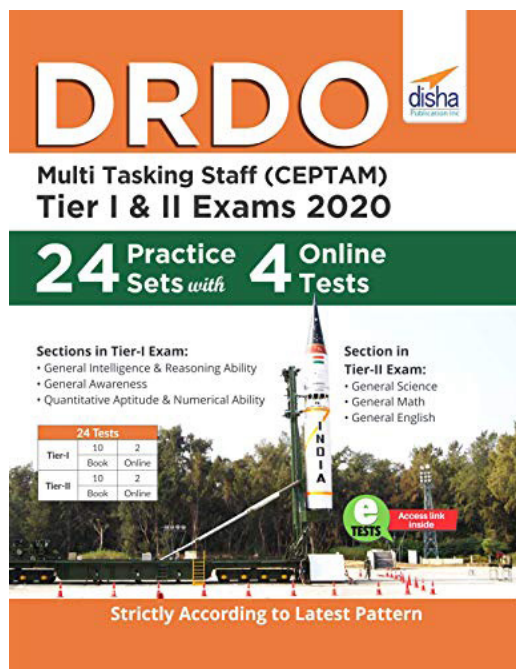


Practice Set for DRDO MTS Tier-1 Exam

This Section is taken from the Book:



ISBN : 9789389645842

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PRACTICE SET -1

GENERAL INTELLIGENCE & REASONING ABILITY

DIRECTIONS (Qs. 1-2) : In questions, select the related word/ letters/number from given alternatives.

1. ACE : FHJ :: OQS : ?
(a) TVX (b) UWY
(c) PRT (d) RTU
2. 18 : 5 :: 12 : ?
(a) 4 (b) 10
(c) 3 (d) 6

DIRECTIONS (Qs. 3-5) : In questions, find the odd word/letters/ number pair from the given alternatives.

3. (a) Kolkata (b) Vishakhapatnam
(c) Bengaluru (d) Haldia
4. (a) HGFE (b) PONM
(c) DCBA (d) MSTU
5. (a) 25, 36 (b) 144, 169
(c) 100, 121 (d) 9, 64

DIRECTIONS (Qs. 6-7) : In questions below, a series is given with one term missing. Choose the correct alternative from the given ones that will complete the series.

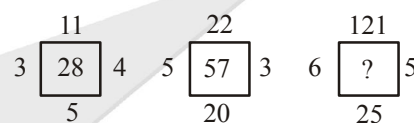
6. FAG, GAF, HAI, IAH, _____
(a) JAK (b) HAK
(c) JAI (d) HAL
7. 3, 6, 9, 15, 24, 39, 63, ?
(a) 100 (b) 87
(c) 102 (d) 99
8. Govind is 48 years old. He is twice as old as his son Prem is now. How old was Prem seven years before ?
(a) 16 (b) 17
(c) 13 (d) 18
9. Pointing to a man, a lady said "His mother is the only daughter of my mother". How is the lady related to the man?
(a) Mother (b) Daughter
(c) Sister (d) Aunt
10. After walking 10 m, Shankar turned left and covered a distance of 6 m, then turned right and covered a distance of 20 m. In the end, he was moving towards the south. From which direction did Shankar start his journey?

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

11. If '-' stands for '+', '+' stands for '×', '×' stands for '-' then which one of the following is not correct ?

- (a) $22 + 7 - 3 \times 9 = 148$ (b) $33 \times 5 - 10 + 20 = 228$
(c) $7 + 28 - 3 \times 52 = 127$ (d) $44 - 9 + 6 \times 11 = 87$

12. Find the missing number-



- (a) 176 (b) 115
(c) 157 (d) 131

13. If HOSPITAL is written as 32574618 in a certain code, how would POSTAL be written in that code?

- (a) 752618 (b) 725618
(c) 725168 (d) 725681

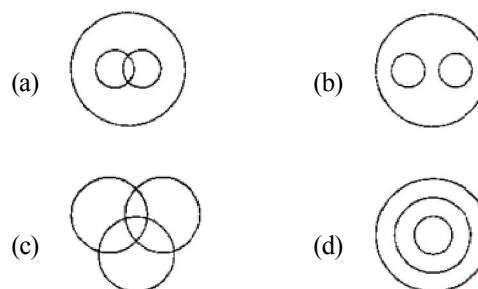
14. In the following question, one statement is given followed by two conclusions I and II. You have to consider the statements to be true even if they seem to be at variance from commonly known facts. You have to decide which of the given conclusions, if any follow from the given statements.

Statement : Songs always have singers to sing them.

Conclusions:

- I. Singers make a song.
- II. There is no un-sung song.
- (a) Only conclusion II follows
(b) Both conclusions I and II follow
(c) Neither conclusion I nor II follows
(d) Only conclusion I follows

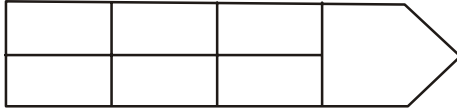
15. Which of the following states the relationship between Sociology, Psychology and Humanities ?



16. In the following question, select the odd word pair from the given alternatives

(a) Error : Accurate
(b) Careless : Casual
(c) Strength : Lethargy
(d) Gloomy : Cheerful

17. How many rectangles are there in the given diagram?



(a) 4 (b) 7
(c) 9 (d) 18

18. Select the word which cannot be formed using the letters of the given word. REJUVENATION

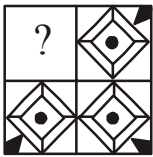
(a) JUTE (b) NATION
(c) REVISION (d) NATIVE

19. If South East becomes North, then what will South West become?

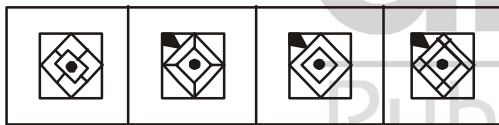
(a) North (b) West
(c) East (d) North West

20. Which answer figure completes the form in question figure ?

Question Figure :



Answer figures :



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

21. In this question two statements are followed by two conclusions numbered I and II. Which one of the four alternatives is correct?

Statement:

I. All teachers are aged.
II. Some women are teachers.

Conclusion:

I. All aged are women
II. Some women are aged.
(a) Both conclusion I and II follow
(b) Only conclusion I follows
(c) Only conclusion II follows
(d) Neither conclusion I nor II follows

22. In the following question, which one set of letters when sequentially placed at the gaps in the given letter series shall complete it ?

$b - 0, y - 3, c - 8, x - 15, d - 24, \underline{\quad}, \underline{\quad}$

(a) $e - 48$ (b) $w - 35$
(c) $w - 39$ (d) $v - 30$

23. In an automobile showroom, seven two-wheelers of seven different companies, viz. H, M, T, V, Y, B and S are displayed in a row, facing east such that:

(A) The H vehicle is to the immediate right of the S vehicle.
(B) The S is fourth to the right of T.
(C) The V is between the M and the B.
(D) The T, which is third to the left of the M, is at one of the ends.
Which vehicle is second to the left of the M?

(a) V (b) S
(c) B (d) T

24. Chanda is the wife of Bharat. Mohan is the son of Chanda. Ashish is the brother of Bharat and father of Dhruv. How is Mohan related to Dhruv?

(a) Sister (b) Cousin
(c) Brother (d) Mother

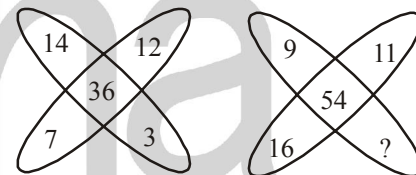
25. The digits are given as below:

562, 871, 438, 753

If the position of the first and the third digits of each of the numbers are interchanged, which of the following will be the sum of the first and the second digits of the third highest number?

(a) 9 (b) 7
(c) 6 (d) 8

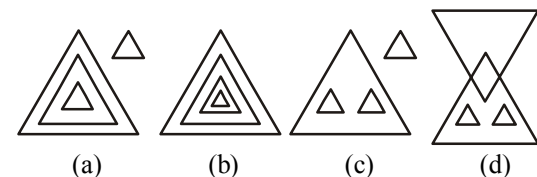
26. Select the missing number from the given responses.



(a) 12 (b) 17
(c) 18 (d) 16

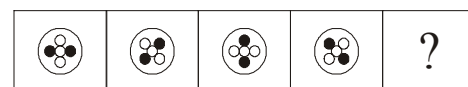
27. Identify the diagram that best represents the relationship among the given classes.

Earth, Saturn, Planet, Star



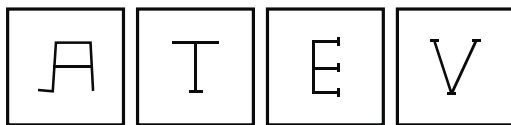
(a) (b) (c) (d)

28. Choose the correct option that will replace the question mark and continue the given figure series.

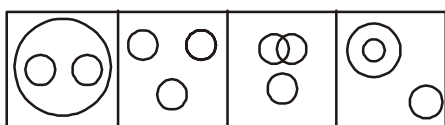


(a) (b)
(c) (d)

29. Of these four figures three figures are similar in some way and one figure is different. Select the figure which is different.



- (a) (b) (c) (d)
30. A is elder to B while C and D are elder to E, who lies between A and C. If C is elder to B, who is the youngest.
- (a) A (b) C
(c) B (d) D
31. Which of the following diagrams represents the relationship among Sun, Moon and Star?



- (a) (b) (c) (d)
32. 'China' is related to 'Yuan' in the same way as 'Japan' is related to '_____'.
(a) Rand (b) Sushi
(c) Lira (d) Yen
33. If the day after tomorrow is sunday, what day was tomorrow day before yesterday?
(a) Friday (b) Thursday
(c) Monday (d) Tuesday
34. Arrange the given words in the sequence in which they occur in the dictionary.
1. Ropped 2. Roster
3. Roasted 4. Road
5. Roller
(a) 35412 (b) 45312
(c) 34512 (d) 43512
35. In a row of men, Manoj is 30th from the right and Kiran is 20th from the left. When they interchange their position, Manoj becomes 35th from the right. What is the total number of men in the row?
(a) 45 (b) 44
(c) 54 (d) 34

QUANTITATIVE APTITUDE & NUMERICAL ABILITY

36. The least number which when divided by 6, 9, 12, 15, 18 leaves the same remainder 2 in each case is:
(a) 178 (b) 182
(c) 176 (d) 180
37. A sum of money is divided among A, B, C and D in the ratio 3 : 5 : 8 : 9 respectively. If the share of D is ₹ 1,872 more than the share of A, then what is the total amount of money of B & C together?
(a) ₹ 4,156 (b) ₹ 4,165
(c) ₹ 4,056 (d) ₹ 4,068
38. What approximate compound interest can be obtained on an amount of ₹ 3,980 after 2 years at 8 p.c.p.a. ?
(a) 650 (b) 680
(c) 600 (d) 662
39. A man walks at the speed of 5 km/hr and runs at the speed of 10 km/hr. How much time will the man require to cover the distance of 28 km, if he covers half (first 14 km) of his journey walking and half of his journey running ?
(a) 8.4 hrs (b) 6 hrs
(c) 5 hrs (d) 4.2 hrs
40. In a 30 litres mixture of water and milk, 50% is milk. How much pure milk need to be added to this mixture to make mixture 30% water?
(a) 10 litres (b) 18 litres
(c) 15 litres (d) 20 litres
41. A bag contains 5 green and 7 red balls. Two balls are drawn. The probability that one is green and the other is red is
(a) $\frac{5}{132}$ (b) $\frac{7}{132}$
(c) $\frac{35}{66}$ (d) $\frac{31}{66}$
42. By selling 8 dozen pencils, a shopkeeper gains the selling price of 1 dozen pencils. What is the gain?
(a) $12\frac{1}{2}\%$ (b) $13\frac{1}{7}\%$
(c) $14\frac{2}{7}\%$ (d) $87\frac{1}{2}\%$
43. Two houses are collinear with the base of a tower and are at distance 3 m and 12 m from the base of the tower. The angles of elevation from these two houses of the top of the tower are complementary. What is the height of the tower?
(a) 4m (b) 6m
(c) 7.5m (d) 36m
44. The average of 50 numbers is 38. If two numbers namely 45 and 55 are discarded, the average of the remaining numbers is :
(a) 36 (b) 35
(c) 32.5 (d) 37.5
45. The difference between a discount of 40% on ₹ 500 and two successive discounts of 36%, 4% on the same amount is
(a) ₹ 0 (b) ₹ 2
(c) ₹ 1.93 (d) ₹ 7.20
46. X and Y can do a piece of work in 30 days. They work together for 6 days and then X quits and Y finishes the work in 32 more days. In how many days can Y do the piece of work alone?
(a) 30 days (b) 32 days
(c) 34 days (d) 40 days

47. If $\left(x + \frac{1}{x}\right) = 4$, then the value of $x^4 - \frac{1}{x^4}$ is :

- (a) 124 (b) 64
(c) 194 (d) 81

DIRECTIONS (Qs. 48 - 50): Study the following table carefully in answer the questions that follow :

Number of Executives recruited by Six different organisations over the years

Organisation	P	Q	R	S	T	U
2004	458	512	418	502	476	492
2005	522	536	472	500	482	523
2006	480	495	464	508	488	518
2007	506	505	428	444	490	534
2008	427	485	422	512	510	498
2009	492	488	444	499	512	510

48. What is the total number of Executives recruited by all the organisations together in the year 2006?

- (a) 2927 (b) 3042
(c) 2864 (d) 2953

49. What is the ratio of the total number of Executives recruited by organisation U in the years 2007 and 2009 together to the total number of Executives recruited by organisation P in the same years?

- (a) 436 : 517 (b) 499 : 522
(c) 517 : 436 (d) 522 : 499

50. What is the average number of Executives recruited by organisation S over all the years together? (rounded off to the nearest integer)

- (a) 494 (b) 482
(c) 514 (d) 506

51. The H.C.F. and L.C.M. of two numbers are 8 and 48 respectively. If one of the numbers is 24, then the other number is

- (a) 48 (b) 36
(c) 24 (d) 16

52. The sum of the series

$(1 + 0.6 + 0.06 + 0.006 + 0.0006 + \dots)$ is

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

53. The average of the first 100 positive integers is

- (a) 100 (b) 51
(c) 50.5 (d) 49.5

54. If the ratio of cost price and selling price of an article be as 10 : 11, the percentage of profit is

- (a) 8 (b) 10
(c) 11 (d) 15

55. Krishna purchased a number of articles at ₹10 for each and the same number for ₹14 each. He mixed them together and sold them for ₹13 each. Then his gain or loss percent is

- (a) Loss $8\frac{1}{3}\%$ (b) Gain $8\frac{2}{3}\%$
(c) Loss $8\frac{2}{3}\%$ (d) Gain $8\frac{1}{3}\%$

56. Ram borrows a certain sum of money at 8% per annum simple interest and Rahim borrows ₹2,000 at 5% per annum simple interest. If the interest at the end of 3 years is equal, then the amount borrowed by Ram is

- (a) ₹1,250 (b) ₹1,500
(c) ₹2,000 (d) ₹1,000

57. Buses start from a bus terminal with a speed of 20 km/hr at intervals of 10 minutes. What is the speed of a man coming from the opposite direction towards the bus terminal if he meets the buses at intervals of 8 minutes?

- (a) 3 km/hr (b) 4 km/hr
(c) 5 km/hr (d) 7 km/hr

58. If 5 men or 7 women can earn ₹5,250 per day, how much would 7 men and 13 women earn per day?

- (a) ₹11,600 (b) ₹11,700
(c) ₹16,100 (d) ₹17,100

59. A drum of kerosene is $\frac{3}{4}$ full. When 30 litres of kerosene is

drawn from it, it remains $\frac{7}{12}$ full. The capacity of the drum is

- (a) 120 l (b) 135 l
(c) 150 l (d) 180 l

60. In a business partnership among A, B, C and D, the profit is shared as follows:

$$\frac{\text{A's share}}{\text{B's share}} = \frac{\text{B's share}}{\text{C's share}} = \frac{\text{C's share}}{\text{D's share}} = \frac{1}{3}$$

If the total profit is ₹4,00,000, the share of C is

- (a) ₹1,12,500 (b) ₹1,37,500
(c) ₹90,000 (d) ₹2,70,000

61. ABCD is a quadrilateral in which diagonal BD = 64 cm, $AL \perp BD$ and $CM \perp BD$, such that $AL = 13.2$ cm and $CM = 16.8$ cm. The area of the quadrilateral ABCD in square centimetres is

- (a) 537.6 (b) 960.0
(c) 422.4 (d) 690.0

62. Two tangents are drawn from a point P to a circle at A and B. O is the centre of the circle. If $\angle AOP = 60^\circ$, then $\angle APB$ is

- (a) 120° (b) 90°
(c) 60° (d) 30°

63. An equilateral triangle of side 6 cm has its corners cut off to form a regular hexagon. Area (in cm^2) of this regular hexagon will be

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

64. If $(a - b) = 3$, $(b - c) = 5$ and $(c - a) = 1$, then the value of

$$\frac{a^3 b^3 c^3 - 3abc}{a b c} \text{ is}$$

- (a) 17.5 (b) 20.5
(c) 10.5 (d) 15.5

65. If $x = 2 + \sqrt{3}$, $y = 2 - \sqrt{3}$, then the value of $\frac{x^2 + y^2}{x^3 + y^3}$ is

- (a) $\frac{7}{38}$ (b) $\frac{7}{40}$
(c) $\frac{7}{19}$ (d) $\frac{7}{26}$

66. Minimum value of $x^2 + \frac{1}{x^2 + 1} - 3$ is

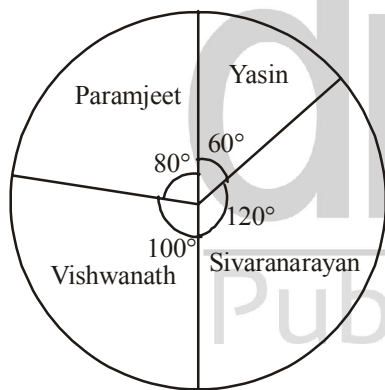
- (a) -3 (b) -2
(c) 0 (d) -1

67. If $\cos A + \cos^2 A = 1$, then $\sin^2 A + \sin^4 A$ is equal to

- (a) 1 (b) $\frac{1}{2}$
(c) 0 (d) -1

DIRECTIONS (Qs. 68-70) : The pie chart, given here, represents the number of valid votes obtained by four students who contested election for school leadership. The total number of valid votes polled was 720.

Observe the chart and answer the questions based on it.



68. What was the minimum number of votes obtained by any candidate?

- (a) 100 (b) 110
(c) 120 (d) 130

69. What was the winner....?

- (a) Sivaraman (b) Paramjeet
(c) Yasin (d) Vishwanath

70. By how many votes did the winner defeat his nearest rival ?

- (a) 40 (b) 45
(c) 48 (d) 50

GENERAL AWARENESS

71. The National Commission for Minorities was constituted in the year

- (a) 1990 (b) 1992
(c) 1980 (d) 1989

72. The first Indian who was chosen as the Secretary General of Commonwealth is

- (a) Rakesh Verma (b) Gopalaswami
(c) Krishna Murthy (d) Kamallesh Sharma

73. In which of the following systems of government is bi-cameralism an essential feature?

- (a) Federal system
(b) Unitary system
(c) parliamentary system
(d) Presidential system

74. Which king is referred to as Devanampiya Piyadassi (Beloved of the Gods) in the inscriptions?

- (a) Asoka (b) Harsha
(c) Bindusara (d) Chandragupta Maurya

75. Socialism succeeds in achieving

- (a) higher standard of living of the people
(b) equal distribution of income in the society
(c) higher individual welfare in the society
(d) maximum social welfare in the society

76. Monopolist resorts to price discrimination depending upon the

- (a) Elasticity of supply (b) Elasticity of demand
(c) Law of demand (d) Law of supply

77. Economic planning is an essential feature of

- (a) Socialist economy (b) Capitalist economy
(c) Mixed economy (d) Dual economy

78. The HYV programme in India is also called as

- (a) Traditional Agriculture
(b) New Agricultural Strategy
(c) White Revolution
(d) Blue Revolution

79. The National Policy for Empowerment of Women was adopted in the year

- (a) 2001 (b) 2005
(c) 1991 (d) 1995

80. Ballots were first used in

- (a) Australia (b) USA
(c) Ancient Greece (d) England

81. The Rashtriya Barh Ayog (RBA) is related with

- (a) Droughts and Floods
(b) Poverty Alleviation
(c) Floods
(d) Disaster Management

82. Railway coaches are manufactured at

- (a) Jamshedpur (b) Chittaranjan
(c) Perambur (d) Varanasi

83. Fertilization occurs normally in the

- (a) Cervix (b) Vagina
(c) Fallopian tube (d) Uterus

84. People consuming alcohol in heavy quantities generally die of

- (a) liver or stomach cancer
(b) weakening of heart muscles leading to cardiac arrest
(c) blood cancer
(d) Cirrhosis

85. The organisms at the base of the grazing food -chain are
(a) Carnivores (b) Decomposers
(c) Producers (d) Herbivores
86. Who among the following was credited with the destruction of 'Chihalgani', a group of powerful nobles?
(a) Balban (b) Qutb-ud-din- Aibak
(c) Iltutmish (d) Razia Sultan
87. Bombay was given away as dowry to the English King Charles II for marrying the Princess of
(a) France (b) Portugal
(c) Holland (d) Denmark
88. The Grand Trunk Road built by Shershah connected Punjab with
(a) Agra (b) East Bengal
(c) Lahore (d) Multan
89. Name the Maratha Saint who was a contemporary of Shivaji.
(a) Saint Eknath (b) Saint Tukaram
(c) Saint Dhyaneshwar (d) Namdev
90. The study of lake is called
(a) Topology (b) Hydrology
(c) Limnology (d) Potomology
91. A series of lines connecting places having a quake at the same time are called
(a) Homoseismal lines (b) Seismolines
(c) Coseismal lines (d) Isoseismal lines
92. 'Lumen' is the unit of
(a) Illuminance (b) Brightness
(c) Luminous flux (d) Luminous intensity
93. The transfer of data from a CPU to peripheral devices of computer is achieved through
(a) interfaces (b) buffer memory
(c) modems (d) computer ports
94. Which of the following items is not used in Local Area Networks (LANs)?
(a) Interface Card (b) Cable
(c) Computer (d) Modem
95. The mass of 10 moles of water is
(a) 90 g (b) 45 g
(c) 18 g (d) 180 g
96. Vitamin A is rich in
(a) Carrot (b) Lime
(c) Beans (d) Rice
97. The high boiling point of water compared to hydrogen sulphide or hydrogen chloride is due to
(a) Dipole insulation
(b) Van der Waal's attraction
(c) Polar covalent bonding
(d) Hydrogen bonding
98. Which of the following determines the chemical properties of an element?
(a) Number of electrons
(b) Number of neutrons
(c) Number of protons
(d) All of the above
99. The Central Drug Research Institute of India is located at
(a) Madras (b) Lucknow
(c) Delhi (d) Bangalore
100. Which of the following cereals was among the first to be used by man?
(a) Rye (b) Wheat
(c) Barley (d) Oat

HINTS & EXPLANATIONS

1. (a) A C E
+5 ↓ +5 ↓ +5 ↓
F H J

Similarly, O Q S
+5 ↓ +5 ↓ +5 ↓
T V X

2. (c) $18/3 - 1 = 5$
 $12/3 - 1 = 3$

3. (c)
4. (d) M S T U is odd word

5. (d)
6. (a)
7. (c) $3+3=6$
 $6+3=9$
 $9+6=15$
 $15+9=24$
 $24+15=39$
 $39+24=63$
 $63+39=102$

8. (b) Govind's age = 48 years
According to question
Prem's age = $48/2 = 24$ years
Prem's age seven years before = $24 - 7$
= 17 years.

9. (a)
man
Mother (-) mother is the
↓ (-)
Mother = Lady only daughter of my
↓ (-) lady
Man (+) mother.

10. (b)

From the diagram, it is clear that Shankar started his journey from North to South.

11. (c) $7 \times 28 + 3 - 52 = 127$
 $196 + 3 - 52$
 $199 - 52 = 127$ (Incorrect)

12. (a)

11
$11 + 5 + 4 \times 3$
$= 16 + 12 = 28$
5

22
$22 + 20 + 5 \times 3$
$= 42 + 15 = 57$
20

121
$121 + 25 + 6 \times 5$
$= 146 + 30 = 176$
25

13. (b) As, H O S P I T A L
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
3 2 5 7 4 6 1 8

Therefore,

P O S T A L
↓ ↓ ↓ ↓ ↓ ↓
7 2 5 6 1 8

14. (d) Any written piece is recognised as song when it is sung by a singer. Therefore, only Conclusion I follows.

15. (a)

16. (b) expect option (b), all others are opposite word.
17. (d)
18. (c) Revision is the word which cannot be formed from the letters of REJUVENATION as, S is not in it.
19. (c) If South East becomes North then South East becomes east.
20. (b)
21. (c)

22. (b)

0	3	8	15	24	35
$+3 \quad +5 \quad +7 \quad +9 \quad +11$					
$+2 \quad +2 \quad +2 \quad +2$					

The two consecutive letters are pairs of opposite letters.

$b \leftrightarrow y$; $c \leftrightarrow x$; $d \leftrightarrow w$
Therefore, ? = $w - 35$.

23. (c)

24. (b)

Chanda	← Spouse →	Bharat = Ashish
↓		↓
Mohan		Dhruv

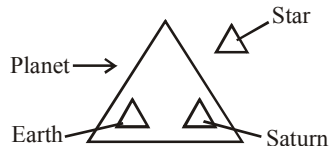
Hence, Mohan is cousin of Dhruv.

25. (d) Arranging digits according to question.
265, 178, 834, 357
Hence, third highest would be 265 and 8 be the sum of first and second digits of the number.

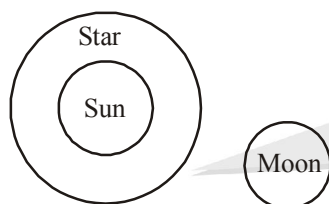
26. (c) $(36) - (14 + 12 + 7) = 3$

$(54) - (9 + 11 + 16) = \boxed{18}$

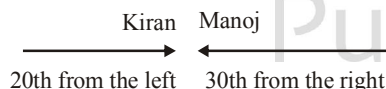
27. (c)



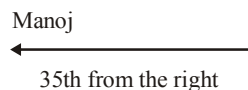
28. (d) Each black spot is rotate 45° in anti clockwise direction. So, option (d) is correct answer.
29. (a) Each element except in option (a) have exactly one line of symmetry.
30. (c) C and $D > E > A > B$ so, B is youngest.
31. (d) Sun is a star. Moon is a satellite.



32. (d) China currency is 'Yuan' like that Japan currency is 'Yen'.
33. (d) The day after tomorrow's day is sunday. Therefore, to day is Friday.
The day on tomorrow's day before yesterday = Friday - 1 = Thursday
34. (c) Meaningful order of the words in ascending order:
4. Road $\rightarrow$ 3. Roasted $\rightarrow$ 5. Roller $\rightarrow$ 1. Ropped $\rightarrow$ 2. Roaster
35. (c) Original Position:



Position after Interchange:



Total Number of Students = $35 + 20 - 1$
 $= 55 - 1 = 54$

36. (b) LCM of 6, 9, 12, 15 and 18

2	6, 9, 12, 15, 18
3	3, 9, 6, 15, 9
3	1, 3, 2, 5, 3
	1, 1, 2, 5, 1

LCM = $2 \times 3 \times 3 \times 2 \times 5 = 180$
Least number = $180 + 2 = 182$

37. (c) Share of $B + C = \frac{1872}{9-3} \times (5+8) = ₹ 4056$

38. (d) Equivalent % interest for compound rate of interest of 8% for 2 years

$$= 8 + 8 + \frac{8 \times 8}{100} = 16.64\%$$

So, interest = 16.64% of 3980 $\approx$ 662

39. (d) Total time required = $\frac{14}{5} \frac{14}{10}$

$$= \frac{28}{10} \frac{14}{10} = 4.2 \text{ hrs}$$

40. (d) 30 litres mixture contains 15 litres of water. When milk added to this, quantity of water will same in sance (i.e. 15l).

Let x of pure milk to be added, then 30% of $(30 + x) = 15$
solve, $x = 20$

41. (c) There are $5 + 7 = 12$ balls in the bag and out of these two balls can be drawn in $^{12}C_2$ ways. There are 5 green balls, therefore, one green ball can be drawn in 5C_1 ways; similarly, one red ball can be drawn in 7C_1 ways so that the number of ways in which we can draw one green ball and the other red is $^5C_1 \times ^7C_1$. Hence, P (one green and the other red)

$$= \frac{^5C_1 \times ^7C_1}{^{12}C_2} = \frac{5}{1} \times \frac{7}{1} \times \frac{1 \times 2}{12 \times 11} = \frac{35}{66}$$

42. (c) Let the cost price = ₹ x

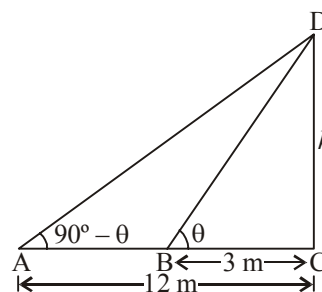
Profit = ₹ x

Cost price of 8 dozen pencil = ₹ $7x$

Gain per cent = $\frac{x}{7x} \times 100$

$$= \frac{100}{7} = 14\frac{2}{7}\%$$

43. (b) Let the height of the tower be h m and $\angle CBD = \theta$ then $\angle DAC = 90^\circ - \theta$ (Because both angles are complementary)



$\therefore$ In $\triangle BCD$,

$$\tan \theta = \frac{CD}{BC} \Rightarrow \tan \theta = \frac{h}{3}$$

Now, in $\triangle ACD$

$$\tan (90^\circ - \theta) = \frac{CD}{AC} \Rightarrow \cot \theta = \frac{h}{12}$$

$$\frac{1}{\tan \theta} = \frac{h}{12}$$

$$h \tan \theta = 12$$

Put the value of $\tan \theta$

$$h \times \frac{h}{3} = 12$$

$$h^2 = 36 \therefore h = 6$$

Then, height of tower = 6 m.

$$44. (d) \text{ New average} = \frac{38 \times 50 - 45 - 55}{48}$$

$$= \frac{1800}{48} = 37.5$$

$$45. (d) \text{ Single equivalent discount for 36\% and 4\%}$$

$$= \left(36 + 4 - \frac{36 \times 4}{100} \right)$$

$$= (40 - 1.44)\% = 38.56\%$$

$$\therefore \text{Required difference} = 1.44\% \text{ of } 500$$

$$= \frac{500 \times 1.44}{100} = ₹7.20$$

$$46. (d) (x+y) \text{ 's 6 days' work} = \left(\frac{1}{30} \times 6 \right) = \frac{1}{5}$$

$$\text{Remaining work} = \left(1 - \frac{1}{5} \right) = \frac{4}{5}$$

$$\text{Now, } \frac{4}{5} \text{ work is done by } y \text{ in 32 days.}$$

$$\text{Whole work will be done by } y \text{ in } \left(32 \times \frac{5}{4} \right) = 40 \text{ days.}$$

$$47. (c) \left(x - \frac{1}{x} \right) = 4$$

On squaring both sides

$$x^2 - \frac{1}{x^2} = 16$$

$$\Rightarrow x^2 + \frac{1}{x^2} = 14$$

On squaring again

$$x^4 - \frac{1}{x^4} = 196$$

$$\Rightarrow x^4 + \frac{1}{x^4} = 194$$

$$48. (d) \text{ Total executives recruited were 2953.}$$

$$49. (d) \text{ Required ratio equals } 1044 : 998$$

$$= 522 : 499$$

$$50. (a) \text{ Required average number of executives}$$

$$= \frac{\text{sum of no. of all executives}}{6}$$

$$= \frac{2965}{6} \approx 494$$

$$51. (d) p \times q = \text{HCF} \times \text{LCM}$$

$$\therefore \text{Second number} = \frac{8 \times 48}{24} = 16$$

$$52. (a) 1 + 0.6 + 0.06 + 0.006 + 0.0006 + \dots$$

$$= 1.666\dots$$

$$= 1.\bar{6} = 1\frac{6}{9} = 1\frac{2}{3}$$

$$53. (c) 1 + 2 + 3 + \dots + n = \frac{n(n+1)}{2}$$

$\therefore$ Average of these numbers

$$\therefore \text{Average} = \frac{n+1}{2}$$

$$= \frac{100+1}{2} = 50.5$$

$$54. (b) \text{ Gain} = 11x - 10x = ₹x$$

$$\therefore p\% = \frac{p \times 100}{p} \times 100 = \frac{x}{10x} \times 100 = 10$$

$$55. (d) \text{ Average cost of} = \frac{10 \times 14}{2} = 12$$

$$QP = 13$$

$$P\% = \frac{13-12}{12} \times 100 = 8\frac{1}{3}$$

$$56. (a) \text{ Let Ram borrowed ₹ } P$$

$$\frac{P \times 8 \times 3}{100} = \frac{2000 \times 5 \times 3}{100}$$

$$P \times \frac{2000 \times 5}{8} = ₹1,250$$

$$57. (c) \text{ Distance covered in 10 minutes at 20 kmph} = \text{distance covered in 8 minutes at } (20+x) \text{ kmph}$$

$$\Rightarrow 20 \times \frac{10}{60} = \frac{8}{60} (20+x)$$

$$\Rightarrow 200 = 160 + 8x$$

$$\Rightarrow 8x = 40$$

$$\Rightarrow x = \frac{40}{8} = 5 \text{ kmph}$$

$$58. (d) 5 \text{ men} \equiv 7 \text{ women}$$

$$\therefore 7 \text{ men} \equiv \frac{7}{5} \times 7 = \frac{49}{5} \text{ women}$$

$$\therefore 7 \text{ men} + 13 \text{ women} = \frac{49}{5} + 13 = \frac{114}{5} \text{ women}$$

Now,

$$\therefore 7 \text{ women} \equiv ₹5250$$

$$\therefore \frac{114}{5} \text{ women}$$

$$\equiv \frac{5250}{7} \times \frac{114}{5} = ₹17100$$

59. (d) Let the capacity of the drum be x litres.

$$\therefore \frac{3x}{4} - 30 = \frac{7x}{12}$$

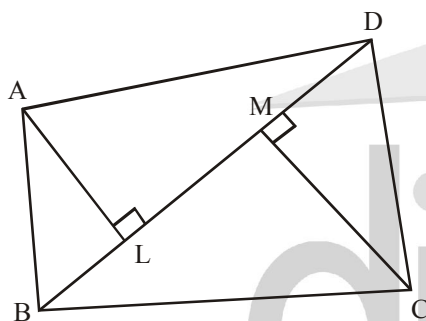
$$\Rightarrow \frac{3x}{4} - \frac{7x}{12} = 30$$

$$\Rightarrow \frac{9x - 7x}{12} = 30$$

$$\Rightarrow \frac{x}{6} = 30 = x = 6 \times 30 = 180 \text{ litres}$$

60. (c) $A : B = 1 : 3$
 $B : C = 1 : 3 = 3 : 9$
 $C : D = 1 : 3 = 9 : 27$
 $\therefore A : B : C : D = 1 : 3 : 9 : 27$
 Sum of ratios $= 1 + 3 + 9 + 27 = 40$
 $\therefore$ C's share of profit
 $= \frac{9}{40} \times 400000 = ₹ 90000$

61. (b)



Given :

$BD = 64 \text{ cm}$

$AL = 13.2 \text{ cm}$

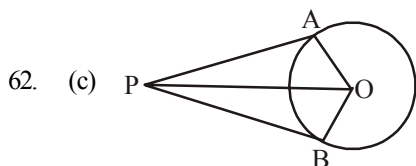
$CM = 16.8 \text{ cm}$

So, $\text{Area}(ABCD) = \text{Area}(\triangle ABD) + \text{Area}(\triangle BCD)$

$$= \frac{1}{2} \times AL \times BD + \frac{1}{2} \times CM \times BD$$

$$= \frac{1}{2} \times BD \times (AL + CM) = \frac{64}{2} (13.2 + 16.8)$$

$$= 32 \times 30 = 960 \text{ cm}^2$$



62. (c)

In right $\triangle$ s OAP and OPB,

$AP = PB$, $OA = OB$

$OP = OP$

$\therefore \triangle OAP \cong \triangle OBP$

$\therefore \angle AOP = \angle POB$ and $\angle APO$

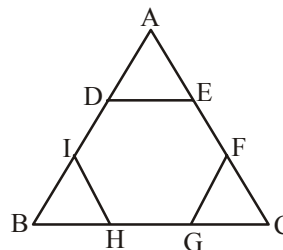
$= \angle OPB$

From $\triangle AOP$,

$\angle APO = 180^\circ - 90^\circ - 60^\circ = 30^\circ$

$\therefore \angle APB = 2 \times 30^\circ = 60^\circ$

63. (c)



Side of the regular hexagon

$$= \frac{1}{3} \times 6 = 2 \text{ cm}$$

$$\therefore \text{Area of the hexagon} = \frac{3\sqrt{3}}{2} a^2$$

$$= \frac{3\sqrt{3}}{2} \times 2 \times 2 = 6\sqrt{3} \text{ sq. cm.}$$

64. (a) $a^3 + b^3 + c^3 - 3abc$
 $= (a + b + c) \left[\frac{1}{2} (a + b + c) [(a - b)^2 + (b - c)^2 + (c - a)^2] \right]$
 $\therefore \frac{a^3 + b^3 + c^3 - 3abc}{a + b + c}$

$$= \frac{1}{2} [(a - b)^2 + (b - c)^2 + (c - a)^2]$$

$$= \frac{1}{2} (9 + 25 + 1) = \frac{35}{2} = 17.5$$

65. (d) $x = 2 + \sqrt{3}$, $y = 2 - \sqrt{3}$
 $x + y = 4$; $xy = 4 - 3 = 1$
 $\therefore \frac{x^2 + y^2}{x^3 + y^3} = \frac{(x + y)^2 - 2xy}{(x + y)^3 - 3xy(x + y)}$
 $= \frac{16 - 2}{64 - 3 \times 4} = \frac{14}{52} = \frac{7}{26}$

66. (b) $x^2 + \frac{1}{x^2} - 3$
 is minimum when $x = 0$

$$0 + \frac{1}{0+1} - 3 = -2$$

67. (a) $\cos A = 1 - \cos^2 A = \sin^2 A$
 $\therefore \sin^2 A + \sin^4 A = \sin^2 A + \cos^2 A = 1$

68. (c) Yasin got the minimum votes.
 $\therefore 360^\circ \equiv 720$

$$\therefore 60^\circ \equiv \frac{720}{360} \times 60 = 120$$

69. (a) Sivaraman got the maximum votes. i.e.

$$\frac{720}{360} \times 120 = 240 \text{ votes}$$

He was the winner.

70. (a) Angles of the difference of votes of the winner and the nearest rival = $120 - 100 = 20^\circ$
 $\therefore 360^\circ \equiv 720$
 $\therefore 20^\circ \equiv \frac{720}{360} \times 20 = 40$
71. (b) 72. (d) 73. (a) 74. (a) 75. (b)
 76. (b) 77. (a) 78. (b) 79. (a) 80. (a)
 81. (c) 82. (c) 83. (c) 84. (d)
85. (c) The food webs we see are grazing food chains since at their base are producers which the herbivores then graze on.
86. (a) Chihalgani was the group of most important and powerful forty nobles or highly placed officers in the court of Iltutmish. Balban destroyed their clout.
87. (b) In 1661, Catherine of Braganza of Portugal brought islands of Bomba Vy to Charles II of England as part of her marriage dowry.
88. (a) The road was initially built by Sher Shah to connect Agra, his capital, with Sasaram, his hometown.
89. (b) Shivaji, the great Maratha King and founder of a nationalist tradition was contemporary of Tukaram. Tukaram introduced Shivaji to Ramdas for his spritual educataion.
90. (c) Limnology is the story of lakes and other freshwater basins.
91. (a) Homoseismal lines is the line on the Earth's surface connecting points where the seismic wave arrives, generated by an earthquake, at the same time.
92. (c) The lumen is the SI derived unit of luminous flux, a measure of the total "amount" of visible light emitted by a source.
93. (a) In computing, an interface is a shared boundary across which two separate components of a computer system exchange information. The exchange can be between software, computer hardware, peripheral devices, humans and combinations of these.
94. (c) Interface Card, Ethernet Cable and Routers are used in setting up a LAN. The router can be plugged directly into the modem via an Ethernet cable, and all other computers are eventually connected in some fashion to the route. In terms of LAN, a computer cannot be said to be an item which constitutes this network.
95. (c) A single mole is set to the number of particles found in 12.000 grams of carbon-12. A mole of water has 6.022×10^{23} water molecules. One mole of water weighs 18.0152 grams.
96. (a) Carrot is rich in Vitamin A and it improves eyesight.
97. (d) The reason for this is the hydrogen bonding between neighboring water molecules. Because hydrogen bonding is a relatively strong intermolecular force, high heat energy is required to break up the force.
98. (a) Valence electrons are important in determining how an elements reacts chemically with other elements. Since the valence electrons are the electrons in the highest energy level, they are the most exposed of all the electrons, so they are the electrons that get most involved in chemical reactions.
99. (b) CDRI, is located at Lucknow was inugurated in 1951 by the then Prime Minister of India, Jawahar lal Nehru.
100. (b) Wheat was the first cereal to be cultivated by man. In several places in the Middle East it was sowed, tended and reaped soon after 8000 BC. The people of Jericho are the first known to have lived mainly from the cultivation of crops.