distance is constant)

Original New

Speed  $\rightarrow 5 : 4$

Time  $\rightarrow 4 : 5$

Here 1 unit (5 - 4) = 15 minutes

Then, 4 unit = 15  $\times$  4 = 60 minutes or 1hr

**Sol.74.(b) 1905 AD. Partition of Bengal -**

Announced officially on 19 July 1905 by Viceroy Lord Curzon and implemented on 16 October 1905. "**Swadeshi Movement**" (7th August 1905) - to oppose partition of Bengal. Partition was finally annulled in **1911** by **Lord Hardinge**. The All-India Muslim League was established in 1906.

**Sol.75.(d) Lateral inversion** - It means the apparent reversal of the mirror image's left and right when compared with the object. Total internal reflection is the complete reflection of a light ray within the medium (Air, Water Glass).

**Refraction:** The change in direction of a wave (light) passing from one medium to another caused by change in speed or by a change in the medium.

## RRB ALP & Technicians 10/08/2018 (Morning)

**Q.1.** Who took charge as the new Comptroller and Auditor General (CAG) of India in 2017?

- (a) Rajiv Mehrishi (b) Ranjit Kumar  
(c) Achal Kumar Jyothi (d) Vivek Goenka

**Q.2.** What will be the acute angle between the hour-hand and the minute-hand at 4:37 p.m.?

- (a) 18° (b) 83.5° (c) 6.5° (d) 18.5°

**Q.3.** Select the related word from the given alternatives:

Examination : Success :: Matches : \_\_\_\_\_

- (a) Attempt (b) Prepare  
(c) Victory (d) Cricket

**Q.4.** Present ages of Sai and Satheesh are in the ratio of 5:4 respectively. Three years hence, the ratio of their ages will become 11: 9 respectively. What is Satheesh's present age in years ?

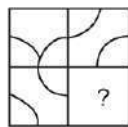
- (a) 22 (b) 24 (c) 21 (d) 23

**Q.5.** The kinetic energy of a ball weighing 0.5 kg moving with a velocity of 4 m / s will be :

- (a) 12 J (b) 8 J (c) 4 J (d) 16 J

**Q.6.** Select the option that fits in the blank space in the given Problem Figure.

Problem Figure



- (a) (b) (c) (d)

**Q.7.** According to Ohm's law, if current (I) increases and potential difference (V) remains constant, then:

- (a) resistance increases  
(b) potential difference decreases  
(c) resistance unchanged  
(d) resistance decreases

**Q.8.** How many atoms are present in one molecule of Ozone?

- (a) 2 (b) 1 (c) 3 (d) 4

**Q.9.** Which is the political party started by Telugu film actor Chiranjeevi, who later merged it with the Indian National Congress?

- (a) Nava Nirman Party  
(b) Andhra Pride Party  
(c) Telugu Desam Party  
(d) Praja Rajyam Party

**Q.10.** Solve the following:

$$(-4)\{19 - (-2) \times (-8)\} = ?$$

- (a) 140 (b) -140 (c) -12 (d) 12

**Q.11.** Which of the following numbers is a perfect square?

- (a) 333 (b) 327 (c) 192 (d) 441

**Q.12.** Select the WRONG number from the given series.

6, 12, 20, 32, 42, 56, 72

- (a) 72 (b) 56 (c) 20 (d) 32

**Q.13.** Consider the given statement and decide which of the given assumption(s) is (are) implicit.

**Statement:**

The train fares have increased by 25% with immediate effect.

**Assumptions:**

I. People still prefer travelling by train despite the increase.

II. Other modes of commutation may also increase their fares.

- (a) Neither assumption I nor II is implicit.  
(b) Only assumption II is implicit.  
(c) Only assumption I is implicit.  
(d) Both assumptions I and II are implicit.

**Q.14.** Veer spends 15% of his monthly income on the house rent and 60% of the rest on household expenditure. If he saves ₹2210, what is his monthly income?

- (a) ₹8,000 (b) ₹ 7,500  
(c) ₹6,500 (d) ₹7,000

**Q.15.** Among chemical properties, Mendeleev concentrated on the compounds formed by the elements with:

- (a) Hydrogen and Oxygen  
(b) Hydrogen and Sodium  
(c) Carbon and Hydrogen  
(d) Carbon and Sodium

**Q.16.** \_\_\_\_\_ reproduces by multiple fission.

- (a) Rhizopus (b) Plasmodium  
(c) Planaria (d) Yeast

**Q.17.** The product of two decimals is 0.768. If one of the decimal numbers is 1.6, find the other.

- (a) 0.47 (b) 0.48 (c) 0.37 (d) 0.42

**Q.18.** A Lawn roller makes 20 revolutions in one hour. The radians it runs through 25 minutes is:

- (a)  $\frac{50\pi}{3}$  (b)  $\frac{150\pi}{7}$   
 (c)  $\frac{250\pi}{3}$  (d)  $\frac{50\pi}{7}$

**Q.19.** Select the odd character out of the following series.

€	¥	\$	A
---	---	----	---

- (a) € (b) A (c) \$ (d) ¥

**Q.20.** In the following series, one term is missing as shown by the question mark (?). Select the missing term from the given options.

A, BC, DEF, GHIJ, ?

- (a) XYZA (b) TUVW (c) PQRS (d) KLMNO

**Q.21.** Which major bank has launched the 'Unnati Credit Card' in 2017 to enhance credit inclusion in India?

- (a) Axis Bank (b) SBI  
 (c) ICICI Bank (d) HDFC Bank

**Q.22.** Which is the form of energy that does NOT occur while riding a bicycle?

- (a) Kinetic energy  
 (b) Heat energy  
 (c) Mechanical energy  
 (d) Chemical energy

**Q.23.** The pH of a solution is 3. When its pH changes to 6, then H<sup>+</sup>ion concentration:

- (a) increases 2 times  
 (b) increases three times  
 (c) decreases 1000 times  
 (d) decreases 100 times

**Q.24.**

City	Population	Literate	Illiterate	% of literates
A	200	150	50	-
B	-	200	100	66.6
C	150	50	100	-
D	120	-	90	25

Based on the given data, the percentage of literates in City C is \_\_\_\_\_ (round to one decimal).

- (a) 33.4 (b) 32.3 (c) 34.5 (d) 33.3

**Q.25.** Name the Indian entrepreneur, co-founder and owner of India's low cost airline SpiceJet.

- (a) Ajay Singh (b) Vijay Mallya  
 (c) Ratan Tata (d) Captain G.R. Gopinath

**Q.26.** Consider the given argument and decide which of the given assumptions is (are) implicit.

**Argument:**

X advised Y that if he/she wants to study Management, he/she should join IIM.

**Assumptions:**

1. IIM provides good Management

education.

2. X listens to the advice given by Y.

- (a) Only assumption 2 is implicit.  
 (b) Neither 1 nor 2 is implicit.  
 (c) Only assumption 1 is implicit.  
 (d) Both 1 and 2 are implicit.

**Q.27.** When a ray of light travels from a denser medium to a rarer medium, it bends:

- (a) away from the normal and speeds up  
 (b) towards the normal and speeds up  
 (c) away from the normal and slows down  
 (d) towards the normal and slows down

**Q.28.** What is the mean of the first five Triangular Numbers?

- (a) 7 (b) 6 (c) 8 (d) 5

**Q.29.** If  $\operatorname{cosec} \theta + \cot \theta = 2$ , then  $\cot \theta = ?$

- (a) 0 (b) 0.5 (c) 1 (d) 0.75

**Q.30.** Who was the flag bearer for India at the 2016 Rio Olympics?

- (a) Sakshi Malik (b) Abhinav Bindra  
 (c) Saina Nehwal (d) P.V. Sindhu

**Q.31.** Except Helium, all noble gases have how many electrons in the outermost shell?

- (a) 6 (b) 10 (c) 8 (d) 4

**Q.32.** Which famous film actress and celebrity won the PETA 'Person of the Year' award in 2017?

- (a) Priyanka Chopra (b) Anushka Sharma  
 (c) Alia Bhatt (d) Deepika Padukone

**Q.33.** Choose the correct analogous word pair from the given alternatives.

People : Person

- (a) Fungus : Fungi (b) Cacti : Cactus  
 (c) Radius : Radii (d) Nucleus : Nuclei

**Q.34.** Consider the given question and decide which of the following statements is sufficient to answer the question.

Which of the natural numbers A, B, C, D and E are odd numbers?

**Statements:**

- A, B, C, D and E are natural numbers.
  - B is a prime number.
- (a) Neither 1 nor 2 is sufficient to answer the given question.  
 (b) 1 alone is sufficient while 2 alone is not sufficient to answer the given question.  
 (c) 2 alone is sufficient while 1 alone is not sufficient to answer the given question.  
 (d) Both 1 and 2 are sufficient to answer the given question.

**Q.35.** A shuttle cock used for playing

badminton has the shape of a frustum of a cone mounted on a hemisphere. The external diameters of the frustum are 5 cm and 2 cm, the height of the entire shuttle cock is 7 cm. Find the external surface area.

- (a)  $74.26 \text{ cm}^2$  (b)  $75.29 \text{ cm}^2$   
 (c)  $80 \text{ cm}^2$  (d)  $73.38 \text{ cm}^2$

**Q.36.** In the given series, how many 8s are there that are not divisible by the number to its left but completely divisible by the number to its right.

563248889266588343

- (a) 3 (b) 1 (c) 2 (d) 4

**Q.37.** The selling price of an item inclusive of a 10% profit was ₹ 440. What would be the percentage loss if the item was sold for ₹ 370?

- (a) 8 (b) 7.5 (c) 8.4 (d) 6.25

**Q.38.** Indian athlete Neeraj Chopra created history by becoming the first Indian to get gold in a world athletics championship. What was his sport?

- (a) Shot put (b) Javelin throw  
 (c) Long jump (d) Discus throw

**Q.39.** Select the option that can replace the '?' symbol in the following equation.

$122 + 345 - 1 \times 1011 \div 337 = ?$

- (a) 446 (b) 464 (c) 644 (d) 460

**Q.40.** The tendency of undisturbed objects to stay at rest or to keep moving with the same velocity is called

- (a) momentum (b) force  
 (c) energy (d) inertia

**Q.41.** A man walks 10 kms towards east, then takes a right turn and walks 8 km and again takes a left and walks 6 km. In which direction is the man with respect to his starting position?

- (a) North east (b) South west  
 (c) North west (d) South east

**Q.42.** Decide which of the conclusions logically follow(s) from the information given in the statement.

**Statements**

Poverty is increasing because politicians don't understand poverty nor do they know anything about the problems faced by the poor.

**Conclusions:**

- All politicians should be replaced.
  - All politicians should be asked to live in poor conditions.
- (a) Only conclusion 2 follows  
 (b) Only conclusion 1 follows  
 (c) Both 1 and 2 follow  
 (d) Neither 1 nor 2 follows

**Q.43.** Which of the following gases is used to prevent food material from getting oxidized?

- (a) Chlorine (b) Hydrogen  
(c) Oxygen (d) Nitrogen

**Q.44.** The science fiction book 'The Extra-Terrestrial Delivery' is penned by which Indian author?

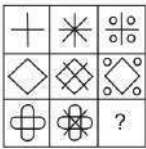
- (a) Namitha Ghokhale (b) Sudipta Das  
(c) Anosh Irani (d) Samit Basu

**Q.45.** The product of two numbers is 0.432. One of the numbers is 1.6. What is the other number?

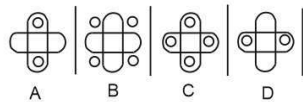
- (a) 2.7 (b) 0.27 (c) 27 (d) 0.027

**Q.46.** Select the Answer Figure that fits in the blank space in the given Problem Figure.

Problem Figure



Answer Figures



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

**Q.47.** Select the missing word from the given related pair of words.

Ancient : Old :: Bedspread: \_\_\_\_\_

- (a) Berth (b) Comforter  
(c) Pillow (d) Couch

**Q.48.** The metal that can be cut with a knife is:

- (a) Sodium (b) Copper  
(c) Aluminium (d) Iron

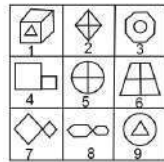
**Q.49.** Consider the given question and decide which of the following statements is sufficient to answer the question.

The trains are very punctual in Malaysia. For a maximum of how long should Mr. Z wait for the train?

**Statements:**

- Mr. Z had reached the railway station at 10 a.m.
  - There is a train at 11 a. m. and the next train is at 12p.m.
- (a) Statement 1 alone is sufficient while statement 2 alone is insufficient.  
(b) Both statement 1 and 2 are sufficient.  
(c) Either statement 1 or 2 is sufficient.  
(d) Statement 2 alone is sufficient while 1 alone is insufficient.

**Q.50.** Use each of the below figures only once and form three groups. The three groups so formed are:



- (a) (1,3,8), (2,5,6), (4,7,9)  
(b) (1,5,9), (2,3,6), (4,7,8)  
(c) (1,3,9), (2,5,6), (4,7,8)  
(d) (1,3,6), (2,5,9), (4,7,8)

**Q.51.** In which of the flowering plants are buds produced in the notches along the leaf margin?

- (a) Banana (b) Bryophyta  
(c) Bryophyllum (d) Rose

**Q.52.** When a compressed slinky is released it converts potential energy into:

- (a) Mechanical energy (b) Heat energy  
(c) Chemical energy (d) Kinetic energy

**Q.53.** The molecular formula of Propane is:

- (a) C<sub>3</sub>H<sub>8</sub> (b) C<sub>2</sub>H<sub>6</sub> (c) CH<sub>4</sub> (d) C<sub>4</sub>H<sub>10</sub>

**Q.54.**

Year	Item of Expenditure			
	Salary	Food	Medicine	Tax
2001	₹1500	₹200	₹500	₹100
2002	₹2600	₹300	₹600	₹200
2003	₹3200	₹150	₹700	₹150
2004	₹4100	₹250	₹650	₹125
2005	₹5000	₹200	₹800	₹150
2006	₹5200	₹100	₹750	₹175

The average salary per year during period 2001 - 2006 is:

- (a) 3,600 (b) 3,400 (c) 3,800 (d) 3,500

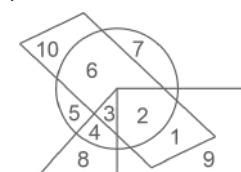
**Q.55.** Find the fraction which is as much greater than  $\frac{4}{7}$  as it is less than  $\frac{5}{6}$  :

- (a)  $\frac{59}{85}$  (b)  $\frac{58}{84}$  (c)  $\frac{59}{84}$  (d)  $\frac{84}{59}$

**Q.56.** Which of the following is present in the centre of a flower?

- (a) Carpel (b) Stamen  
(c) Petals (d) Sepals

**Q.57.**



- → Boys ○ → Athletic  
△ → Girls ▭ → Disciplined

Boys - Girls - Athletic - Disciplined  
In the above Venn diagram, what is the sum of the numbers that represent all those athletes who are not disciplined?

- (a) 27 (b) 11 (c) 16 (d) 13

**Q.58.** If  $2\sec^2x - \tan^2x = 5$  and  $0^\circ \leq x \leq 90^\circ$ , then  $x = ?$

- (a) 30° (b) 90° (c) 45° (d) 60°

**Q.59.** The sum of two fractions is  $\frac{5}{6}$ .

One of them is  $\frac{3}{4}$ . What is the other fraction?

- (a)  $\frac{2}{5}$  (b)  $\frac{2}{2}$  (c)  $\frac{1}{10}$  (d)  $\frac{1}{12}$

**Q.60.** Atomic mass of Carbon is 12 and that of Helium is 4. State which of the following statements is true for 1 mole of each of the elements?

- (a) 1 mole of Helium will contain 3 times more atoms than 1 mole of Carbon.  
(b) 1 mole of Carbon will contain the same number of atoms as present in 1 mole of Helium.  
(c) 1 mole of Carbon will contain one-third the number of atoms present in 1 mole of Helium.  
(d) 1 mole of Carbon will contain 3 times more atoms than 1 mole of Helium.

**Q.61.** Deepti bought a set of cups for 175, but then had to sell it later to clear old stocks for 161. What is the percentage of loss that she had to incur?

- (a) 8 (b) 16 (c) 14 (d) 7

**Q.62.** In a 900 metres race, Sathish beats Kiran by 270 metres and Rahul by 340 metres. By how many metres does Kiran beat Rahul in the same race?

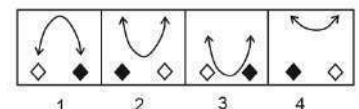
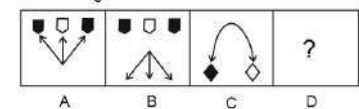
- (a) 70 (b) 20 (c) 140 (d) 100

**Q.63.** Which one of the following derives nutrition from plants as a parasite?

- (a) Malaria Parasite (b) Cuscuta  
(c) Bryophyllum (d) Lice

**Q.64.** Choose the correct figure to replace the question mark.

Problem Figures



- (a) 4 (b) 3 (c) 2 (d) 1

**Q.65.** \_\_\_\_\_, a Muslim saint, lived at the place where Fatehpur Sikri was built.

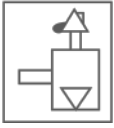
- (a) Nizamuddin Auliya  
(b) Nasiruddin Chiragh Dehlavi  
(c) Sheikh Salim Chisti  
(d) Baba Fakruddin

**Q.66.** If a person bought an item for ₹60 and sold it at a profit of 25%, the selling price of the item would be:

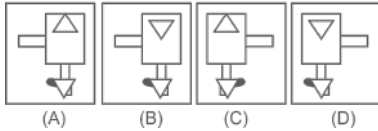
- (a) ₹75 (b) ₹80 (c) ₹72 (d) ₹84

**Q.67.** Which of the Answer Figures is the correct water image of the given Problem Figure?

Problem Figure



Answer Figures



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

**Q.68.** Which of the following regions has the highest potential for wind energy?

- (a) The Deccan Plateau  
(b) Gangetic plains  
(c) The Himalayas  
(d) Western Ghats

**Q.69.** Sound travels at a speed of  $333 \text{ ms}^{-1}$  in the air, thus, in 1 s, a distance of 333 m is travelled by:

- (a) particles (b) receiver  
(c) source (d) disturbance

**Q.70.** A 150 m long train, travelling at 54 km/h, crosses a platform in 42 seconds. What is the length of the platform?

- (a) 540 m (b) 480 m (c) 780 m (d) 630 m

**Q.71.** Consider the given statement as true and decide which of the given conclusions can definitely be drawn from the given statements.

**Statements:**

Some actors are businessmen.  
All businessmen are intelligent.

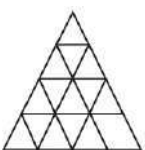
**Conclusions:**

1. All actors are intelligent.  
2. All businessmen are actors.  
(a) Both 1 and 2 follow  
(b) Only conclusion 1 follows  
(c) Neither 1 nor 2 follows  
(d) Only conclusion 2 follows

**Q.72.** Samarth heading towards north turns right after walking 10m, he turns right again walks for 4 meters and then he turns left and walks 6km. In which direction he is walking?

- (a) West (b) North (c) East (d) South

**Q.73.** The minimum number of straight lines required to construct the given figure is \_\_\_\_\_.



- (a) 9 (b) 11 (c) 10 (d) 12

**Q.74.** 'Freedom Trail' is a 2.5 mile long passage that offers a rich insight into the American Revolution. In which US city would you find this famous and historic trail?

- (a) Denver (b) Boston  
(c) Connecticut (d) Memphis

**Q.75.** Krish is 5 years younger than Parthiv. Eight years ago, three times the age of Krish was 10 more than twice the age of Parthiv. Find Krish's present age.

- (a) 32 years (b) 33 years  
(c) 30 years (d) 28 years

**Answer Key :-**

1.(a)	2.(b)	3.(c)	4.(b)
5.(c)	6.(c)	7.(d)	8.(c)
9.(d)	10.(c)	11.(d)	12.(d)
13.(c)	14.(c)	15.(a)	16.(b)
17.(b)	18.(a)	19.(b)	20.(d)
21.(b)	22.(d)	23.(c)	24.(d)
25.(a)	26.(d)	27.(a)	28.(a)
29.(d)	30.(b)	31.(c)	32.(b)
33.(b)	34.(a)	35.(a)	36.(b)
37.(b)	38.(b)	39.(b)	40.(d)
41.(d)	42.(d)	43.(d)	44.(b)
45.(b)	46.(c)	47.(b)	48.(a)
49.(b)	50.(c)	51.(c)	52.(d)
53.(a)	54.(a)	55.(c)	56.(a)
57.(c)	58.(d)	59.(d)	60.(b)
61.(a)	62.(d)	63.(b)	64.(c)
65.(c)	66.(a)	67.(b)	68.(d)
69.(d)	70.(b)	71.(c)	72.(c)
73.(b)	74.(b)	75.(d)	

**Solutions :-**

**Sol.1.(a) Rajiv Mehrishi.** CAG is an independent authority under the Constitution of India. He/she is the head of the Indian audit & account department and chief Guardian of Public purse. Article 148 deals with the CAG appointment, oath and conditions of service.

**Sol.2.(b)** Required angle

$$= \left| 30H - \frac{11M}{2} \right|, \text{ where } H = \text{hour hand and } M = \text{minute hand}$$

$$= \left| 30 \times 4 - \frac{11 \times 37}{2} \right|$$

$$= |120 - 203.5| = 83.5^\circ$$

**Sol.3.(c)**

After passing the examination we get success. Similarly, after winning the matches we get victory.

**Sol.4.(b)**

Balancing the given ratio, we have :

Sai Satish

Current age  $5_{x2} : 4_{x2} = 10 : 8$

Three years hence, their age  $11 : 9$

Here, 1 unit i.e,  $(11 - 10) = 3$  yrs

Then, 8 unit =  $3 \times 8 = 24$  yrs

So, the present age of Satheesh = 24yrs

**Sol.5.(c) 4 J.**

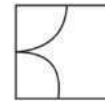
Kinetic Energy (KE) =  $\frac{1}{2} mv^2$  (Where m = mass, v = velocity)

Given m = 0.5 kg, v = 4m/sec

KE =  $\frac{1}{2} \times 0.5 \times 4 \times 4$

KE =  $\frac{1}{2} \times 8 \Rightarrow \text{KE} = 4\text{J}$

**Sol.6.(c)**



**Sol.7.(d) resistance decreases. Ohm's law**

- The voltage across a conductor is directly proportional to the current flowing through it, provided all physical conditions and temperatures remain constant.  $V \propto I$ ,  $V = IR$  (Where V = Voltage, I = Current, R = Resistance),  $I = \frac{V}{R}$  (Current is inversely proportional to resistance. This means that as the resistance increases, current decreases, and if the resistance decreases, current increases.)

**Sol.8.(c) 3. Ozone (Trioxigen, O<sub>3</sub>).** The formula was given by Jacques-Louis Soret. It is an allotrope of oxygen and is a pale blue gas with a distinct pungent smell. It is less stable than diatomic oxygen O<sub>2</sub> gas. Ozone is an excellent oxidizing agent as it breaks down into oxygen gas and nascent oxygen.  $\{O_3 \rightarrow O_2 + [O]\}$ . A layer of ozone is present in the stratosphere of Earth and prevents the UV rays from reaching the earth surface.

**Sol.9.(d) Praja Rajyam Party.** Chiranjeevi founded the Praja Rajyam Party In 2008 and contested in the 2009 Andhra Pradesh election. The party won 18 out of 294 seats with a vote share of over 16% and was later merged into the Indian National Congress in 2011. Telugu Desam Party - Founded by N. T. Rama Rao on 29 March 1982.

**Sol.10.(c)**  $(-4)\{19 - (-2) \times (-8)\}$   
 $\Rightarrow (-4)\{19 - 16\}$

$$\Rightarrow (-4) \times 3 = -12$$

**Sol.11.(d)** On observing the given options we can clearly see that 441 i.e.  $21^2$  is a perfect square

**Sol.12.(d) Logic :-**

6	12	20	30	42	56	72
+6	+8	+10	+12	+14	+16	

**Sol.13.(c)** Even if fares increase it does not mean people will stop using the train. Because for some people trains are the basic mode of transportation. However, it is possible that some people might shift to other modes of transportation. Assumption 1 is implicit.

It is not given in the statement that other modes of transportation will increase the price. Statement 2 is not implicit.

**Sol.14.(c)**

Let the monthly income of Veer be x.

ATQ,

$$x \times \frac{17}{20} \times \frac{2}{5} = 2210$$

$$\Rightarrow x \times \frac{17}{50} = 2210$$

$$x = \frac{2210 \times 50}{17} = ₹6500$$

**Sol.15.(a) Hydrogen and Oxygen.** They are highly reactive and hence formed compounds with almost all the elements. Dmitri Mendeleev - The father of the Periodic Table.

**Sol.16.(b) Plasmodium. Multiple Fission:**

The process of asexual reproduction in which many daughter cells are produced from the parent cell instead of two daughter cells. During this process, the nucleus is repeatedly divided to generate a large number of nuclei. A small amount of cytoplasm is absorbed by each nucleus, and then a membrane is formed around each structure. The dimensions of all the daughter cells formed are similar and identical. **Rhizopus** - Reproduce asexually by the formation of the spores. **Planaria** - Binary Fission. **Yeast** - Budding.

**Sol.17.(b)** Let the required decimal be x

ATQ,  $1.6x = 0.768$

$$x = \frac{0.768}{1.6} = 0.48$$

**Sol.18.(a)**

No of revolution in 60 minutes = 20

Then, no. of revolution in 25 minutes

$$= \frac{20}{60} \times 25 = \frac{25}{3}$$

So, the radians it runs through 25 minutes

$$= \frac{25}{3} \times 2\pi$$

$$= \frac{50\pi}{3} \text{ (As 1 revolution} = 2\pi \text{ radian)}$$

**Sol.19.(b)** In the given series except A all are symbols. So A is odd.

**Sol.20.(d) Logic :-** In the given series the number of letters are increasing in the English alphabetical order. So KLMNO is the correct answer.

**Sol.21.(b) SBI** - State Bank of India was established in 1955. It is India's largest commercial bank.

**Sol.22.(d) Chemical energy. Heat energy** is produced while riding the bicycle due to the friction between the tires and the surface of the road. **Mechanical energy** is a combination of kinetic and potential energy. The energy by virtue of motion is termed Kinetic energy and the energy possessed by virtue of a stationary position is termed potential energy. Since the bicycle is in motion hence, Kinetic energy is present and also Mechanical energy. In this case, kinetic energy is equal to mechanical energy, since potential energy is zero.

**Sol.23.(c) decreases 1000 times.** pH tells the concentration of hydrogen ions - lower the pH, higher is the hydrogen ion concentration. Acids have pH ranging from 1-6, pH 7 denotes neutral solution, and pH in the range of 8-14 denotes bases.

**Sol.24.(d)** Total population of city C = 150

Literate population = 50

Illiterate population = 100

the percentage of literates in City C

$$= \frac{50}{150} \times 100 = 33.3\%$$

**Sol.25.(a) Ajay Singh.** On 15 January 2015, Ajay Singh re-acquired ownership of SpiceJet from Sun Group's chairman and managing director Kalanithi Maran. The famous slogan "Abki Baar Modi Sarkar" was coined by Ajay Singh. **Ratan Tata** - Former Chairman of Tata and sons. **Vijay Mallya** - Former owner - Kingfisher Airlines. **Captain G.R. Gopinath** - Former owner - Deccan Airways.

**Sol.26.(d)** We can assume that IIM does provide good management studies that is why X advised Y to join the IIM. So assumption 1 is implicit.

If Y is advising X, we can say that X is

listening to the advice given by Y. So assumption 2 is implicit.

Both assumptions 1 and 2 are implicit.

**Sol.27.(a) Option (a) is correct.**

**Refraction** - The bending of light rays after entering a medium where its speed is different. Natural Phenomenon: Bending of Objects in a Glass, Shallower Swimming Pool, Atmospheric Refraction and Setting sun, Twinkling Star.

**Reflection** - The return of light or sound waves from a surface. **Diffraction** - It is defined as the bending of light around corners such that it spreads out and illuminates areas where a shadow is expected.

**Sol.28.(a)** First five Triangular Numbers = 1, 3, 6, 10, 15

$$\text{So, the required mean} = \frac{1+3+6+10+15}{5}$$

$$= \frac{35}{5} = 7$$

**Sol.29.(d)**  $\operatorname{cosec} \theta + \cot \theta = 2$  ----- (1)

$$\operatorname{cosec}^2 \theta - \cot^2 \theta = 1$$

$$(\operatorname{cosec} \theta + \cot \theta)(\operatorname{cosec} \theta - \cot \theta) = 1$$

$$\Rightarrow (\operatorname{cosec} \theta - \cot \theta) = \frac{1}{2} \text{----- (2)}$$

Subtracting eqn(2) from (1) we get :

$$\cot \theta = \frac{2 - \frac{1}{2}}{2} = \frac{3}{2 \times 2} = \frac{3}{4} = 0.75$$

**Sol.30.(b) Abhinav Bindra** (ace Indian shooter) - India's first individual Olympic gold medallist (10m Air Rifle event at the 2008 Games in Beijing). **Sakshi Malik** - (Freestyle wrestler) - olympic bronze medalist in 58 kgs in olympics (2016). **Saina Nehwal** - (Badminton player) - bronze medalist in Olympic 2012. **PV Sindhu** - (Badminton player) - First Indian woman to win two olympics medals 2016 (Silver), 2020 (Bronze).

**Sol.31.(c) 8.** Helium had 2 electrons in its outermost cell. The other Noble gasses are Neon (10), Argon (18), Krypton (36), Xenon (54), and Radon (86). All the noble gases have 8 electrons in their valence i.e. they have completely filled octet. The completely filled octet provides these elements stability and thus they have **0 valencies**. All other elements form cations and anions to get a stable configuration like that of a noble gas.

**Sol.32.(b) Anushka Sharma.** People for the Ethical Treatment of Animals (PETA) is the largest animal rights organization in the world. PETA was established on March 22, 1980. Headquarters of PETA:

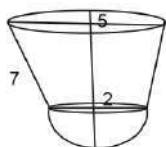
Norfolk, Virginia, United States.

**Sol.33.(b) Logic :** the first word is plural and the second word is its singular form. Similarly in the option b first word is the plural and the second word is its singular form.

**Sol.34.(a)**

A, B, C, D and E are natural numbers so it can be odd or even, here it is not clear. So statement 1 is not sufficient. B is a prime number. Examples of prime numbers are 2, 3, 5, 7, 11, ..... So B can be 2 which is even so statement 2 is also not sufficient.

**Sol.35. (a)**



Larger radius of frustum(R) =  $\frac{5}{2} = 2.5\text{cm}$

Smaller radius of frustum(r) = radius of hemisphere = 1 cm

Height of frustum = 7 - 1 = 6 cm

Slant height of frustum(l)

$$= \sqrt{(2.5 - 1)^2 + 6^2} = \sqrt{(1.5)^2 + 36}$$

$$= \sqrt{38.25} = 6.18 \text{ cm}$$

$$\text{CSA of hemisphere} = 2 \times \pi \times 1^2 = 2\pi \text{ cm}^2$$

$$\text{CSA of frustum} = \pi \times (1+2.5) \times \sqrt{\frac{153}{4}} =$$

$$\pi \times 3.5 \times 6.18 = 21.63\pi \text{ cm}^2$$

External surface area = CSA of hemisphere + CSA of frustum

$$= 2\pi + 21.63\pi = 23.63\pi = 23.63 \times \frac{22}{7}$$

$$= 74.26 \text{ cm}^2$$

**Sol.36.(b)**

Given series is : 563248889266588343. We can clearly see that there is only one 8 that are not divisible by the number to its left i.e.5.

**Sol.37.(b)** Let the CP be  $x$

$$\text{ATQ, } x \times \frac{110}{100} = 440$$

$$\text{So, } x = 400$$

$$\text{Required loss\%} = \frac{400-370}{400} \times 100 = 7.5\%$$

**Sol.38.(b) Javelin throw.** It is a track and field event. Neeraj Chopra is the first athlete to win a gold medal in olympics individual event (2020). Best throw in olympics 87.58 m in his second attempt. Personal best - 88.44(Zurich Diamond League final in 2022). He is the first Indian to win the diamond league. Devendra Jhajharia, Sundar Singh Gurjar,

Shivpal Singh, Kashinath Naik are some other famous javelin thrower of India.

**Sol.39.(b)**  $122 + 345 - 1 \times 1011 \div 337$

$$= 122 + 345 - 1 \times 3$$

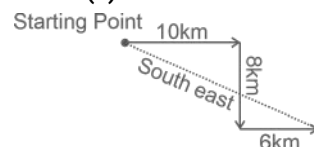
$$= 122 + 345 - 3$$

$$= 122 + 342 = 464$$

**Sol.40.(d) inertia.** SI Unit -  $\text{Kgm}^2$ .

**Velocity** is a vector quantity which measures the rate and direction of motion. SI Unit - m/s. **Force** is a push or pull that tends to change the motion of an object or its direction. SI Unit - Newton. The quantity of motion that an object has is known as **momentum**. SI Unit - kilogram meter per second (kg.m/s).

**Sol.41.(d)**



**Sol.42.(d)** Even if all the politicians are replaced there is no guarantee the new politician will understand poverty. So, conclusion 1 does not follow.

If politicians are made to live in poor conditions there is still a possibility that politicians will not understand the poverty. So conclusion 2 does not follow. Neither conclusion 1 nor 2 follows.

**Sol.43.(d) Nitrogen.** It will displace oxygen in the air (nitrogen doesn't react with foods or affect the flavor or texture, so they stay fresher longer). Oxygen is the main reason in the air that causes spoilage. **Nitrogen** - Discovered and isolated by Daniel Rutherford in 1772. **Oxygen and Chlorine** - Discovered independently by Carl Wilhelm Scheele. **Hydrogen** - Discovered by Henry Cavendish in 1766.

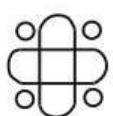
**Sol.44.(b) Sudipta Das.**

**Sol.45.(b)** Let the other no. be  $x$

$$\text{ATQ, } 1.6x = 0.432$$

$$x = \frac{0.432}{1.6} = 0.27$$

**Sol.46.(c) The correct answer is**



**Sol.47.(b)** As the synonym of old is ancient. Similarly the synonym of bedspread is comforter.

**Sol.48.(a) Sodium:** Symbol - Na, Atomic

number - 11, Atomic mass - 22.99. The first three alkali metals (Li, Na and K) are so soft that they can be cut by knife. **Copper** - (symbol Cu, Atomic number - 29, Atomic mass - 63.54), **Aluminium** - (Symbol - Al, Atomic number - 13, Atomic mass - 27), **Iron** - (Symbol - Fe, Atomic number - 26, Atomic mass - 55.85).

**Sol.49.(b)** From statement 1, we know Mr. Z reached the railway station at 10 a.m.

From statement 2, we get information regarding the time of waiting that Mr Z should have to wait a maximum of 14 hrs for the train.

So, clearly we can see that both statements 1 and 2 are sufficient to answer the given question.

**Sol.50.(c)** In figure 1,3,9 there are different figures outside and inside. In 2, 5, 6 there is a cross sign inside the figure. In the figure 4, 7, 8 similar figures but different sizes(one bigger one smaller) are adjacent to each other.

**Sol.51.(c) Bryophyllum** - It is a genus of plant species in the Crassulaceae family native to Madagascar. **Bryophyta** is a phylum of Plant kingdom in which the most simple and primitive land plants are included. The plants are devoid of vascular tissues. Some of the plants included in this phylum are Riccia, Anthoceros, Funaria, and Sphagnum, etc. **Banana** is a berry fruit and is the largest herbaceous flowering plant. **Rose** is an ornamental flowering plant that propagates by stem cutting.

**Sol.52.(d) Kinetic energy.** When slinky is compressed work is done against the spring force, and this work done is stored as potential energy. When compressed slinky is released, its potential energy will be converted into the energy of motion called kinetic energy. **Potential energy** is the energy held by an object because of its position relative to other objects. **Mechanical energy** is the energy that is possessed by an object due to its motion or due to its position.

**Sol.53.(a) C<sub>3</sub>H<sub>8</sub>** (Propane) is a three-carbon alkane gas. It is stored under pressure inside a tank as a colorless, odorless liquid. **C<sub>2</sub>H<sub>6</sub>** (Ethane) - It is a colourless and odorless gas at room temperature. **CH<sub>4</sub>** (Methane) - It is a hydrocarbon that is a primary component of natural gas. **C<sub>4</sub>H<sub>10</sub>** (Butane) - Straight chain alkane composed of 4 carbon atoms. It has a role as a food propellant and a