
RAILWAY RECRUITMENT BOARD

RRRB

TECHNICIAN

GRADE-I SIGNAL

PRACTICE

BOOK

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Content

■ PRACTICE SET - 1	3-17
■ PRACTICE SET - 2	18-32
■ PRACTICE SET - 3	33-47
■ PRACTICE SET - 4	48-63
■ PRACTICE SET - 5	64-79
■ PRACTICE SET - 6	80-95
■ PRACTICE SET - 7	96-112
■ PRACTICE SET - 8	113-128
■ PRACTICE SET - 9	129-144
■ PRACTICE SET - 10	145-160
■ PRACTICE SET - 11	161-176
■ PRACTICE SET - 12	177-192
■ PRACTICE SET - 13	193-208
■ PRACTICE SET - 14	209-224
■ PRACTICE SET - 15	225-240

Tentative Subject-wise break-up of questions and marks for CBT of Technician Gr-I Signal		
Subjects	No. of Questions	Marks for Each Section
General Awareness	10	10
General Intelligence and Reasoning	15	15
Basics of Computers and Applications	20	20
Mathematics	20	20
Basic Science & Engineering	35	35
Total	100	100
<p>1. Duration : 90 minutes (with 30 minutes extra time for PwBD candidates using scribe).</p> <p>2. The Subject-wise distribution give above is merely indicative. The question papers may vary.</p>		

PRACTICE SET - 1

1. In which projects did ISRO succeeded in September 2014?
 - (a) Launched polar load vehicle
 - (b) Launched synchronous satellite
 - (c) Launched rockets to mars
 - (d) Mars orbiter spacecraft successfully entered orbit around planet Mars.
2. Sachin Tendulkar scored his 100th international cricket century against which team?
 - (a) England
 - (b) Australia
 - (c) Bangladesh
 - (d) Pakistan
3. In which of the following states is the Gambhira- a popular dance, performed using various wooden masks?
 - (a) Rajasthan
 - (b) Telangana
 - (c) West Bengal
 - (d) Gujarat
4. Kailash Satyarthi was the founder of:
 - (a) Bachpan Bachao Andolan
 - (b) Sabko Padhao Andolan
 - (c) Stree Bachao Andolan
 - (d) Beti Padhao Andolan
5. Securities sold by the Central Bank with a clear specification of repurchase date and price is called
 - (a) outright open market operations
 - (b) Interest Rate Swap
 - (c) repurchase agreement
 - (d) reverse repo
6. How many members nominated by the President of India to the Rajya Sabha?
 - (a) 12
 - (b) 10
 - (c) 8
 - (d) 6
7. Which of the following is the lowermost layer of the earth's atmosphere?
 - (a) Thermosphere
 - (b) Mesosphere
 - (c) Stratosphere
 - (d) Troposphere
8. Which of the following is NOT a Himalayan Mountain Pass connecting Uttarakhand with Tibet ?
 - (a) Shipki La
 - (b) Mana Pass
 - (c) Mangsha Dhura
 - (d) Niti Pass
9. ___ was Bairam Khan son, who became an important person in Akbar court.
 - (a) Abdul Rahim Khan -i- Khanan
 - (b) Amir Khusrow
 - (c) Abul Fazl
 - (d) Birbal
10. The Tri-Color which was hoisted in Stuttgart by Madam Cama was smuggled into British India by:
 - (a) Indulal Yagnik
 - (b) Bhikaji Cama
 - (c) Kishan Singh
 - (d) Veer Savarkar
11. Select the option that is related to the third term in the same way as the second term is related to the first term.
Book : Reading :: Poetry : ?
 - (a) Rhyming
 - (b) Singing
 - (c) Recitation
 - (d) Teaching
12. If 'A # B' means 'A is the father of B', 'A \$ B' means 'A is the mother of B', 'A @ B' means 'A is the husband of B', 'A % B' means 'A is the wife of B', 'A =B' means 'A is the brother of B' then how is P related to V in the following expression?
 $P @ Q \$ U = R \% S \# V$
 - (a) Paternal grandfather
 - (b) Maternal grandfather
 - (c) Father's brother
 - (d) Mother's brother
13. If J denotes addition, G denotes subtraction, M denotes multiplication and B denotes division, then which of the following equations will not be correct?
 - (a) $6M5J4B2G10 = 22$
 - (b) $4G16B2J6M5 = 26$
 - (c) $6B2M8G10J4 = 20$
 - (d) $8M2G6B3J7 = 21$
14. 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) Only conclusion 2 follows
 - (c) Either 1 or 2 follows
 - (d) Both 1 and 2 follow
15. Consider the given statement and decide which of the given assumption is/are implicit in the statement :
Statement:
"We use platinum, the lustrous metal, for jewellery" _____ An advertisement
Assumption:
 - I. Platinum is a lustrous metal
 - II. Platinum is use for making jewellery
 - (a) Only assumption II implicit
 - (b) Neither assumption I nor II is implicit
 - (c) Only assumption I is implicit
 - (d) Both assumption I and II are implicit
16. A question and three statements labelled (I), (II) and (III) are given, You have to decide which statement(s) is/are sufficient to answer the question.
Question: Who is the shortest among A, B, C, D and E?

Statement :

I. A is taller than E but shorter than D.

II. B is shorter than C but taller than E.

III. D is taller than C and A is taller than B.

- (a) Statements I, II and III are insufficient
(b) Statements I and II together are sufficient.
(c) Statements I and III together are sufficient
(d) Statements I, II and III together are sufficient
17. From among the given options, select the word which cannot be formed using the letters of the given word.

LAUGHTER

- (a) GRUNT (b) GATE
(c) HATE (d) RATE
18. Select the option that is related to the third term in the same way as the second term is related to the first term.

India : Tiger :: Nepal : ?

- (a) Lion (b) Cow
(c) Rhinoceros (d) Leopard
19. In a certain code language, PAINT is coded as 83527 and SCORE is coded as 49061. How would you code RECENT in the same language?

- (a) 921235 (b) 190985
(c) 648497 (d) 619127
20. Three pairs are similar in one way and one pair is different from following four pair of terms. Which one is different from other three?

- (a) Captain : Team
(b) Boss : Gang
(c) Prime Minister : Cabinet
(d) Artist : Troupe
21. Select the number from among the given options that can replace the question mark (?) and continue the given series.

113, 115, 119, 125, 133, ?

- (a) 143 (b) 152
(c) 147 (d) 141
22. Study the given pattern carefully and select the letter that can replace the question mark (?) in it



- (a) P (b) Q
(c) M (d) O
23. One day, Rekha was standing facing the east. She then turned 90 degrees right and then turned 45 degrees in the anti-clockwise direction. She then turned 90 degrees clockwise. Which direction is she facing now?

- (a) North-east (b) South-west
(c) North (d) South

24. A family consists of 7 people with three couples. The artist is married to the politician and they have three children. The teacher is the sister-in-law of the accountant, who is the wife of the engineer. The doctor and businessman are brothers. Who among the following could be the husband of the teacher?

- (a) Engineer (b) Doctor
(c) Politician (d) Accountant

25. If 'A' represents 'subtraction', 'B' represents 'Multiplication', 'C' represents 'division' and 'D' represents 'addition', then what is the value of (3 B 4 D 5 A 6) C 1?

- (a) 1 (b) 11
(c) 0 (d) 10
26. Who built the analytical engine, one of the early computing devices?

- (a) John Napier (b) Herman Hollerith
(c) Blaise Pascal (d) Charles Babbage

27. Which of the following is a special purpose application software?

- (a) Payroll system (b) Linux
(c) Windows
(d) Database management system

28. Which of the following input devices is used as a personal computer peripheral or general control device consisting of a hand - held stick that rotates around a loose and moves the screen cursor around rotates?

- (a) Microphone (b) MICR
(c) Biometric (d) Joystick

29. Which of the following types of mouse uses laser rays for cursor movement on the computer screen?

- (a) Optical (b) Electrical
(c) Gyroscopic (d) Mechanical

30. Which among the following statements is/are correct with respect to types of memory?

- A. Internal processor memories
B. Primary memory or main memory
C. Secondary or auxiliary memory
(a) All of the options
(b) Both B and C
(c) Both A and B
(d) Both C and A

31. Where is the cache memory located?

- (a) RAM (b) CPU
(c) CU (d) Monitor

32. The main memory of a computer is made using which of the following technique?

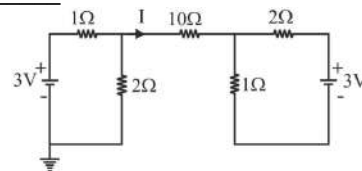
- (a) Magnetic (b) Optical
(c) Semi-conductor (d) Vacuum tube

33. Which of the following communication protocols is used to interconnect network devices on the internet?

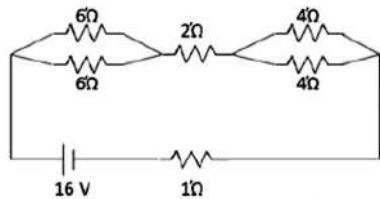
- (a) HTTP (b) FTP
(c) TCP/IP (d) WWW

34. A cell phone connected to a Bluetooth headset or a mobile computer connected to a portable Bluetooth thermal printer is an example of a _____.
- (a) SAN (b) MAN
(c) PAN (d) LAN
35. Which of the following is a disadvantage of the Dial-up Internet Access method when compared with DSL and cable modem?
- (a) Low speed
(b) Limited perimeter
(c) Security risk
(d) Expensive
36. The term 'wide', 'Mirrored,' 'Narrow' describe which of the following options in MS word 365 in terms of the layout the document?
- (a) Breaks (b) Margins
(c) Size (d) Orientation
37. In MS - Word 365 which of the following function keys, if possible repeats the last command or action?
- (a) F3 (b) F1
(c) F4 (d) F2
38. Select the correct sequence of steps showing how to double underline text in MS Word.
- (a) a-select text.
b-click Insert tab; then on arrow of 'Font' group.
c-Select Underline Style as double line.
- (b) a- select text.
b- click page Layout tab; then click on arrow of 'Font' group.
c-Select Underline Style as double line.
- (c) a- Select text.
b- Click Home tab; then click on arrow of 'Font' group.
c- Select Underline style as double line.
- (d) a- Select text.
b- Click Layout tab; then click on arrow of 'Font' group.
c- Select Underline as double line.
39. Which of the following terms is a world-wide network of computers also known as network of networks?
- (a) VLAN (b) MAN
(c) Internet (d) World Wide Web
40. If you are replying to an email, which of the following fields are filled in automatically?
- (a) "To" and "From" field both
(b) Only "From" field
(c) Neither "To" field nor "From" field
(d) Only "To" field
41. What does HTTPS stand for?
- (a) Hyper Text Transport Protocol Secure
(b) Hyper Text Transfer Protocol Secure
(c) Hyper Transfer Tariff Protocol System
(d) Hyper Transport Tariff Protocol System
42. Which of the following is not a web browser?
- (a) Netscape (b) Military
(c) Yandex (d) Opera
43. Which of the following is not web mail provider?
- (a) upGrad (b) Yahoo
(c) Outlook (d) Google
44. Which of the following keyboard shortcuts is used to activate the first tab when multiple tabs are opened in Google Chrome?
- (a) Ctrl + 1 (b) Alt + 9
(c) Alt + 1 (d) Ctrl + 9
45. Which of the following characteristics refers to the use of technology to complete a task with as little human interaction as possible?
- (a) Remembrance power
(b) No EQ
(c) No IQ
(d) Automation
46. Which of the following numbers is NOT divisible by 9 ?
- (a) 49104 (b) 77832
(c) 35253 (d) 45390
47. $(64 \times 5^4) - (5^4 \times 16) = ?$
- (a) 40,000 (b) 35,000
(c) 30,000 (d) 25,000
48. Which of the following fractions is the largest?
- $\frac{7}{9}, \frac{6}{7}, \frac{22}{25}$ and $\frac{11}{13}$
- (a) $\frac{11}{13}$ (b) $\frac{22}{25}$
(c) $\frac{7}{9}$ (d) $\frac{6}{7}$
49. The value of $\frac{3}{15} + \frac{13}{14} - \frac{19}{21} + \frac{31}{35} - \frac{23}{30} = ?$
- (a) $\frac{8}{21}$ (b) $\frac{1}{3}$
(c) $\frac{2}{5}$ (d) $\frac{12}{35}$
50. The LCM of the numbers 36, 54, 72 and 96 is :
- (a) 1064 (b) 764
(c) 864 (d) 964
51. What is the largest number by which, dividing 63, 77 and 98, gives remainders 3, 5 and 2 respectively?
- (a) 10 (b) 9
(c) 6 (d) 8
52. x and y are in direct proportion and y = 92.5 when x = 37. What will be the value of y when x = 16?
- (a) 32 (b) 40
(c) 48 (d) 24

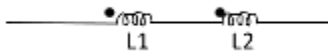
53. The current population of a town is 15,625. It increases by 8% and 12% in two successive years but decreases by 22% in the third year. What is the population of the town at the end of the third year?
 (a) 13,230 (b) 15,120
 (c) 14,742 (d) 14,042
54. The length of the three sides of a triangle are 12 cm, 15 cm and 21 cm, respectively, Find the area (in cm^2) of the triangle.
 (a) $36\sqrt{6}$ (b) $30\sqrt{6}$
 (c) $72\sqrt{6}$ (d) $48\sqrt{6}$
55. Paras can complete 40% of the work in 8 days while Deepti & Paras together can complete 10% of the work in a day. Find the time taken by Deepti alone to complete the work.
 (a) 23 days (b) 21 days
 (c) 22 days (d) 20 days
56. Two buses from a house run at a speed of 25 km/h at an interval of 15 minutes. How much more speed (km/h) does a woman coming from the opposite side of the house have to walk so that the buses meet at an interval of 10 minutes.
 (a) 12 (b) 12.25
 (c) 12.5 (d) 12.75
57. The compound interest on a sum of money at 5% per annum for 3 years is ₹ 6305 Find the simple interest (in ₹) for the same sum at the same rate of interest for the same number of years.
 (a) ₹4,000 (b) ₹6,000
 (c) ₹5,000 (d) ₹3,600
58. If the cost price of an item is ₹4,500 and its selling price is ₹3,500 then the loss percentage is :
 (a) $44\frac{2}{9}\%$ (b) $55\frac{2}{9}\%$
 (c) $22\frac{2}{9}\%$ (d) $33\frac{2}{9}\%$
59. What is the sum of the first 25 odd numbers?
 (a) 150 (b) 625
 (c) 250 (d) 144
60. Simplify $\sqrt{\frac{1+\cos A}{1-\cos A}}$
 (a) $\sec A + \tan A$
 (b) $\sec A - \tan A$
 (c) $\operatorname{cosec} A - \cot A$
 (d) $\operatorname{cosec} A + \cot A$
61. The scores obtained by 10 students in a test are 82, 60, 62, 63, 78, 75, 86, 75, 91, 46 Find the arithmetic mean of their scores.
 (a) 70.6 (b) 71.8
 (c) 72.2 (d) 72.8
62. The positive square root of $(6+2\sqrt{3})(6-2\sqrt{3})$ is _____.
 (a) 12 (b) $6\sqrt{2}$
 (c) 24 (d) $2\sqrt{6}$
63. Three times the present age of P is 25 years more than the present age of Q. After 10 years, twice the age of Q will be 18 years less than thrice the age of P. Find the present age (in years) of Q.
 (a) 21 (b) 16
 (c) 19 (d) 17
64. Two pipes A and B can fill a tank in 21 hours and 18 hours, respectively. If both the pipes are opened simultaneously, then the time taken to fill the tank is:
 (a) $9\frac{27}{39}$ hours (b) $11\frac{27}{39}$ hours
 (c) $10\frac{27}{39}$ hours (d) $8\frac{27}{39}$ hours
65. An amount of ₹ 1,470 is shared between Anant and Mohan in the ratio 3:4. What is the amount received by Mohan?
 (a) ₹ 1,050 (b) ₹ 630
 (c) ₹ 1,650 (d) ₹ 840
66. Which one of the following physical quantities is a vector quantity?
 (a) Gravitational Potential energy
 (b) Electric Power
 (c) Electric current
 (d) Dipole Moment
67. A 10 N force is applied on a body which produces in it an acceleration of 2 m/s^2 . The mass of the body is
 (a) 5 kg (b) 10 kg
 (c) 15 kg (d) 20 kg
68. A car accelerates uniformly from 5 ms^{-1} to 10 ms^{-1} in five seconds. Find the acceleration of the car
 (a) 1 ms^{-2} (b) 1 ms^{-2}
 (c) 1 ms^{-1} (d) 1 ms^{-1}
69. An object of mass 10kg is moving with a uniform velocity of 6 ms^{-1} . What is the kinetic energy possessed by the object
 (a) 180J (b) 18J
 (c) 360J (d) 1800J
70. The efficiency of a heat energy can never be
 (a) 10% (b) 80%
 (c) 100% (d) 50%
71. Consider the circuit shown in the figure. The current I flowing through the 10Ω resistor is _____.



- (a) 0A (b) 10A
(c) 0.1A (d) 1A
72. What is the dimensional formula of mutual induction?
(a) $[M L T^{-2} A^{-1}]$
(b) $[M L^2 T^{-1} A^{-3}]$
(c) $[M L^2 T^{-2} A^{-2}]$
(d) $[M L^2 T^{-1} A^{-2}]$
73. A network of resistors is connected to a 16 V battery with an internal resistance of 1 Ω , as shown in the figure. Compute the equivalent resistance of the network.



- (a) 13 Ω (b) 8 Ω
(c) 12 Ω (d) 7 Ω
74. If 'M' is the mutual inductance between two coils connected in series cummulative coupled, the equivalent inductance is



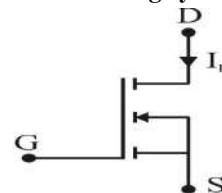
- (a) $L_{eq} = L_1 + L_2 + 2M$ (b) $L_{eq} = L_1 = L_2 - 2M$
(c) $L_{eq} = L_1 + L_2 - 2M$ (d) None of the above
75. In a two-watt power meter, for all lagging power factors, first meter shows positive and second meter shows negative reading. What is the power factor?
(a) 0 to 0.5 (b) 0.866 to 1
(c) 0 to 1 (d) 0.5 to 1
76. What is the unit of magnetic field intensity?
(a) Volt per meter (b) Ampere per meter
(c) Volt per square meter (d) Weber per meter
77. Which of the following provides maximum capacitance in the smallest space with the least cost?
(a) Electrolytic capacitor (b) Paper
(c) Ceramic (d) Mica
78. Magnetic flux can be measured by-
(a) Capacitive pick-up
(b) Inductive pick-up
(c) Resistive pick-up
(d) Hall effect pick-up
79. A parallel plate capacitor with plates separated by distance 1 mm is filled with dielectric with relative permittivity 2. The electric field inside the capacitor when it is connected to 1V Battery is

- (a) 1 N/C
(b) 1000 N/C
(c) 2000 N/C
(d) 500 N/C
80. Which material has the highest electrical conductivity?
(a) Aluminium (b) Steel
(c) Silver (d) Lead
81. The operating temperature of PVC, paper, silk or cotton without impregnation is:
(a) 105°C (b) 180°C
(c) 155°C (d) 90°C
82. A resistor reads following colours from left to right: brown, black, red, golden. What is the value of the resistor?
(a) 100 Ω with plus-or-minus 5% tolerance.
(b) 1 k Ω with plus-or-minus 5% tolerance.
(c) 100 k Ω with plus-or-minus 5% tolerance.
(d) 10 k Ω with plus-or-minus 5% tolerance.
83. Match items in Group 1 with items in Group II, most suitably :

Group - 1

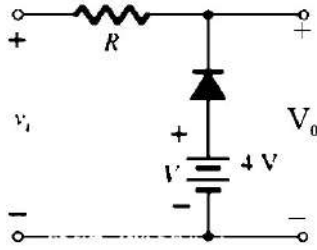
Group - II

- | | |
|--------------------------|----------------------------|
| (A) LED | (i) Heavy doping |
| (B) Avalanche photodiode | (ii) Coherent radiation |
| (C) Tunnel diode | (iii) Spontaneous emission |
| (D) Laser | (iv) Current gain |
- (a) (A)-(i), (B)-(ii), (C)-(iv), (D)-(iii)
(b) (A)-(ii), (B)-(iii), (C)-(i), (D)-(iv)
(c) (A)-(iii), (B)-(iv), (C)-(i), (D)-(ii)
(d) (A)-(ii), (B)-(i), (C)-(iv), (D)-(iii)
84. The value of current gain (α) lies in the range of :
(a) 1 to 99
(b) 0.9 to 0.998
(c) 0.9 to 1
(d) 0 to 0.998
85. What does the following symbol represent?



- (a) N-channel depletion MOSFET
(b) Silicon Controlled rectifier
(c) P-channel enhancement MOSFET
(d) N-channel enhancement MOSFET

86.



Which of the following circuits is represented by the given figure?

- (a) Series clipper (b) Clamper
(c) Shunt clipper (d) Amplifier
87. When emitter bypass capacitor in a CE amplifier is removed, it considerably reduces:
- (a) Input resistance
(b) Output load resistance
(c) Emitter current
(d) Voltage gain
88. In an amplifier, the coupling capacitors are employed for
- (a) Limiting the bandwidth
(b) Matching the impedance
(c) Preventing of DC mixing with input or output
(d) Controlling the output
89. Which of the following options represents the effect current shunt feedback on input impedance (Z_i) and output impedance (Z_o)?
- (a) Z_i - Increase, Z_o - Decreases
(b) Z_i - Decreases, Z_o -Increases
(c) Z_i - Increases, Z_o -Increases
(d) Z_i - Decrease, Z_o - Decreases
90. A simple PN junction diode is connected in the feedback path of an inverting op-amp. The circuit can be used as _____.
- (a) high-pass filter (b) log amplifier
(c) low-pass filter
(d) tuner in AM communication
91. What is the operation of pin 4 of the 555 timer IC?
- (a) Output
(b) Control Voltage
(c) Reset
(d) Threshold voltage
92. The ratio of maximum displacement deviation to full scale deviation of the instrument is known as :
- (a) Static sensitivity
(b) Dynamic deviation
(c) Linearity
(d) Precision or accuracy

93. A galvanometer is converted to a voltmeter by....

- (a) Adding a high resistance in series with the galvanometer
(b) Adding a low resistance across with the galvanometer
(c) Increase the number of turns of the galvanometer coil
(d) Decreases the number of turns of the galvanometer coil
94. A power factor meter has
- (a) one current and one pressure circuit
(b) one current circuit and two pressure circuits
(c) two current circuits and two pressure circuits
(d) two current circuits and one pressure circuit
95. A Wheatstone bridge is balanced if?
- (a) The ratio of resistors on one side of the bridge is one while the ratio of resistors on the other side is infinity
(b) The ratio of resistors on one side of the bridge is greater than the ratio of resistors on the other side
(c) The ratio of resistors on one side of the bridge equals to the ratio of resistors on the other side
(d) None of the above
96. Strain gauge converts ____ into ____ signals.
- (a) electrical signals; mechanical
(b) mechanical displacement; electrical
(c) mechanical displacement; vibrational
(d) force; mechanical
97. What is the value of K in the given number system expression?
- $$(347)_{16} = (3515)_K$$
- (a) 6 (b) 5
(c) 7 (d) 4
98. A _____ is a well-defined relationship between binary variables specified by either a boolean equation or a truth table
- (a) Boolean function
(b) Boolean algebra
(c) logical equation
(d) logical relationship
99. How many control lines do we have in a 32 : 1 MUX?
- (a) 32 (b) 1
(c) 4 (d) 5
100. The digital logic family that has the lowest propagation delay time is :
- (a) ECL (b) TTL
(c) CMOS (d) NMOS

SOLUTION : PRACTICE SET- 1

ANSWER KEY

1. (d)	11. (c)	21. (a)	31. (b)	41. (b)	51. (c)	61. (b)	71. (a)	81. (d)	91. (c)
2. (c)	12. (b)	22. (c)	32. (c)	42. (c)	52. (b)	62. (d)	72. (c)	82. (b)	92. (c)
3. (c)	13. (c)	23. (b)	33. (c)	43. (a)	53. (c)	63. (d)	73. (d)	83. (c)	93. (a)
4. (a)	14. (c)	24. (b)	34. (c)	44. (a)	54. (a)	64. (a)	74. (a)	84. (b)	94. (b)
5. (a)	15. (d)	25. (b)	35. (a)	45. (d)	55. (d)	65. (d)	75. (a)	85. (d)	95. (c)
6. (a)	16. (d)	26. (d)	36. (b)	46. (d)	56. (c)	66. (d)	76. (b)	86. (c)	96. (b)
7. (d)	17. (a)	27. (a)	37. (c)	47. (c)	57. (b)	67. (a)	77. (a)	87. (d)	97. (a)
8. (a)	18. (b)	28. (d)	38. (c)	48. (b)	58. (c)	68. (b)	78. (d)	88. (c)	98. (a)
9. (a)	19. (d)	29. (a)	39. (c)	49. (d)	59. (b)	69. (a)	79. (c)	89. (b)	99. (d)
10. (a)	20. (d)	30. (a)	40. (a)	50. (c)	60. (d)	70. (c)	80. (c)	90. (b)	100. (a)

SOLUTION

1. (d)

Mars orbiter spacecraft successfully entered into an orbit around planet Mars projects did ISRO succeed in September 24, 2014.

2. (c)

The former Indian Cricket team batsman Sachin Tendulkar made his 100th century against Bangladesh. Sachin is the only person in the world to have 100 centuries in ICC test and One day international matches.

3. (c)

Famous folk dances and their concerned states are as follow:

State	Folk Dances
Rajasthan	– Ghumar, Chakri, Ganagor, Jhulan, Leela, Jhuma, Suisini, Ghapal, Bhavai
Telangana	– Perani Thandvam or Perani Shivtam Davam
West Bengal	– Kathi, Gambhira, Dhali, Jatra, Baul, Marasia, Mahal, Keertam
Gujarat	– Garba, Dandiya Ras, Tippani Jurium, Bhavai

4. (a)

Kailash Satyarthi was the founder of 'Bachpan Bachao Andolan'. He founded the Bachpan Bachao Andolan in 1980. Kailash Satyarthi was awarded the Nobel Peace Prize in 2014 along with Malala Yousafzai for his struggle against the suppression of children and young people and right of children to education. The book titled 'COVID-19: Crisis of Civilisation and Solutions' is penned by Kailash Satyarthi.

5. (a)

Securities sold by the central Bank with a clear specification of repurchase date and price is called open market operations.

6. (a)

Article 80 consists of the council of states.

The council of states shall consist of-

(a) Twelve members to be nominated by the president in accordance with the provisions of the clause (3); and

(b) Not more than two hundred and thirty eight representatives of the states and of the Union Territories. Rajya Sabha members are elected for 6 years and 1/3 of its members retire every second year.

7. (d)

The troposphere is the lowest layer of our atmosphere. extending roughly to a height of 8 km. near the poles and about 18 km. at the equator. All changes in climate and weather take place in this layer.

Others layers of atmosphere–

Stratosphere	-	13-50 km
Mesosphere	-	50-80 km
Thermosphere	-	80-400 km

(Ionosphere is part of this layer)

Exosphere	-	400km-above
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Exosphere is the highest layer of the atmosphere.

8. (a)

Shipki La Pass is located through Sutlej Gorge. It connects Himachal Pradesh with Tibet. It is India's third border post for trade with China after Lipu Lekh and Nathula Pass.

State/Union territory

Pass

Jammu and Kashmir	Burzail pass, Banihal Pass, Pir-Panjial Pass
Ladakh	Zoji La, Chang-La, Khardung La
Himachal Pradesh	Rohtang Pass, Shipki La, Bara-lacha La
Uttarakhand	Niti Pass, Mana Pass, Muling La, Mangsha Dhura
Arunachal Pradesh	Diphu pass, Pangsau Pass, Bomdi-La

9. (a)

Bairam Khan's son was Abdul Rahim-Khan-i-Khanan, who was one of the Navratnas of Akbar. Akbar gave him the title of Khan-i-Khanan due to his prestigious performance in Gujarat war. Rahim was a brilliant scholar of Arabian, Turkey, Persian and Sanskrit language. Rahim was born in 1556 in Delhi.

10. (a)

Madam Bhikaji Cama unfurled the first version of the Indian National flag-a tricolour of green, saffron, and red stripes-at the International Socialist Congress held at Stuttgart, Germany, in 1907. She is also known as the 'Mother of Indian Revolution'. One thousand representatives from across the world had come to attend the conference. Madam Bhikaji Cama became the first person to hoist Indian flag on foreign soil in that conference. The same flag was later smuggled into India by socialist leader Indulal Yagnik and is now on display at the Maratha and Kesari Library in Pune.

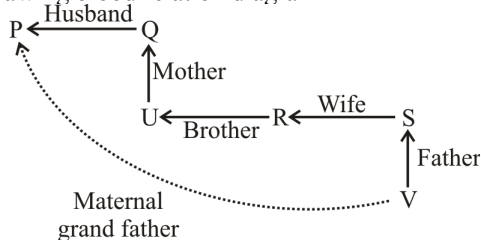
11. (c)

Just as, book is read. Same as, poetry is read as recitation.

12. (b)

Expression $\rightarrow P @ Q \$ U = R \% S \# V$

On drawing blood relation diagram-



Hence, it is clear from above diagram that P is V's maternal grandfather.

13. (c)

Given,

$J \rightarrow (+)$, $G \rightarrow (-)$

$M \rightarrow (\times)$, $B \rightarrow (\div)$

From option (a)

$6M5J4B2G10 = 22$

$6 \times 5 + 4 \div 2 - 10 = 22 \Rightarrow 6 \times 5 + \frac{4}{2} - 10 = 22$

$32 - 10 = 22$

$22 = 22$ This is equal

From option (b)

$4G16B2J6M5 = 26$

$4 - 16 \div 2 + 6 \times 5 = 26$

$4 - \frac{16}{2} + 30 = 26$

$-4 + 30 = 26$

$26 = 26$ This is equal too

From option (c)

$6B2M8G10J4 = 20$

$6 \div 2 \times 8 - 10 + 4 = 20$

$\frac{6}{2} \times 8 - 10 + 4 = 20$

$24 - 10 + 4 = 20$

$14 + 4 = 20$

$18 = 20$ This is not equal

So option (c) will not be correct.

14. (c)

It is clear from the statement that politician only marry beautiful girls and 'X' is a beautiful girl but depends on 'X' that she may or may not marry a politician. Hence, option (c) is true.

15. (d)

According to the question it is clear from the statement that assumption I and II both are implicit.

16. (d)

From statement-I,

$D > A > E$

From statement-II,

$C > B > E$

From statement-III,

$D > C$

$A > B$

From statement (I), (II) and (III),

$D > C / A > B > E$

It is clear that E is the shortest.

Hence, the statement I, II and III together are sufficient to answer the given question.

17. (a)

The word GRUNT can't be formed from 'LAUGHTER' because it doesn't contain letter 'N'.

18. (b)

Just as, Tiger is the National animal of India. Similarly, Cow is the National animal of Nepal.

19. (d)

According to the question,

$P \rightarrow 8$ and, $S \rightarrow 4$

$A \rightarrow 3$, $C \rightarrow 9$

$I \rightarrow 5$, $O \rightarrow 0$

$N \rightarrow 2$, $R \rightarrow 6$

$T \rightarrow 7$, $E \rightarrow 1$

On using the given code

$R \rightarrow 6$

$E \rightarrow 1$

$C \rightarrow 9$

$E \rightarrow 1$

$N \rightarrow 2$

$T \rightarrow 7$

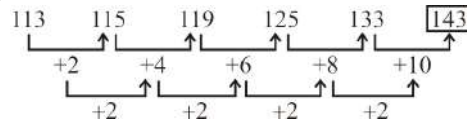
Hence, RECENT = 619127

20. (d)

Just as, Team's head is called Captain. Gang's head is called Boss. Cabinet's head is called Prime Minister whereas Troupe word is used for group of artist. So, option (d) is different.

21. (a)

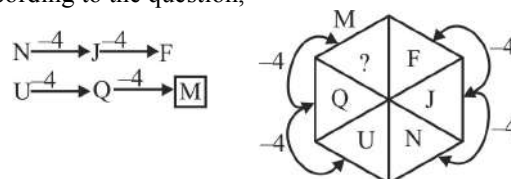
The given series is as follows-



Hence, 143

22. (c)

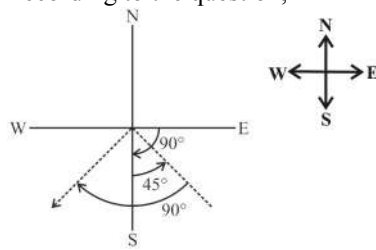
According to the question,



Hence, M

23. (b)

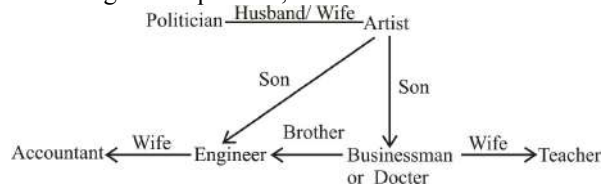
According to the question,



Hence, Rekha is facing South-West direction now.

24. (b)

According to the question,



So, Doctor may be the husband of Teacher because Artist is married to Politician and Accountant is married to Engineer and it is said that there are only three married couples and Business man is not in option.

25. (b)

Given,

(3 B 4 D 5 A 6) C1

[A → -, B → ×, C → ÷, D → +]

On changing the sign-

$$\begin{aligned} &(3 \times 4 + 5 - 6) \div 1 = ? \\ &= (12 + 5 - 6) \div 1 \\ &= (17 - 6) \div 1 \\ &= 11 \div 1 = 11 \end{aligned}$$

26. (d)

The analytical engine was built by Charles Babbage. Blaise Pascal built the first calculator machine. Herman Hollerith invented an electromechanical tabulating of punch card machine.

27. (a)

Payroll software is an on-premises or cloud - based solution that manages, maintains and automates payments to employees.

28. (d)

Joystick is an input device which works like a trackball. The ball has a stick attached to it that rotates on a base and reports its angle or direction to the CPU. It is used in video games, simulator training etc.

29. (a)

Optical mouse uses a laser to detect the movement of the mouse. An optical mouse uses LEDs, optical sensor, and digital signal processing in place of traditional mouse ball and electromechanical transducers.

30. (a)

Memory is a device in a computer where instruction and other data are stored, their types are as follows.

- Internal Processor Memory
- Primary Memory or Main Memory
- Secondary or Auxiliary Memory

Register is a type of internal processor memory while main memory is RAM, but both of them interact

directly with the processor. There are two types of primary memory RAM and ROM. Secondary memory is also called auxiliary memory. In this data can be stored for a long time.

31. (b)

Cache memory is an extremely fast memory that act as a buffer between RAM and the CPU. It holds frequently requested data and instructions so that they are immediately available to the CPU when needed, cache is usually located inside the CPU Chip.

32. (c)

A semiconductor substance lies between the conductor and insulator. It control and manage the flow of electric current in electronic equipment and devices. As a result, it is a popular component of electronic chips made for computing components and a variety of electronic devices, including solid state storage.

33. (c)

TCP/IP Transmission Control Protocol/Internet Protocol is an application layer protocol that enables application programs and Internet devices to exchange messages over a network.

34. (c)

A cell phone connected to a Bluetooth headset or a mobile computer connected to a portable Bluetooth thermal printer is an example of a Personal Area Network (PAN). PAN is a computer network that is used to connect personal devices such as laptops, mobile phones, media players and play stations. This network was developed by Thomas Zimmerman. This network helps in communication.

35. (a)

Dial-up Internet access is a low-speed Internet connection when compared with DSL (Digital Subscriber Line) and cable modem.

Dial-up connections use a standard phone line and analog modem to access the Internet at data transfer rates of up to approximately 56–64 Kbps. Dial-up connections are the cheapest way to access the Internet, but they are also the slowest connections.

36. (b)

The Margins options in the Page Setup group of MS Word, page layout includes wide, Mirrored, Narrow, Normal, Moderate, default and custom.

Apply a predefined margin setting

- (1) Select Layout - Margins
- (2) Select the margin measurements you want.
- (3) You can also create custom margins.

37. (c)

F4 → Repeat the last command or action, if possible.

F1 → Displays the word help Task Pane.

F2 → Move the selected text or graphic.

Shift + F3 → switch case.

F5 → Display the Go to dialog box.

38. (c)

The correct sequence of steps which adds to double underline text in MS Word are

a – select text

b – Click Home tab; then click on arrow of 'Font' group.

c – Select underline style as double line.

39. (c)

The internet is a World Wide Network of computers which is also called a network of networks.

40. (a)

If an email user wants to reply an email then he would filled "To" and "From" field both automatically.

To → Email address of receiver

From → Email address of sender

41. (b)

HTTPS is short form of Hyper Text Transfer Protocol Secure. It is the secure version of HTTP. It is used to secure communication internet.

42. (c)

Yandex is a search engine.

Search engines - Google, Bing, Yahoo, DuckDuckGo, Baidu, Ask.com, Never.

Web browser - Chrome, Firefox, Opera, Microsoft Edge, Safari, Vivaldi, Brave, Netscape Navigator, Mosaic, Internet Explorer, Chromium etc.

43. (a)

Google, Outlook and Yahoo are web mail provider, these are usually free e-mail accounts that operate from a website, whereas upGrad is not related to Webmail.

44. (a)

Table for chrome tab action

Action	Shortcut
Active the first tab	Ctrl + 1
Active the right most tab	Ctrl + 9
Move tabs right or left	Ctrl + Shift +Pg Dn Ctrl + Shift + Pg Up

45. (d)

In general usage, automation can be defined as a technology concerned with performing a process by means of programmed commands combined with automatic feedback control to ensure proper execution of the instructions.

46. (d)

Divisibility rule of 9 : A number whose sum of its digit is exactly divisible by 9 then the number is always divisible by 9.

from options -

(a) 49104 → 4 + 9 + 1 + 0 + 4 = 18, divisible by 9.

(b) 77832 → 7 + 7 + 8 + 3 + 2 = 27, divisible by 9.

(c) 35253 → 3 + 5 + 2 + 5 + 3 = 18, divisible by 9.

(d) 45390 → 4 + 5 + 3 + 9 + 0 = 21, not divisible by 9.

47. (c) From question-

$$\begin{aligned} & (64 \times 5^4) - (5^4 \times 16) \\ &= (64 \times 625) - (625 \times 16) \\ &= 40,000 - 10,000 = 30,000 \end{aligned}$$

48. (b) From question-

$$\frac{7}{9} = 0.777$$

$$\frac{6}{7} = 0.857$$

$$\frac{22}{25} = 0.88$$

$$\frac{11}{13} = 0.846$$

Hence, fraction $\frac{22}{25} = 0.88$ is the largest in which.

49. (d)

$$\begin{aligned} & \frac{3}{15} + \frac{13}{14} - \frac{19}{21} + \frac{31}{35} - \frac{23}{30} \\ & \text{(LCM of 15, 14, 21, 35 and 30 is 210)} \\ &= \frac{42 + 195 - 190 + 186 - 161}{210} \\ &= \frac{423 - 351}{210} \\ &= \frac{72}{210} = \frac{12}{35} \end{aligned}$$

Hence, the required value is $\frac{12}{35}$.

50. (c)

The LCM of the numbers 36, 54, 72 and 96 is

$$36 = 2 \times 2 \times 3 \times 3$$

$$54 = 2 \times 3 \times 3 \times 3$$

$$72 = 2 \times 2 \times 2 \times 3 \times 3$$

$$96 = 2 \times 2 \times 2 \times 2 \times 2 \times 3$$

Hence the LCM of 36, 54, 72, 96

$$= 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3$$

$$= 32 \times 27$$

$$= 864$$

51. (c)

According to the question,

$$63 - 3 = 60$$

$$77 - 5 = 72$$

$$98 - 2 = 96$$

So, the required number = HCF of 60, 72 and 96.

$$60 = 2 \times 2 \times 3 \times 5$$

$$72 = 2 \times 2 \times 2 \times 3 \times 3$$

$$96 = 2 \times 2 \times 2 \times 2 \times 2 \times 3$$

$$\text{HCF} = 2 \times 2 \times 3 = 12$$

While 12 is not in the option but 12 will be divisible by 6.

So, option (c) is required answer.

52. (b)

$$\frac{x}{y} = \frac{37}{92.5} = \frac{1}{2.5}$$

$$\text{When } x = 16$$

$$\text{then } \frac{16}{y} = \frac{1}{2.5}$$

$$y = 40$$

53. (c)

Population increased in two successive years by 8% and 12% respectively.

$$\text{Increase percentage in 2 years} = 8 + 12 + \frac{12 \times 8}{100} = 20.96$$

Population decreased in 3rd year = 22%

$$\begin{aligned} \text{Compound increases in 3}^{\text{rd}} \text{ year} &= 20.96 - 22 - \frac{20.96 \times 22}{100} \\ &= -5.65\% \end{aligned}$$

Thus, the population of the town at the end of 3rd year

$$= 15625 \times \frac{(100 - 5.65)}{100}$$

$$= 15625 \times \frac{94.35}{100} = 14742.18 \approx 14742$$

54. (a)

Given,

Length of the three sides of a triangle are-

$$a = 12 \text{ cm, } b = 15 \text{ cm, } c = 21 \text{ cm}$$

$$\text{Semi-perimeter}(s) = \frac{a+b+c}{2}$$

$$= \frac{12+15+21}{2} = \frac{48}{2}$$

$$= 24 \text{ cm}$$

$$\text{Hence, Area of triangle } (\Delta) = \sqrt{s(s-a)(s-b)(s-c)}$$

$$= \sqrt{24(24-12)(24-15)(24-21)}$$

$$= \sqrt{24 \times 12 \times 9 \times 3}$$

$$= 36\sqrt{6} \text{ cm}^2$$

55. (d)

Paras can complete 40% of work in 8 day then,

Time taken by Paras to complete whole work

$$= 8 \times \frac{100}{40}$$

$$= \frac{5}{2} \times 8$$

$$= 20 \text{ days}$$

(Deepti + Paras) can do 10% of work in 1 day.

$$\text{Then, they can complete whole work} = 1 \times \frac{100}{10}$$

$$= 10 \text{ days}$$

According to the question,

$$\text{Then, } \frac{1}{10} = \frac{1}{20} + \frac{1}{\text{Deepti}}$$

$$\frac{1}{\text{Deepti}} = \frac{1}{10} - \frac{1}{20} = \frac{2-1}{20} = \frac{1}{20}$$

Hence Time taken by Deepti to complete the whole work = 20 days

56. (c)

Speed of bus = 25 km./hr.

Let the speed of woman = x km/h

$$\text{Distance} = D, \text{ Time} = 15 \text{ minutes} = \frac{15}{60} = \frac{1}{4} \text{ hours}$$

$$\text{then new time interval} = 10 \text{ minutes} = \frac{10}{60} = \frac{1}{6} \text{ hours}$$

$$\text{Then relative speed } (S) = \frac{D}{T}$$

$$\Rightarrow D = S \times T$$

$$D = 25 \times \frac{1}{4}$$

$$\therefore D = \frac{25}{4} \quad \dots\dots\dots(i)$$

$$D = \frac{25+x}{6} \quad \dots\dots\dots(ii)$$

From equation (i) and equation (ii)

$$\frac{25+x}{6} = \frac{25}{4}$$

$$25+x = \frac{150}{4}$$

$$x = \frac{150}{4} - 25$$

$$x = \frac{150-100}{4}$$

$$x = \frac{50}{4}$$

Speed of woman (x) = 12.5 Km./hr.

57. (b)

Let amount = ₹P

Given,

r = 5% yearly

n = 3 years

$$\text{C.I.} = P \left[\left(1 + \frac{r}{100} \right)^n - 1 \right]$$

$$6305 = P \left[\left(1 + \frac{5}{100} \right)^3 - 1 \right]$$

$$6305 = P \left[\frac{21}{20} \times \frac{21}{20} \times \frac{21}{20} - 1 \right]$$

$$6305 = P \left[\frac{9261 - 8000}{8000} \right]$$

$$6305 = P \left[\frac{1261}{8000} \right]$$

$$P = 5 \times 8000$$

$$P = ₹40,000$$

$$\text{S.I.} = \frac{P \times r \times t}{100}$$

$$= \frac{40000 \times 5 \times 3}{100} = ₹6000$$

58. (c)

The cost price of an item (CP) = ₹4500

Selling price (SP) = ₹ 3500

$$\text{loss}\% = \frac{CP - SP}{CP} \times 100$$

$$= \frac{4500 - 3500}{4500} \times 100$$

$$= \frac{1000}{4500} \times 100$$

$$= \frac{1000}{45}$$

$$= 22\frac{2}{9}\%$$

59. (b)

The first 25 odd numbers will be 1,3,5,7,9.....49 respectively which are in the arithmetic progression.

Where first term (a) = 1

and common difference (d) = 3 - 1 = 2

And number of terms (n) = 25

So, sum of n numbers of term in arithmetic progression

$$\begin{aligned} S_n &= \frac{n}{2}[2a + (n-1)d] \\ &= \frac{25}{2}[2 \times 1 + (25-1) \times 2] \\ &= \frac{25}{2}[2 + (24) \times 2] \\ &= \frac{25}{2}[2 + 48] \\ &= \frac{25 \times 50}{2} \\ &= 25 \times 25 = 625 \end{aligned}$$

Hence, sum of the first 25 odd number = 625

60. (d)

$$\begin{aligned} &\sqrt{\frac{1+\cos A}{1-\cos A}} \\ &= \sqrt{\frac{1+\cos A}{1-\cos A} \times \frac{1+\cos A}{1+\cos A}} \\ &= \sqrt{\frac{(1+\cos A)^2}{\sin^2 A}} \\ &= \frac{1+\cos A}{\sin A} \\ &= \frac{1}{\sin A} + \frac{\cos A}{\sin A} \\ &= \operatorname{cosec} A + \cot A \end{aligned}$$

61. (b)

$$\begin{aligned} \text{Arithmetic Mean} &= \frac{\text{Total sum of Scores}}{\text{Number of Students}} \\ &= \frac{82+60+62+63+78+75+86+75+91+46}{10} \\ &= \frac{718}{10} \\ &= 71.8 \end{aligned}$$

62. (d)

$$\begin{aligned} \text{square root of } &(6+2\sqrt{3})(6-2\sqrt{3}) \\ &= \sqrt{(6+2\sqrt{3})(6-2\sqrt{3})} \\ &= \sqrt{(6)^2 - (2\sqrt{3})^2} \\ &= \sqrt{36-12} \\ &= \sqrt{24} \\ &= 2\sqrt{6} \end{aligned}$$

63. (d)

Let the present age of P be x years and the present age of Q be y years.

According to the question -

$$3x - 25 = y$$

$$3x - y = 25 \dots\dots\dots (i)$$

After 10 years age of P = (x + 10) years

After 10 years age of Q = (y + 10) years

Then

$$3(x + 10) = 2(y + 10) + 18$$

$$3x - 2y = 8 \dots\dots\dots (ii)$$

on solving equation (i) and (ii) -

$$6x - 2y = 50 \dots\dots\dots (\text{on multiplying 2 in equation (i)})$$

$$\underline{-3x + 2y = -8}$$

$$3x = 42$$

$$x = 14$$

Putting the value of x in equation (i) -

$$42 - y = 25$$

or

$$y = 17 \text{ years}$$

Hence the present age of Q is 17 years

64. (a)

Part filled by pipe A in hour = $\frac{1}{21}$ part

Part filled by B in 1 hour = $\frac{1}{18}$ part

Part filled by both (A + B) in 1 hour

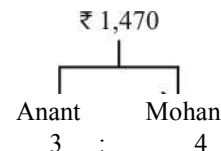
$$= \frac{1}{21} + \frac{1}{18} = \frac{6+7}{126} = \frac{13}{126}$$

So, time taken to fill the tank = $\frac{126}{13} = 9 \frac{9 \times 3}{13 \times 3}$

$$= 9 \frac{27}{39} \text{ hours.}$$

65. (d)

Given, Amount



$$\text{Mohan's Share} = \frac{4}{7} \times 1470 = \text{₹ } 840$$

66. (d)

Dipole moment - The product of the charge and the distance between the two charges is called dipole moment. It is a vector quantity.

$$\vec{P} = q \times \vec{d}$$

Where, p = dipole moment

q = charge

d = distance.

Electric Current - The rate of flow of charge is called electric current. It is a scalar quantity.

Gravitational Potential Energy- The energy stored in an object due to its position above the earth's surface is called gravitational potential energy. It is scalar quantity.

Electric Power: It is electrical energy per unit time. It is a scalar quantity.

67. (a)

Given,

$F = 10$ Newton
 Acceleration $(a) = 2 \text{ m/s}^2$
 The mass of the body = ?

$$F = m \times a$$

$$10 = m \times 2$$

$$m = 5 \text{ kg}$$

68. (b)

Given :

Initial velocity = 5 m/sec.
 Final velocity = 10 m/sec.
 Time = 5sec.

$$\Delta V = \text{Final velocity} - \text{Initial velocity}$$

$$= 10 - 5$$

$$= 5 \text{ m/sec.}$$

$$\text{Acceleration of car } (a) = \frac{\Delta V}{t}$$

$$= \frac{5 \text{ m/sec}}{5 \text{ sec}}$$

$$= 1 \text{ m/sec}^2 \text{ or, } 1 \text{ ms}^{-2}$$

69. (a)

Given,

Mass $(m) = 10 \text{ kg}$
 Velocity $(v) = 6 \text{ m/sec.}$

We know that, Kinetic Energy (K.E) = $\frac{1}{2}mv^2$, where m is mass and v is the velocity

$$\Rightarrow \text{K.E} = \frac{1}{2} \times 10 \times 6 \times 6$$

So, K.E = 180 Joule

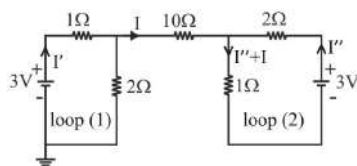
70. (c)

Heat energy is the result of the movement of tiny particles called atoms, molecules or ions in solids, liquid and gases.

- Heat energy can be transferred from one object to another. Its transfer or flow is done by the difference in temperature between the two bodies.

- According to second law of thermodynamics, it is impossible to get 100% of efficiency because of environmental changes and some other factors. So, the efficiency of a heat energy can never be 100%.

71. (a)



According to the law of conservation in loop (1)

$$I' = I' - I$$

$$I = 0A$$

According to the law of conservation in loop (2)

$$I'' = I'' + I$$

$$I = 0A$$

It proves that, there is no current flowing through 10Ω resistance because not a complete path for current flow.

72. (c)

As we know that,

$$\text{Magnetic flux } \phi = LI$$

$$\text{So, Mutual inductance } (L) = \frac{\phi}{I} = \frac{[BA]}{[I]}$$

$$[B] = [M^1T^{-2}A^{-1}]$$

$$[A] = [L^2]$$

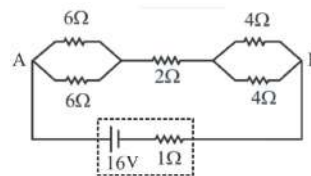
$$[I] = [A]$$

Dimensional formula of mutual inductance

$$L = \frac{[M^1T^{-2}A^{-1}][L^2]}{[A]}$$

$$L = [M^1L^2T^{-2}A^{-2}]$$

73. (d)



$$R_{AB} = R_{eq} = \frac{6 \times 6}{6 + 6} + 2 + \frac{4 \times 4}{4 + 4}$$

$$= 3 + 2 + 2$$

$$R_{eq} = 7\Omega$$

74. (a)

Equivalent inductance with the combination of two inductor either in same polarity or opposite polarity may be defined as

$$L_{eq} = L_1 + L_2 \pm 2M$$

For series cumulatively coupled the equivalent inductance

$$L_{eq} = L_1 + L_2 + 2M$$

75. (a)

In a two-watt power meter, for all lagging power factors, first meter shows positive and second meter shows negative reading. 0 to 0.5 is the power factor.

76. (b)

Ampere per meter is the unit of magnetic field intensity.

$$H = \frac{NI}{\ell}$$

Where,

H = magnetic field intensity

N = Number of turn

I = coil current

ℓ = length of the coil

77. (a)

Electrolytic capacitor provide maximum capacitance in the smallest space with the least cost.

• This type of capacitors are usually polarized. They provide very high capacitance (Usually more than 1μF)

78. (d)

Magnetic flux can be measured by hall effect pick-up.

Hall effect- When a current (I) carrying conductor, placed in a transverse magnetic field (B), an electric field E is induced in the conductor which is perpendicular to both I and B. This phenomenon is called the hall effect.

(i) The carrier concentration of charge is measure by hall effect.

(ii) Measures magnetic flux.

(iii) Hall voltage and current density are measured.

79. (c)

Capacitance of a capacitor filled with dielectric-

$$C = \frac{\epsilon A}{d}$$

$$C = \frac{\epsilon_0 \epsilon_r A}{d}$$

Store charge (Q) = CV

Electric field inside a parallel plate capacitor-

$$E = \frac{Q}{\epsilon_0 A} = \frac{CV}{\epsilon_0 A}$$

$$E = \frac{\epsilon_0 \epsilon_r AV}{\epsilon_0 d A} = \frac{\epsilon_r V}{d} = \frac{2 \times 1}{1 \times 10^{-3}}$$

$$E = 2000 \text{ N/C}$$

80. (c)

Silver has the highest electrical conductivity. It is a conducting material with a large number of free electrons. Due to large number of free electron it has a high electrical conductivity. The resistivity of silver is $1.59 \times 10^{-8} \Omega \text{m}$ and the conductivity is $6.29 \times 10^7 \Omega^{-1} \text{m}^{-1}$

81. (d)

The operating temperature of PVC, paper, silk or cotton without impregnation is 90°C.

Insulation classes	Maximum permissible temperature
Y	90°C
A	105°C
E	120°C
B	130°C
F	155°C
H	180°C
C	180°C above

82. (b)

Colour coding of resistance-

Brown → 1

Black → 0

Red → 10^2

golden → $\pm 5\%$

$R = 10 \times 10^2 \pm 5\%$

$R = 1 \text{k}\Omega \pm 5\%$

83. (c)

Group - I

(A) LED

(B) Avalanche Photodiode

(C) Tunnel diode

(D) Laser

Group - II

(iii) Spontaneous emission

(iv) Current gain

(i) Heavy doping

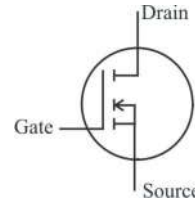
(ii) Coherent radiation

84. (b)

The current gain of a transistor in CB configuration is defined as the ratio of collector current (I_C) to the emitter current (I_E). The current gain of a transistor in CB configuration is less than unity. The value of current gain lies in the range of CB configuration is 0.9 to 0.998.

85. (d)

The given symbol of n-channel enhancement MOSFET,



In enhancement mode there is no channel between drain and source. It is formed by given positive gate source voltage.

86. (c)

Negative shunt clipper circuit is represented by the given figure.

Shunt clipper-

• In shunt clipper, the diode is connected in parallel with the output load resistance.

• The operating principles of the shunt clipper are near opposite to the series clipper

Types of shunt clipper-

• Positive shunt clipper

• Negative shunt clipper

87. (d)

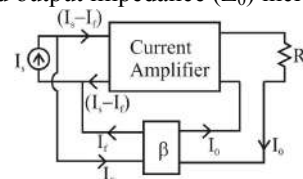
With the removal of emitter bypass capacitor the effect of emitter resistor is predominant and gain will be reduced.

88.(c)

The main purpose of using coupling capacitor is to prevent d.c. mixing with input and output. These capacitor block unwanted dc components and decouple or insulate dc from input and output.

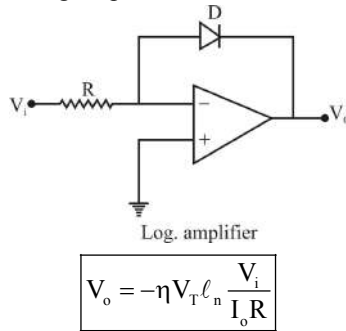
89. (b)

Current shunt feedback has input impedance (Z_i) decreases and output impedance (Z_o) increases.



90. (b)

A simple PN junction diode is connected in the feedback path of an inverting op-amplifier, the circuit can be used as log amplifier.

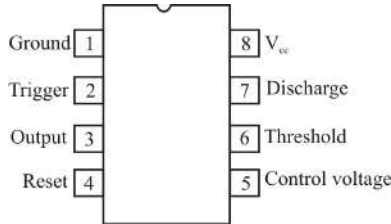


Where,

- η = Recombination factor
- V_T = Thermal voltage
- I_o = Reverse saturation current

91. (c)

Reset is the operation of pin 4 of the 555 timer IC.



92. (c)

The ratio of maximum displacement deviation to full scale deviation of the instrument is known as linearity.

93. (a)

A galvanometer is converted to a voltmeter by adding a high resistance in series with the galvanometer.

- A galvanometer is converted to an ammeter by adding a low resistance in parallel with the galvanometer.

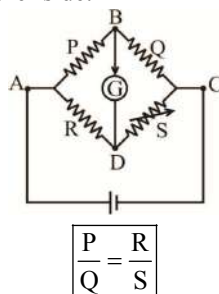
94. (b)

A power factor meter has one current circuit and two pressure circuits.

- The meter has two identical pressure coils. Both the coils are pivoted on spindle.
- A power factor meter has no control springs.

95. (c)

A Wheatstone bridge is balanced if the ratio of resistance on one side of the bridge equals to ratio of resistors on the other side.



96. (b)

Strain gauge converts mechanical displacement into electrical signals. A strain gauge type transducer converts physical quantity such as load, pressure or displacement into mechanical strain on the strain generating body (elastic body) and the mechanical strain is converted into electrical output using strain gauges mounted on the elastic body.

97. (a)

$$(347)_{16} = (3515)_K$$

$$3 \times 16^2 + 4 \times 16^1 + 7 \times 16^0 = 3 \times K^3 + 5 \times K^2 + 1 \times K^1 + 5 \times K^0$$

$$3 \times 256 + 4 \times 16 + 7 \times 1 = 3K^3 + 5K^2 + K + 5$$

$$768 + 64 + 7 = 3K^3 + 5K^2 + K + 5$$

$$839 = 3K^3 + 5K^2 + K + 5$$

$$3K^3 + 5K^2 + K + 5 - 839 = 0$$

$$3K^3 + 5K^2 + K - 834 = 0$$

Putting $K=6$ in this equation satisfies the equation. Thus $K=6$ a factor of the given equation.

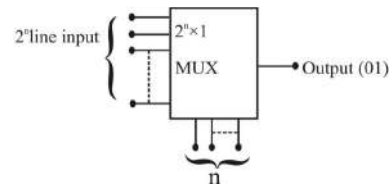
Therefore $K = 6$

98. (a)

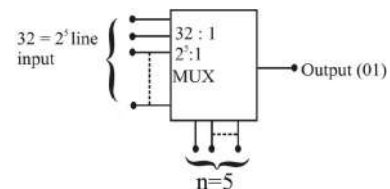
A Boolean function operation of binary variables can be described by mean of appropriate mathematical function called Boolean function.

- An implementation of a Boolean function requires the use of logic gates.

99. (d)



n = number of select line or control lines



$n=5$ select line or control lines

32:1 MUX have a 5 control lines

100. (a)

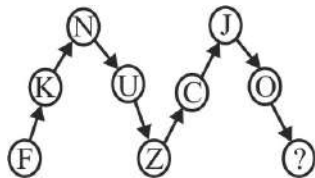
logic family	Propagation delay by time
ECL	2 ns
TTL	10 ns
CMOS	70 ns
RTL	12 ns
I ² L	25-100 ns
HTL	90 ns
DCTL	10 ns

So, ECL has the lowest propagation delay time.

PRACTICE SET - 2

1. **Who was the first person to walk on the Moon?**
 - (a) Katherine Johnson
 - (b) Neil Armstrong
 - (c) Buzz Aldrin
 - (d) George Tailor
2. **Identify the Indian batsman who scored three consecutive test centuries in his first three International Cricket test matches.**
 - (a) Virat Kohli
 - (b) Sachin Tendulkar
 - (c) Mohammad Azharuddin
 - (d) Rahul Dravid
3. **Below are four pairs, each representing a state and a folk dance. Which pairing of state and folk dance is incorrect?**
 - (a) Assam– Bihu
 - (b) Chhatisgarh–Dagla
 - (c) Gujarat– Garba
 - (d) Uttarakhand–Tapali
4. **What was the real name of the Hindi literary writer Munshi Premchand?**
 - (a) Atmaram
 - (b) Sachchidanand
 - (c) Dhanpat Rai
 - (d) Nawab Rai
5. **Which regulatory body is the only note issuing authority in India?**
 - (a) Reserve Bank of India
 - (b) Small Industries Development Bank of India
 - (c) Securities and Exchange Board of India
 - (d) Insurance Regulatory and Development Authority of India
6. **During a no-confidence motion against his own government, the Prime Minister of India cannot participate in voting, if he-**
 - (a) Is a Rajya Sabha Member.
 - (b) Is prohibited by opposing parties of the Lok Sabha.
 - (c) Is in a majority
 - (d) Is a member of the Lok Sabha.
7. **The amount of carbon dioxide in the atmosphere is :**
 - (a) 71%
 - (b) 21%
 - (c) 0.03%
 - (d) 0.3%
8. _____ is a type of crescent-shaped sand dune formed in desert regions where the wind direction is very constant.
 - (a) Blowhole
 - (b) Bluff
 - (c) Bergschrund
 - (d) Barchan
9. **Which of the following was not Akbar's nine gems or navratna?**
 - (a) Ustad Ali Khan
 - (b) Raja todarmal
 - (c) Abul fazal
 - (d) Fakir Aziao Din
10. **Who shot dead Rand, the commissioner of Police, Pune due to failure to check the plague in India at the end of the 19th century in India?**
 - (a) Damodar Chapekar
 - (b) Veer Savarkar
 - (c) Bhagat Singh
 - (d) Vasudev B. Phadke
11. **Rafting is related to water as Skiing is related to**
 - (a) Ice
 - (b) Surface
 - (c) Sceeze
 - (d) Sky
12. **B's mother is the daughter of F. C is the son of F and D, G is the son of C and E. D is the mother of R. How is F related to G?**
 - (a) Father's mother
 - (b) Brother
 - (c) Father's father
 - (d) Mother's father
13. **If '÷' is replaced with '+', '×' is replaced with '−', '+' is replaced with '×' and '−' is replaced with '÷', then what will be the value of the given expression?**
 $8 + 5 \times 54 - 9 \div 3 = ?$
 - (a) 44
 - (b) 46
 - (c) 37
 - (d) 33
14. **Statement:**
This scale is transparent.
Conclusion:
 1. The scale is made up of glass.
 2. The scale is made up of plastic.
 - (a) Only II follow
 - (b) Both I and II follows
 - (c) Only I follow
 - (d) Neither I nor II follow
15. **Consider the given statement and decide which of the given assumptions is/are implicit in the statement.**
Statement :
"The Indian cricket team is expected to win the World Cup in 2019" –Mahendra Singh Dhoni.
Assumptions :
 1. Indian cricket team is good
 2. Indians want the Indian cricket team to win the World Cup 2019
 - (a) Neither assumption 1 nor 2 is implicit
 - (b) Only assumption 1 is implicit
 - (c) Only assumption 2 is implicit
 - (d) Both assumptions 1 and 2 are implicit

16. **Question :**
Who is smallest in age among A, B, C and D?
Statements :
1. A is greater than D and B
2. C is greater than A
 (a) Both statement are not sufficient
 (b) Only statement 2 is sufficient
 (c) Both statement together are sufficient
 (d) Only statement 1 is sufficient
17. **From among the given options, select the word which cannot be formed using the letters of the given word.**
DAUGHTER
 (a) DATE (b) HURT
 (c) TOUGH (d) GET
18. **The option which is related to the third word. In the same way as the second word is related to the first word is -**
Poem : Verse :: Book: ?
 (a) Story (b) Page
 (c) Printing (d) Language
19. **In a code language, if KARAN is written as 45, then how will ARUN be written as in that language?**
 (a) 54 (b) 56
 (c) 41 (d) 42
20. **Four words have been given, out of which three are alike in some manner and one is different. Select the odd one.**
 (a) Chalk (b) Marker
 (c) Book (d) Pen
21. **In the series 11, 19, 27, 35, 43, which of the following will NOT be a number of the series?**
 (a) 195 (b) 434
 (c) 107 (d) 307
22. **Study the given pattern carefully and select the letter that can replace the question mark (?) in it,**



- (a) P (b) S
 (c) R (d) L
23. **Umesh is standing facing the south-west direction. He then takes a 90° clockwise turn. After that, he takes a 135° clockwise turn. He finally takes a 90° anticlockwise turn. In which direction is he facing now?**

- (a) West (b) North
 (c) North-east (d) North-west
24. **Geet and Anshuman are the children of Aditya's Mother's brother. Roop has only one brother-Manjeet and no sister. Ayushman is the son of Rajkumar. Roop's husband and Manjeet's wife have no siblings. If Aditya is Roop's son, how is Manjeet related to Geet?**
 (a) Father (b) Uncle
 (c) Husband (d) Mother's brother
25. **If Q means addition, J means multiplication, T means Subtraction and K means division, then find the value**
18K 6J 7Q 5T 2
 (a) 30 (b) 34
 (c) 26 (d) 24
26. **ENIAC, EDVAC, etc are examples of _____ generation computers.**
 (a) Third (b) First
 (c) Second (d) Fourth
27. **Which of the following statements is incorrect with reference to the visual display unit (VDU) of a computer system?**
 (a) VDU creates images by arranging tiny dots known as pixels, in a rectangular pattern
 (b) VDU is the primary output device of a computer
 (c) VDU has differences between cathode-ray tube and flat-panel display
 (d) The size of the pixel determines the clarity of the image displayed on the VDU
28. **Which of the following statements is correct about the output devices of a computer?**
 (a) It is used to send data to the computer
 (b) Mouse is an output device
 (c) It converts digital data into a form understandable by humans
 (d) It converts data into digital form
29. **Which of the following statements is incorrect regarding computer output devices?**
 (a) It converts digital data into a form that is human understanding
 (b) It converts data into digital form
 (c) It receives data from the computer system for display
 (d) Printer is an output device
30. **Moving data from one system buffer to the process and reading data from the I/O device to the other buffer may be performed simultaneously in which of the following buffering schemes?**

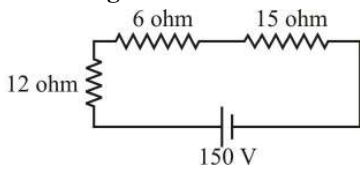
- (a) Circular buffering
 (b) User-level buffering
 (c) Double buffering
 (d) Single buffering
31. In a multitasking system, the ____ is a fixed amount of RAM that is allocated as a temporary holding area, so, that the CPU can perform calculations on the data before transferring the data to a particular device.
 (a) Helix (b) Wizard
 (c) Bounce (d) Buffer
32. Which of the following is a communication service provided by the internet?
 (a) Gopher (b) Archie
 (c) Telnet (d) FTP
33. Which of the following statements is false about HTTPS?
 (a) It ensures protection against man-in-the-middle attacks
 (b) Due to the use of encryption, communication between two hosts using HTTPS is secure
 (c) It is more secure than HTTP
 (d) It cannot be used for financial transaction
34. Which layer protocol is in DNS internet architecture?
 (a) Transport (b) Application
 (c) Data Link (d) Network
35. In MS - Word 365 which the following refers to the use of a short, dashed line to break a word when it reaches the edge of a document or container?
 (a) Hyphenation (b) Strikethrough
 (c) Wrap text (d) Merge and Center
36. Which of the following options best describes the words regular, bold and Italic in MS Word 365?
 (a) Font Size (b) Color
 (c) Effects (d) Size
37. In MS - word 365, when we click on 'Delete' option in the Mini toolbar, which is displayed by right - clicking on the table cell, row or column which you want to delete. If you click, which of the following option is not available?
 (a) Delete Rows (b) Delete Columns
 (c) Delete Cells (d) Delete Pages
38. Match the points under the column 'LIST-I to those under the column 'LIST-II'.

List-I	List-II
a)Email server	i) A free email (Webmail) tool provided by Microsoft
b) LinkedIn	ii) Postfix
c) Orkut	iii) A social networking portal for business professionals

d) Hotmail	iv) The service was designed to help users meet new and old friends.
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- (a) a-ii, b-iii, c-i, d-iv
 (b) a-iii, b-ii, c-iv, d-i
 (c) a-ii, b-iii, c-iv, d-i
 (d) a-ii, b-iv, c-iii, d-i
39. Verification of a login name and password on a computer is known as.....
 (a) Authentication (b) Synchronization
 (c) Identification (d) Accessibility
40. Which of the following is a computer based application for exchanging message between users?
 (a) e-kyc (b) e-mail
 (c) e-aadhar (d) e-sharm
41. Which of the following is a graphical web browser developed by Apple?
 (a) Edge (b) Chrome
 (c) Safari (d) Firefox
42. Which of the following is an incorrect statement about search engines?
 (a) Bing was launched by Microsoft in 2009.
 (b) Google search engine was originally known as Backrub
 (c) AltaVista was launched by Apple.
 (d) Ask was launched in 1996.
43. Which of the following web browsers was developed by Apple?
 (a) Mozilla Firefox (b) Safari
 (c) Opera (d) Internet Explorer
44. Which of the following operations refers to the process of converting information, corresponding text, numbers photos or music into digital data that can be manipulated by electronic devices?
 (a) Normalization (b) Unification
 (c) Regularization (d) Digitization
45. Several studies have shown that ____ video games have negative effects on the younger generation.
 (a) puzzle (b) violent
 (c) racing (d) adventure
46. If the number 6484y6 is divisible by 8, then find the least value of y?
 (a) 3 (b) 4
 (c) 1 (d) 7
47. Simplify the following expression :
 $(15 \div 3) - \{ (19 - 1) \div 2 \} - \{ 5 \times 20 - (7 \times 9 - (-2)) \}$
 (a) 21 (b) 31
 (c) -21 (d) 35

48. Find the greatest fraction out of $-\frac{3}{2}, \frac{3}{2}, \frac{11}{4}, \frac{5}{2}$:
- (a) $\frac{3}{2}$ (b) $\frac{11}{4}$
(c) $\frac{5}{2}$ (d) $-\frac{3}{2}$
49. Which of the following fraction will be subtracted from $\frac{3}{4}$ to give the result $\frac{5}{12}$?
- (a) $\frac{1}{3}$ (b) $\frac{2}{8}$
(c) $\frac{1}{6}$ (d) $\frac{2}{3}$
50. The LCM of 6, 9 and x is 72. Which of the given options can be a possible value of x?
- (a) 18 (b) 12
(c) 36 (d) 24
51. The LCM of $\frac{2}{3}, \frac{4}{9}, \frac{7}{12}, \frac{3}{5}$ is:
- (a) 98 (b) 94
(c) 84 (d) 86
52. The difference of two numbers is equal to 30% of their sum find the ratio of the larger number to the smaller number.
- (a) 15 : 7 (b) 13 : 7
(c) 2 : 1 (d) 17 : 15
53. The total population of a village is 4,000. The number of males and females increases by 10% and 20% respectively and consequently the population of the village becomes 4500. What was the number of males in the village prior to the new members coming in?
- (a) 2500 (b) 3000
(c) 4000 (d) 2000
54. In any triangle ABC, $a + b + c = 2s$ with usual notation, then the value of $\sin\left(\frac{A}{2}\right)$ is
- (a) $\sqrt{\frac{(s-b)(s-c)}{s(s-a)}}$ (b) $\sqrt{\frac{(s-c)(s-a)}{ac}}$
(c) $\sqrt{\frac{(s-b)(s-c)}{bc}}$ (d) $\sqrt{\frac{s(s-a)}{bc}}$
55. A and B can complete a piece of work in 10 days and 12 days respectively. If they work on alternate days beginning with A, then in how many days will the work be completed?
- (a) 10 (b) $10\frac{1}{2}$
(c) $10\frac{1}{4}$ (d) $10\frac{5}{6}$
56. Two cars A and B starting at the same time meet each other in opposite direction after t hours and after arriving they reach their destination after 5 hours and 6 hours. If the speed of car A is 55 km/hr, what will be the speed of the car B?
- (a) $66\sqrt{12}$ km/hr (b) $110\sqrt{3}$ km/hr
(c) $\frac{110}{\sqrt{6}}$ km/hr (d) $\frac{55}{6}\sqrt{30}$ km/hr
57. Amount of ₹1250 becomes ₹1550 in 4 years. What is the rate of simple interest?
- (a) 4% (b) 6%
(c) 8% (d) 1%
58. A shopkeeper sells wheat at ₹20/kg that he purchased at ₹18/kg and he gives only 900 gm of wheat instead of 1 kg while selling. The actual percentage profit of the shopkeeper is:
- (a) 22.45 % (b) 24.45 %
(c) 23.45 % (d) 20.45 %
59. What is the sum of the following two series? $(8 + 27 + 64 + \dots + 1000) + (2 + 4 + 6 + \dots + 20)$
- (a) 3136 (b) 3134
(c) 3135 (d) 3133
60. In a triangle ABC, $\tan A + \tan B + \tan C = ?$
- (a) 1
(b) $-\tan A \cdot \tan B \cdot \tan C$
(c) $\tan A \cdot \tan B + \tan B \cdot \tan C + \tan C \cdot \tan A$
(d) $\tan A \cdot \tan B \cdot \tan C$
61. The following table gives a frequency distribution whose arithmetic mean is 33. Find the product of the possible values of k from the distribution.
- | Value (X) | Frequency (f) |
|-----------|---------------|
| 29 | 4 |
| 30 | 3 |
| 30 + k | 3k |
| 34 | 2 |
| 62 | 1 |
- (a) 5 (b) 2
(c) 3 (d) 4
62. The square root of 519841 is-
- (a) 721 (b) 629
(c) 631 (d) 731
63. Two years ago, the ratio of the respective ages of subash and Pranav was 4 : 5. Three years hence, this ratio will become 5 : 6. The present age of Pranav is-
- (a) 22 years (b) 25 years
(c) 20 years (d) 27 years

64. If two flood gates A and B work together then the reservoir will be filled in 6 hours gate A fills the reservoir 5 hour faster than gate B. The fast flood gate A will fill the reservoir in how many hours?
 (a) 5 Hours (b) 10 Hours
 (c) 7 Hours (d) 13 Hours
65. Two numbers are in the ratio 3 : 2. If 8 and 6 are subtracted from the first and the second number respectively, the ratio becomes 8 : 5. The numbers are :
 (a) 32, 24 (b) 24, 16
 (c) 40, 30 (d) 3, 2
66. Which of the following is not a vector quantity?
 (a) Speed (b) Velocity
 (c) Displacement (d) Acceleration
67. If a force of 250 N acts on a body at rest, the momentum required is 125 kgm/s. The time for which the force acts on the body is
 (a) 0.5 s (b) 0.2 s
 (c) 0.1 s (d) 0.3 s
68. A particle starts moving from rest under uniform acceleration. It travels a distance 'x' in the first two seconds and a distance 'y' in the next two seconds. If $y = nx$, then $n =$
 (a) 1 (b) 3
 (c) 2 (d) 4
69. An electric motor is marked 2 HP. The work done by the electric motor in 3 seconds will be nearly.
 (a) 373 J (b) 497 J
 (c) 1.5 kJ (d) 4.4 kJ
70. The heat generated while transferring 96000 coulomb of charge is one hour through a potential difference of 50 V is
 (a) 4.8×10^4 J (b) 1.33×10^3 J
 (c) 4.8×10^6 J (d) 1.33×10^4 J
71. What is the unit of electric potential?
 (a) Volt (b) Ampere
 (c) Newton per meter (d) Volt per meter
72. Find the voltage across the 6 ohm resistor.
- 
- (a) 150V (b) 181.6 V
 (c) 27.27 V (d) 54.48 V
73. A light bulb is rated for 60 W, 240 V. Find the resistance of the bulb.
 (a) 960 Ω (b) 4 Ω
 (c) 1000 Ω (d) 860 Ω
74. The property of a material which opposes the creation of magnetic flux in it
 (a) Resistance (b) Reluctance
 (c) Permeance (d) Conductance
75. What happens to the energy meter if supply is more than rated value?
 (a) It will run slow.
 (b) It will run fast.
 (c) It will remain constant
 (d) It will stop
76. Electric flux is a _____ field, and its density is a _____ field.
 (a) vector, vector (b) vector, scalar
 (c) scalar, scalar (d) scalar, vector
77. The coils on the iron core have coefficient of coupling _____.
 (a) equals to unity (b) zero
 (c) from 0.05 to 0.3 (d) 0.5
78. According to Ampere's circuital Law the line integral of H about any closed path is exactly _____ to the direct current enclosed by that path.
 (a) Double (b) Equal
 (c) 4 Times (d) Half
79. The induced e.m.f in a coil of 0.08 mH carrying 2A current is reversed in 0.4 seconds
 (a) 0.16 mV (b) 0.4 mV
 (c) 0.8 mV (d) 0.064 mV
80. A material is said to have become superconductor when
 (a) its resistance becomes negative
 (b) its resistance becomes very small
 (c) its resistance decreases
 (d) its resistance becomes zero
81. For an insulating material, dielectric strength and dielectric loss should be respectively :
 (a) High and high (b) Low and high
 (c) High and low (d) Low and low
82. When a semiconductor is doped with a p-type impurity, each impurity atom will :
 (a) Acquire negative charge
 (b) Acquire positive charge
 (c) Remain electrically neutral
 (d) Give away one electron
83. Tunnel diode and Avalanche photodiode are operated in _____ bias and _____ bias respectively.
 (a) Reverse, reverse.
 (b) Reverse, forward
 (c) Forward, reverse
 (d) Forward, forward

84. The emitter region in N-P-N junction transistor is more heavily doped than the base region so that

- (a) The flow across the base region will be mainly due to electrons
- (b) The flow across the base region will be mainly due to holes
- (c) Base current will be high
- (d) There will be increase recombination in base region

85. An n-channel E-MOSFET is turned ON, the gate-to-source voltage must be _____.

- (a) less than $V_{\text{threshold}}$
- (b) greater than V_{peak}
- (c) less than V_{peak}
- (d) greater than $V_{\text{threshold}}$

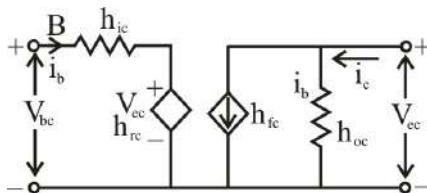
86. We get percentage ripple if multiply _____ with 100.

- (a) Ratio of the input resistance and input voltage
- (b) Product of AC current and DC current
- (c) Ratio of AC rms voltage to DC voltage
- (d) Addition of the AC and DC component of given signal

87. The main advantage of emitter follower is:

- (a) Voltage gain is less than unity.
- (b) Output impedance is high and input impedance is low.
- (c) Voltage gain is very high.
- (d) Output impedance is low and input impedance is high.

88. Identify the above configuration of circuit?



- (a) hybrid equivalent circuit of common base
- (b) hybrid equivalent circuit of common Emitter
- (c) hybrid equivalent circuit of common collector
- (d) Inverse hybrid equivalent circuit of common base

89. Voltage series feedback (also called series shunt feedback) results in :

- (a) Increase in both input and output impedance.
- (b) Decrease in both input and output impedance.
- (c) Increase in input impedance and decrease in output impedance.
- (d) Decrease in input impedance and increase in output impedance.

90. Slew rate of output op amp refers to

- (a) Maximum rate of change of output voltage.
- (b) Maximum time required by the output to go from zero to 90% of final value
- (c) Large signal voltage gain
- (d) Maximum rate at which input can change

91. _____ multivibrator is used as a gating circuit and as a delay element.

- (a) Astable
- (b) Monostable
- (c) Bistable
- (d) Oscillator

92. A 0-200 V voltmeter has an accuracy of 0.75% of full scale reading. If voltage measured is 100 V, the error is-

- (a) 3%
- (b) 2%
- (c) 1.5%
- (d) 0.75%

93. Which is an example of Absolute Instrument?

- (a) Indicating Ammeter
- (b) Deflecting voltmeter
- (c) Tangent galvanometer
- (d) Digital meter

94. Which of the following types of instruments are not used as ammeters or voltmeters?

- (a) PMMC
- (b) Hotwire
- (c) Moving coil
- (d) Electromagnetic

95. Which of the following methods can not be used to measure capacitance?

- (a) De-Sauty's Bridge
- (b) Schering Bridge
- (c) Wien Bridge
- (d) Anderson's Bridge

96. _____ is used to measure pressure directly.

- (a) Rotameter
- (b) LVDT
- (c) Strain gauge
- (d) Bourdon tube

97. The binary equivalent of $(FA)_{16}$ is :

- (a) 1010 1111
- (b) 1111 1010
- (c) 1000 1111
- (d) 1111 1000

98. The function $F = ABC' + ABC + A'BC + A'BC'$ can be reduced to which one of the following?

- (a) $F = A$
- (b) $F = AB$
- (c) $F = ABC$
- (d) $F = B$

99. For a full Adder

- (a) Sum = $XY \oplus YZ \oplus ZX$
Carry = $X.Y.Z$
- (b) Sum = $X.Y.Z$
Carry = $X \oplus Y \oplus Z$
- (c) Sum = $X \oplus Y \oplus Z$
Carry = $X.Y.Z$
- (d) Sum = $X \oplus Y \oplus Z$
Carry = $XY + YZ + ZX$

100. CMOS offers high

- (a) Switching
- (b) gain
- (c) Input impedance
- (d) Output impedance

SOLUTION : PRACTICE SET- 2

ANSWER KEY

1. (b)	11. (a)	21. (b)	31. (d)	41. (c)	51. (c)	61. (b)	71. (a)	81. (c)	91. (b)
2. (c)	12. (c)	22. (c)	32. (c)	42. (c)	52. (b)	62. (a)	72. (c)	82. (c)	92. (c)
3. (d)	13. (c)	23. (b)	33. (d)	43. (b)	53. (b)	63. (d)	73. (a)	83. (c)	93. (c)
4. (c)	14. (d)	24. (a)	34. (b)	44. (d)	54. (c)	64. (b)	74. (b)	84. (a)	94. (d)
5. (a)	15. (b)	25. (d)	35. (a)	45. (b)	55. (d)	65. (b)	75. (b)	85. (d)	95. (d)
6. (a)	16. (a)	26. (b)	36. (a)	46. (c)	56. (d)	66. (a)	76. (d)	86. (c)	96. (d)
7. (c)	17. (c)	27. (d)	37. (d)	47. (b)	57. (b)	67. (a)	77. (a)	87. (d)	97. (b)
8. (d)	18. (b)	28. (c)	38. (c)	48. (b)	58. (c)	68. (b)	78. (b)	88. (c)	98. (d)
9. (a)	19. (a)	29. (b)	39. (a)	49. (a)	59. (b)	69. (d)	79. (b)	89. (c)	99. (d)
10. (a)	20. (c)	30. (c)	40. (b)	50. (d)	60. (d)	70. (c)	80. (d)	90. (a)	100. (c)

SOLUTION

1. (b)

Neil Armstrong was the first man to put feet on the moon. He reached on the moon on 21st July, 1969 via Apollo-11 mission. Neil was an American. In 2019 China sent 2 rovers via its Lunar mission.

2. (c)

Mohd. Azharuddin made three consecutive centuries in his first three test matches. His international playing career came to an end when he was found to be involved in a match-fixing scandal in 2000 and subsequently banned by the BCCI for life. In 2012, the Andhra Pradesh High Court lifted the life ban.

3. (d)

Famous folk dances and their concerned states are as follow:	
Name of States	Folk Dances
Assam	Bihu, Bichhua, Natpuja, Maharas, Kaligopal, Bagurumba, Naga dance, Khel Gopal, Tabal Chongli, Canoe, Jhumura Hobjanai
Chhattisgarh	Tapali, Goudi, Karma, Jhumar, Dagla, Pali, Navrani, Diwari, Mundari
Gujarat	Garba, Dandiya Ras, Tippani Juriun, Bhavai.
Uttarakhand	Garhwali, Kumayuni, Kajari, Jhora, Raslila, Chappeli.

4. (c)

Premchand, pseudonym of Dhanpat Rai Srivastava, (born July 31, 1880, Lamhi, near Varanasi, India—died October 8, 1936, Varanasi), was an Indian author of novels and short stories in Hindi and Urdu who pioneered in adapting Indian themes to Western literary styles.

He is regarded as one of the foremost Hindi writers of the early twentieth century. His works include Godaan, Karmabhoomi, Gaban, Mansarovar, Idgah.

5. (a)

Reserve Bank of India is the only note issuing authority in India. It is India's central bank and regulatory body responsible for regulation of the Indian banking system. The Reserve Bank of India was established on 1st April 1935 as per Reserve Bank of India Act 1934.

6. (a)

According to Article 75 (3) of the Indian Constitution, the council of ministers is collectively responsible to the Lok Sabha, that is, the council of minister can remain in office only if a majority is elected in this house. The cabinet, including the Prime Minister, has to resign when a motion of no confidence is passed against it. Only members of Lok Sabha can participate in the motion of no confidence, so the Prime Minister cannot participate in voting if he is a Rajya Sabha member.

7. (c)

Different types of gases present in the air and their percentage-

Nitrogen – 78.8%

Oxygen – 20.95%

Argon – 0.93%

Carbon dioxide – 0.03%

8. (d)

Barchan is a type of crescent-shaped sand dune formed in desert regions where the wind direction is very constant.

9. (a)

Nine gems of Akbar's court were Abul Fazal, Tansen, Birbal, Todarmal, Mansingh, Abdul Rahim Khan-i-Khana, Fakir Aziano-Din, Mulla Do-Piyaza and Faizi.

10. (a)

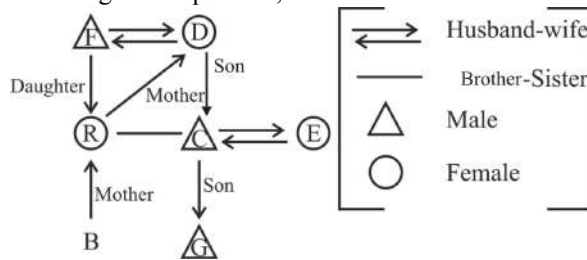
In 1897, the Plague Commissioner had resorted to tyranny and force while managing the epidemic of plague in Pune. As a revenge the Chapekar brothers, Damodar and Balkrishna, shot him dead on 22 June 1897. Damodar, Balkrishna and Vasudev these three brothers and their associate Vinayak Ranade were hanged to death.

11. (a)

Just as rafting is related to water, in the same way Skiing is related to Ice/Snow.

12. (c)

According to the question,



Hence, It is clear from above that F is father's father of G.

13. (c)

Given,

$$\div \rightarrow +$$

$$\times \rightarrow -$$

$$+ \rightarrow \times$$

$$- \rightarrow \div$$

$$\text{Expression} = 8 + 5 \times 54 - 9 \div 3$$

On changing the symbols,

$$8 \times 5 - 54 \div 9 + 3$$

$$= 40 - 6 + 3$$

$$= 37$$

14. (d)

According to the statement conclusion I states that the scale is made of glass. So, it is not necessary that the scale can be made of plastic iron etc. Conclusion II states that the scale is made of plastic. So, it is also not necessary that the scale is made of plastic because such information does not come out of the statement.

15. (b)

According to the question it is clear from the statement that only assumption 1 is implicit.

16. (a)

Given that,

$$A > D, A > B \text{ and } C > A$$

but information is insufficient related to D and B. Hence both the statements are not sufficient to answer the question.

17. (c)

The word TOUGH can't be formed from letter DAUGHTER because it doesn't contain the letter 'O'.

18. (b)

Just as Verse comes under Poem, in the same way Page comes under Book.

19. (a)

Just as,

Same as,

K A R A N

$$11+1+18+1+14 = 45$$

A R U N

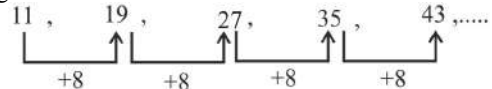
$$1+18+21+14 = 54$$

20. (c)

Pen, Marker and Chalk is used for writing, while Book is used for reading. Hence option (c) is different among all.

21. (b)

The given series is as follows-



Since adding 8 to each number gives each subsequent number. And in each number, when divided by 8, 3 remainder is obtained, while in option (b) 434, when divided by 8, 2 remainder is obtained.

Hence option (b) is odd.

22. (c)

The series is as follows-

$$F \xrightarrow{+5} K \xrightarrow{+3} N \xrightarrow{+7} U$$

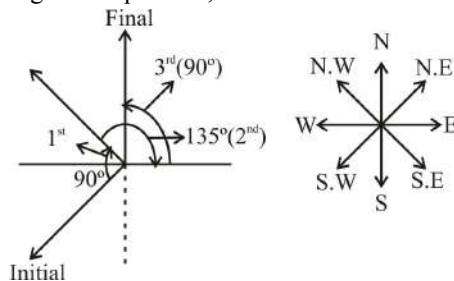
$$U \xrightarrow{+5} Z \xrightarrow{+3} C \xrightarrow{+7} J$$

$$J \xrightarrow{+5} O \xrightarrow{+3} \boxed{R}$$

Hence, $\boxed{? + R}$

23. (b)

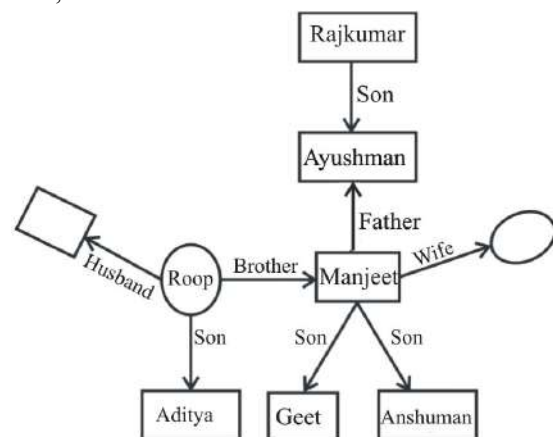
According to the question,



Hence, it is clear from above that Umesh is facing North direction.

24. (a)

On drawing blood relation diagram according to the question,



Hence, it is clear from above diagram that Manjeet is father of Geet.

25. (d)

Given,

$$18K \ 6J \ 7Q \ 5T \ 2$$

$$[Q = +, J = \times, T = -, K = \div]$$

According to the question, on changing signs-

$$18 \div 6 \times 7 + 5 - 2$$

$$3 \times 7 + 3 = 24$$

26. (b)

ENIAC, EDVAC and EDSAC are examples of the first generation of computers. ENIAC was the first general purpose programmable computer, developed during World War II with the aim of helping to calculate artillery firing tables.

27. (d)

The size of the pixel determines the clarity of the image displayed on the VDU.

28. (c)

Output devices are hardware components of a computer system that displays or presents information to the user or another machine. They convert digital data generated by computer into human-readable or machine-readable form. Ex- Monitors, Printers, Speakers, Projectors, Headphones etc. Mouse is an input device. So, option (c) is correct.

29. (b)

Output device is a component of computer system which displays data or instructions as result after processing. Example - Monitor, Printer, Speaker, Plotter video card. It converts digital data into a form that is human understandable.

30. (c)

A buffer is a memory area that store data temporarily. Buffering is an act of storing data temporarily in the buffer.

Double buffering– In double buffering two buffer are used in the place of one. In this buffering the producer produces one buffer while the consumer consumes another buffer, simultaneously. So the producer not needs to wait for filling the buffer.

31. (d)

Buffer Memory, is a temporary storage area in the main memory (RAM) that stores data transferring between two or more devices or between an application and a device. Buffering compensates for the difference in transfer speeds between the sender and receiver of the data.

32. (c)

Telnet is an application layer protocol that enables one computer to connect to local computer. It is used as a standard TCP/IP protocol for virtual terminal service. It provides bi-directional text-oriented communication in the network.

33. (d)

HTTPS is short form of Hyper Text Transfer Protocol Secure. It is secure version of the HTTP protocol which is used for communication between a web browser and a website. HTTPS uses encryption protocols, such as SSL (Secure Sockets Layer) or its successor, TLS (Transport Layer Security) to establish a secure connection. It can be used for financial transaction, so statement (d) is false to HTTPS.

34. (b)

The full name of DNS is 'Domain Name System'. It converts domain names to IP addresses.

The full name of OSI model is 'Open System Inter Connection. It was developed by ISO in 1984 and this model consists of 7 layers.

(i) Physical layer

(ii) Data link layer

(iii) Network layer

(iv) Transport layer

(v) Session layer

(vi) Presentation layer

(vii) Application layer

Protocols like HTTP, FTP, SMTP and NFS are used in the application layer. DNS is an application layer protocol in the internet architecture.

35. (a)

In MS word 365, hyphenation refers to the use of a short dashed line to break up a word when it reaches the edge of a document or container.

36. (a)

Font size option best describes the words- regular, Bold and Italic in MS Word 365.

37. (d)

In MS word 365 when we see the mini toolbar which is displayed when we right click in those table cell row or column. In this, on clicking 'Delete' option the following options are displayed -

→ Delete cell

→ Delete columns

→ Delete Rows

→ Delete Table.

38. (c)

Postfix is a hugely-popular Mail Transfer Agent (MTA) designed to determine routes and send emails. LinkedIn is a social networking site or portal designed specifically for the business community/professionals. Orkut was a social networking service owned and operated by Google. This service was designed to help users meet new and old friends and maintain existing relationships. Accounts such as hotmail, outlook, MSN etc. are provided by Microsoft.

39. (a)

The process of verifying the login name and password is known as authentication.

40. (b)

Email is a computer based application. It allows an internet user to send a message in formatted manner (mail) to the other internet user in any part of world.

41. (c)

Safari is a web browser developed by Apple. It is built into Apple's operating systems, including Mac OS, iOS, and iPad OS are used Apple's open source browser engine website.

42. (c)

About search engine Bing, Google search engine, Ask are correct based on the given statements, while AltaVista is incorrect because it was not launched by Apple, AltaVista was launched by Digital Equipment Corporation on December 15, 1995.

43. (b)

Safari is a graphical web browser developed by Apple that is based on open-source software such as WebKit. It was first released for desktop in 2003 with Mac OSx Panther on Mac. It was presented first time with iPhone in 2007 with iOS device for mobile.

44. (d)

Digitization refers to the process of converting analog information such as text numbers, photos or music into digital data that can be manipulated by electronic devices.

45. (b)

Several studies have shown that violent video games have negative effects on the younger generation.

46. (c)

Divisibility rule of 8 - If the last three digits of the given number are divisible by 8 then it will be divisible by 8.

On putting Least value of $y = 1$

Number = 648416

$$\text{Divided by} = \frac{416}{8} = 52$$

47. (b)

$$\begin{aligned} & (15 \div 3) - [\{(19 - 1) \div 2\} - \{5 \times 20 - (7 \times 9 - (-2))\}] \\ &= 5 - [\{18 \div 2\} - \{100 - (63 + 2)\}] \\ &= 5 - [9 - \{100 - 65\}] \\ &= 5 - [9 - 35] \\ &= 5 + 26 \\ &= 31 \end{aligned}$$

48. (b)

$$-\frac{3}{2} = -1.5$$

$$\frac{3}{2} = 1.5$$

$$\frac{11}{4} = 2.75$$

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

It is clear that greatest fraction is $\frac{11}{4}$

49. (a)

Let the fraction be $\frac{1}{x}$,

According to the question,

$$\frac{3}{4} - \frac{1}{x} = \frac{5}{12}$$

$$\frac{1}{x} = \frac{5}{12} - \frac{3}{4}$$

$$\frac{1}{x} = \frac{20 - 36}{48}$$

$$\frac{1}{x} = \frac{-16}{48}$$

$$\frac{1}{x} = \frac{1}{3}$$

Hence the required fraction is $\frac{1}{3}$.

50. (d)

$$\text{LCM} = 72$$

$$= 2 \times 2 \times 2 \times 3 \times 3$$

$$\text{Number} = 6, 9, x$$

$$6 = 2 \times 3$$

$$9 = 3 \times 3$$

$$\text{HCF} = 3$$

$$\text{Number } x = \frac{72}{3}$$

Hence it is clear that $x = 24$

51. (c)

$$\text{L. C. M of } \frac{2}{3}, \frac{4}{9}, \frac{7}{12}, \frac{3}{5}$$

$$\begin{aligned} \frac{\text{L.C.M. of numerator}}{\text{H.C.F. of denominator}} &= \frac{\text{L.C.M. of } 2, 4, 7 \text{ and } 3}{\text{H.C.F. of } 3, 9, 12 \text{ and } 5} \\ &= \frac{4 \times 7 \times 3}{1} \\ &= 84 \end{aligned}$$

52. (b)

Let the larger number and smaller number be x and y respectively.

According to the question,

$$(x - y) = (x + y) \times \frac{30}{100}$$

$$10(x - y) = 3(x + y)$$

$$10x - 10y = 3x + 3y$$

$$7x = 13y$$

$$x : y = 13 : 7$$

53. (b)

Let, the no. of males = x

And number of females = y

From the initial part of the question,

$$x + y = 4000$$

$$x = 4000 - y$$

... (1)

From the second part of the question,

$$x + x \times \frac{10}{100} + y + y \times \frac{20}{100} = 4500$$

$$\frac{110x + 120y}{100} = 4500$$

$$110x + 120y = 450000$$

... (2)

On putting the value of x from eqⁿ-1 in eqⁿ-2,

$$110(4000 - y) + 120y = 450000$$

$$440000 - 110y + 120y = 450000$$

$$10y = 10000$$

$$y = 1000$$

\therefore Number of females (y) = 1000

And number of males (x) = $4000 - y$

$$= 4000 - 1000 = 3000$$

54. (c)

Given-

$$a + b + c = 2s$$

... (i)

$$\text{Area of triangle} = \frac{1}{2} bc \sin A$$

By formula:-

$$\text{Area of triangle} = \sqrt{s(s-a)(s-b)(s-c)}$$

$$\frac{1}{2}bc \sin A = \sqrt{s(s-a)(s-b)(s-c)}$$

$$\sin A = \frac{2 \times \sqrt{s(s-a)(s-b)(s-c)}}{bc} \quad \left\{ \begin{array}{l} \text{formula -} \\ \sin x = 2 \sin \frac{x}{2} \cos \frac{x}{2} \end{array} \right\}$$

$$\sin \frac{A}{2} \cos \frac{A}{2} = \frac{\sqrt{s(s-a)(s-b)(s-c)}}{bc} \quad \dots \text{(ii)}$$

We know that-

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

$$2 \cos^2 \frac{A}{2} - 1 = \frac{b^2 + c^2 - a^2}{2bc} \quad \left(\begin{array}{l} \text{Formula - } \cos 2A = 2 \cos^2 A - 1 \\ \cos A = 2 \cos^2 \frac{A}{2} - 1 \end{array} \right)$$

$$2 \cos^2 \frac{A}{2} = \frac{b^2 + c^2 - a^2 + 2bc}{2bc}$$

$$\cos^2 \frac{A}{2} = \frac{(b+c-a)(b+c+a)}{4bc}$$

$$\cos^2 \frac{A}{2} = \frac{(2s-a-a)2s}{4bc} \quad [\text{From equ}^n \text{(i)}]$$

$$\cos^2 \frac{A}{2} = \frac{(2s-2a)2s}{4bc}$$

$$\cos^2 \frac{A}{2} = \frac{s(s-a)}{bc}$$

$$\cos \frac{A}{2} = \sqrt{\frac{s(s-a)}{bc}}$$

Putting the value of $\cos \frac{A}{2}$ in equation (ii)-

$$\sin \frac{A}{2} \sqrt{\frac{s(s-a)}{bc}} = \frac{\sqrt{s(s-a)(s-b)(s-c)}}{bc}$$

$$\boxed{\sin \frac{A}{2} = \sqrt{\frac{(s-b)(s-c)}{bc}}}$$

55. (d)

According to the question -

LCM of 10 and 12 = 60

Total work = 60 unit

1 day's work of A = 6 unit

1 day's work of B = 5 unit

2 day's work of (A + B) = 11 unit

$\times 5 = \times 5$

By A+B \rightarrow 10 days = 55 unit

Remaining work = 60 - 55

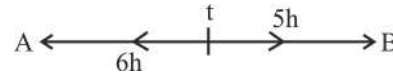
= 5 unit

Time taken by A to complete 5 unit work = $\frac{5}{6}$ day

$$\begin{aligned} \text{Hence required time} &= \left(10 + \frac{5}{6}\right) \text{ days} \\ &= 10\frac{5}{6} \text{ days} \end{aligned}$$

56. (d)

Given,



Time taken to reach destination after meeting (A) = 5 hr.

Time taken to reach destination after meeting (B) = 6 hr.

Speed of A = 55 Km./hr.

Let Speed of B = x Km./hr.

$$\therefore \frac{S_B}{S_A} = \sqrt{\frac{t_A}{t_B}}$$

$$\frac{x}{55} = \sqrt{\frac{5}{6}}$$

$$x = 55 \times \sqrt{\frac{5}{6}}$$

$$x = 55 \times \sqrt{\frac{5 \times 6}{6 \times 6}}$$

$$x = \frac{55}{6} \times \sqrt{30}$$

$$x = \frac{55}{6} \sqrt{30} \text{ km/hr}$$

57. (b)

According to the question,

Principal (P) = ₹1250

Amount (A) = ₹1550

Time (T) = 4 years

A = SI + P

$$1550 = \frac{P \times R \times T}{100} + 1250$$

$$1550 = \frac{1250 \times 4 \times R}{100} + 1250$$

$$1550 = \frac{5000 \times R}{100} + 1250$$

$$50R = 1550 - 1250$$

$$R = \frac{300}{50}$$

R = 6%

58. (c)

Cost price of 1000 gm wheat = ₹18

$$1 \text{ gm cost price} = \frac{18}{1000}$$

Selling price of 900 gm = ₹20

$$1 \text{ gm selling price} = \frac{20}{900}$$

$$\begin{aligned} \text{Actual profit percentage} &= \frac{\left(\frac{20}{900} - \frac{18}{1000}\right)}{\frac{18}{1000}} \times 100 \\ &= \frac{20000 - 16200}{\frac{18}{1000}} \times 100 \\ &= \frac{3800 \times 1000}{900000 \times 18} \times 100 \\ &= \frac{3800}{162} \\ &= 23.45\% \end{aligned}$$

59. (b)

$$\begin{aligned} &(8 + 27 + 64 + \dots + 1000) + (2 + 4 + 6 + \dots + 20) \\ &= [(2)^3 + (3)^3 + (4)^3 + \dots + (10)^3] + 2(1+2+3+ \dots + 10) \\ &= [\{(1)^3 + (2)^3 + (3)^3 + (4)^3 + \dots + (10)^3\} - (1)^3] + 2 \\ &\quad (1+2+3+ \dots + 10) \end{aligned}$$

∴ The sum of cubes of the first 'n' natural numbers

$$= \left[\frac{n(n+1)}{2} \right]^2$$

$$\text{And, sum of the first 'n' natural numbers} = \frac{n(n+1)}{2}$$

$$\begin{aligned} &= \left[\frac{10(10+1)}{2} \right]^2 - 1 + 10(10+1) \\ &= (5 \times 11)^2 - 1 + 10 \times 11 \\ &= (55)^2 - 1 + 110 \\ &= 3025 - 1 + 110 \\ &= 3024 + 110 \\ &= 3134 \end{aligned}$$

60. (d)

$$\tan A + \tan B + \tan C = ?$$

$$A + B + C = 180^\circ$$

$$A + B = 180^\circ - C$$

$$\tan(A+B) = \tan(180^\circ - C)$$

$$\frac{\tan A + \tan B}{1 - \tan A \cdot \tan B} = -\tan C$$

$$\tan A + \tan B = -\tan C + \tan A \cdot \tan B \cdot \tan C$$

$$\tan A + \tan B + \tan C = \tan A \cdot \tan B \cdot \tan C$$

61. (b)

Value (x)	Frequency (f)	f×x
29	4	116
30	3	90
30+k	3k	90k+3k ²
34	2	68
62	1	62
	∑f = 10+3k	∑fx = 336+90k+3k ²

We know that,

$$\text{Arithmetic Mean} = \frac{\sum fx}{\sum f}$$

$$33 = \frac{336 + 90k + 3k^2}{10 + 3k}$$

$$\begin{aligned} 330 + 99k &= 336 + 90k + 3k^2 \\ 3k^2 + 90k - 99k + 336 - 330 &= 0 \\ 3k^2 - 9k + 6 &= 0 \\ k^2 - 3k + 2 &= 0 \\ (k-2)(k-1) &= 0 \\ k &= 2, 1 \end{aligned}$$

Hence, the number of possible value of k = 2

62. (a)

Square root of 519841

	721
7	519841
+7	49
142	298
+2	284
1441	1441
+1	1441
1442	××××

Hence the square root of 519841 is 721.

63. (d)

Let the ages of Subhash and Pranav 2 years ago be 4x and 5x years respectively.

Then,

$$\text{The present age of Subhash} = 4x + 2$$

$$\text{The present age of Pranav} = 5x + 2$$

According to the question,

$$\frac{4x + 2 + 3}{5x + 2 + 3} = \frac{5}{6}$$

$$\Rightarrow \frac{4x + 5}{5x + 5} = \frac{5}{6}$$

$$\Rightarrow 24x + 30 = 25x + 25$$

$$\Rightarrow 25x - 24x = 30 - 25$$

$$\therefore x = 5$$

Hence the present age of Pranav = 5 × 5 + 2

$$= 25 + 2$$

$$= 27 \text{ years}$$

64. (b)

Suppose flood gate A will fill the reservoir in x hrs. So flood gate B will fill the reservoir in (x + 5) hrs.

As per the question,

$$\frac{1}{x} + \frac{1}{x+5} = \frac{1}{6}$$

$$\frac{x+5+x}{x^2+5x} = \frac{1}{6}$$

$$12x + 30 = x^2 + 5x$$

$$x^2 - 7x - 30 = 0$$

$$x^2 - 10x + 3x - 30 = 0$$

$$(x-10)(x+3) = 0$$

$$\boxed{x=10}$$

Hence fast flood gate A will fill the reservoir in 10 hours.

65. (b)

Let the numbers be 3x and 2x respectively.

According to the question-

$$\frac{3x-8}{2x-6} = \frac{8}{5}$$

$$15x-40=16x-48$$

$$x = 8$$

Hence the first number = $3 \times 8 = 24$

And second number = $2 \times 8 = 16$

66. (a)

Vector Quantity - A physical quantity which has both magnitude and direction. Displacement, velocity, acceleration, momentum, force, weight are examples of vector Quantity.

Scalar quantity- A scalar quantity only has a magnitude. Some common examples of scalar quantity are mass, speed, volume, temperature, density etc.

67. (a)

Given that,

$$F = 250 \text{ N}$$

Change in momentum = Impulse (ΔP) = 125 Kgm/s

$$\Delta t = ?$$

$$\Delta P = F \times \Delta t$$

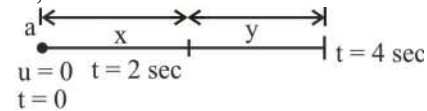
$$\Delta t = \frac{\Delta P}{F}$$

$$\Delta t = \frac{125}{250}$$

$$\Delta t = 0.5 \text{ sec}$$

68. (b)

Given that,



$$S = ut + \frac{1}{2} \times at^2$$

$$x = \frac{1}{2} a \times 4$$

$$x = 2a \quad \dots (i)$$

and $S = ut + \frac{1}{2} \times at^2$

$$x + y = \frac{1}{2} \times a \times 4 \times 4$$

$$x + y = 8a \quad \dots (ii)$$

From equation (i) and (ii), we get

$$x + y = 8a$$

$$2a + y = 8a$$

$$y = 6a$$

Given, $y = nx$

$$y = 3 \times 2a$$

$\Rightarrow n = 3$

69. (d)

Given:

Power of the motor (P) = 2 HP

Time (t) = 3 sec

From the work done formula- $W = P \times t$

$$= 2 \times 746 \times 3 \quad [\because 1 \text{ HP} = 746 \text{ W}]$$

$$= 4476 \text{ Joule}$$

$$= 4.4 \text{ kJ}$$

70. (c)

Given,

$$V = 50 \text{ V}$$

$$Q = 96000$$

$$t = 1 \text{ hour} = 3600 \text{ sec}$$

We know that-

$$H = V I t = \frac{V \times Q \cdot t}{t} = V \times Q = 50 \times 96000$$

\Rightarrow

$$\boxed{H = 4.8 \times 10^6 \text{ J}}$$

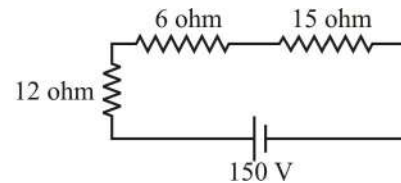
71. (a)

Electrical potential : The amount of work needed to move a unit charge from a reference point to specific point against an electric field known as electric potential.

$$V = \frac{W}{q}$$

The unit of electric potential is 'volt' or joule/coulomb.

72. (c)



Total resistance = $12 + 6 + 15 = 33 \Omega$

$$\therefore \text{Current (I)} = \frac{V}{R} = \frac{150}{33} = 4.54$$

$$\therefore \text{Voltage of } 6 \Omega \text{ (V)} = 4.54 \times 6 = 27.27 \text{ V}$$

73. (a)

Given that,

$$P = 60 \text{ W}, \quad V = 240 \text{ V}, \quad R = ?$$

$$P = \frac{V^2}{R}$$

$$60 = \frac{240 \times 240}{R}$$

$$R = \frac{240 \times 240}{60}$$

$$\boxed{R = 960 \Omega}$$

74. (b)

Reluctance is the property of a material which opposes the creation of magnetic flux in it.

$$\boxed{\text{Reluctance(S)} = \frac{\text{MMF}}{\phi}}$$

The unit of reluctance is 1/Henry or Ampere turn/Weber

75. (b)

If the voltage supply to the energy meter is higher than the rated value, the energy meter will typically run faster because the current flowing through the meter will be higher than what the meter is calibrated for, causing the meter to register more energy usage than is actually being consumed. This can result in an over-billing of energy usage to the customer. It important to