

STAFF SELECTION COMMISSION

COMBINED GRADUATE LEVEL (TIER - I) MOCK TEST

No. of Questions: 100

Maximum Marks: 200

Time: 60 Mts.

GENERAL INTELLIGENCE & REASONING

Directions (Q. 1 – 4): In each of the following questions, select the related letter/ word/ number from the given alternatives.

1. TRIPPLE : SQHOOKD :: DISPOSE : ?
1) CHRONRD 2) DSOESPI 3) ESJTPTF 4) ESOPSID
2. 123 : 132 :: 235 : ?
1) 232 2) 352 3) 260 4) 252
3. Sound : Muffled :: ? : ?
1) Moisture : Humid 2) Colour : Faded
3) Despair : Anger 4) Odour : Pungent
4. 2197 : 13 :: 19683 : ?
1) 57 2) 27 3) 47 4) 37

Directions (Q. 5 – 7): Find the odd word/ letter/ number from the given alternatives.

5. 1) Bus stand 2) Platform 3) Dock 4) Park
6. 1) ASIBU 2) OARSE 3) OINAK 4) ZAMOL
7. 1) LAZO 2) HCXS 3) GHSR 4) FEVU
8. Some statements are given here which are followed by two conclusions. You have to consider the two 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.

Statements: All the actors are girls.

All the girls are beautiful.

Conclusions: I. All the actors are beautiful.

II. Some girls are actors.

- 1) Only conclusion I follows 2) Only conclusion II follows
- 3) Either I or II follows 4) Both I and II follow
9. P runs faster than T but not as fast as Q. Q runs faster than R but not as fast as S. Who runs fastest among them?
1) P 2) Q 3) R 4) S
10. From the given alternatives, select the word which can be formed using the letters of the given word.
RHINOCEROS
1) SOCCER 2) RHYME 3) SHINE 4) SOUND

11. If '+' means '-', 'x' means '+', '÷' means '+' and '-' means 'x', then which of the following will be the value of the expression

$$252 \times 9 - 5 + 32 \div 92 = ?$$

- 1) 95 2) 168 3) 192 4) 200
12. Two cars started from the opposite direction of a 150 kms main road. First car runs for 25 km, takes a right turn and then runs 15 km. It then turns left and runs for another 25 km. Again it moves back towards the main road. In the mean time, due to minor break down the other car has run only 35 km along the main road. What would be the distance between two cars at this point?
- 1) 65 km 2) 75 km 3) 80 km 4) 85 km
13. Which of the following diagrams indicates the best relation between Judge, Thieves and Criminals?



14. A \$ B means A is the father of B.
A # B means A is the sister of B.
A ★ B means A is the daughter of B and
A @ B means A is the brother of B.

Which of the following indicates that M is the wife of Q?

- 1) Q \$ R # T @ M
2) Q \$ R @ T # M
3) Q \$ R ★ T # M
4) Q \$ R @ T ★ M

Directions (Q. 15 – 16): In the following questions, a series is given with one terms missing. Choose the correct alternative from the given ones that will complete the series:

15. 55296, ?, 288, 36, 9
1) 3456 2) 3436 3) 4638 4) 3638
16. J2Z, K4X, I7V, ?, H16R, M22P
1) I11T 2) L11S 3) L12T 4) L11T

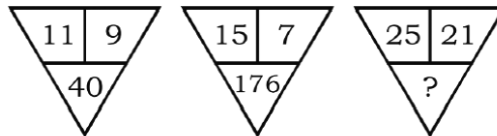
Directions (Q. 17 – 18): All the six faces of a cube are colour with six different colours -Black, Brown, Green, Red, White and Blue.

1. Red face is opposite to the black face.
 2. Green face is between red and black faces.
 3. Blue face is adjacent to white face.
 4. Brown face is adjacent to blue face.
 5. Red face is at the bottom.
17. The face opposite to brown is
- 1) Blue 2) White 3) Green 4) Red

18. Which of the following is adjacent to green?

- 1) Black, White, Brown, Red
- 2) Blue, Black, Red, White
- 3) Red, Black, Blue, White
- 4) None of these

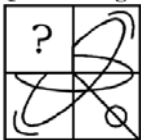
19. In the following question, select the missing number from the given responses.



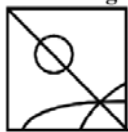
- 1) 184
- 2) 210
- 3) 241
- 4) 425

20. Identify the figure that will complete the pattern.

Question figure:



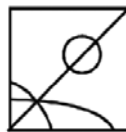
Answer figures:



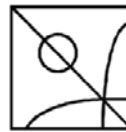
1)



2)



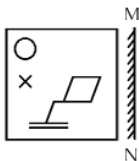
3)



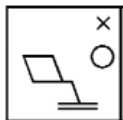
4)

21. If a mirror is placed on the line MN, then which of the answer figures is the right image of the given figure?

Question figure:



Answer figures:



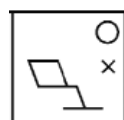
1)



2)



3)

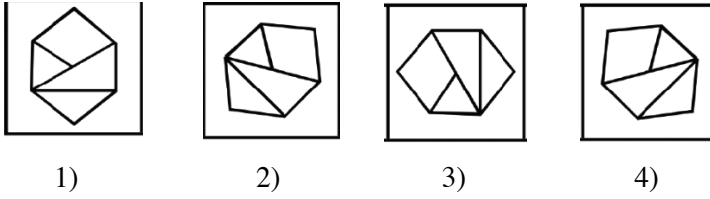


4)

22. A waiter's weekly income consists of his salary and tips. During one of the weeks, his tips were $\frac{5}{4}$ part of his salary. What fraction of his income came from tips?

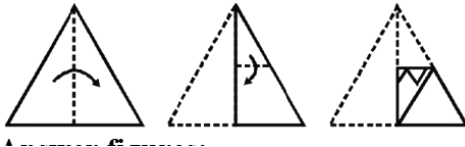
- 1) $\frac{4}{9}$
- 2) $\frac{5}{4}$
- 3) $\frac{5}{8}$
- 4) $\frac{5}{9}$

23. Choose the figure which is different from the others.

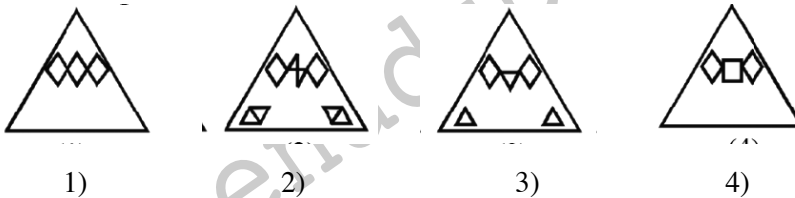


24. A triangular sheet of paper is folded and cut as shown below in question figures. Choose among the following four answer figures, how it will appear when open?

Question figure:



Answer figures:



25. A word is represented by only one set of numbers as given in any one of the alternatives. The sets of numbers given in the alternatives are represented by two classes of letters as in two matrices given below. The columns and rows of Matrix-I are numbered from 0 to 4 and that of Matrix-II are numbered from 5 to 9. A letter from these matrices can be represented first by its row and next by its column. E.g., 'M' can be represented by 01, 10 etc., and 'A' can be represented by 56, 65 etc. Similarly, you have to identify the set for the word 'SONY'.

Matrix - I

	0	1	2	3	4
0	I	M	Y	S	Q
1	M	Y	S	Q	I
2	Y	S	Q	I	M
3	S	Q	I	M	Y
4	Q	I	M	Y	S

Matrix - II

	5	6	7	8	9
5	O	A	D	R	N
6	A	D	R	N	O
7	D	R	N	O	A
8	R	N	O	A	D
9	N	O	A	D	R

1) 21, 69, 58, 11

2) 44, 77, 86, 20

3) 12, 87, 95, 34

4) 30, 96, 59, 32

GENERAL AWARENESS

26. Who among the following is the Minister of Human Resource Development in the present Union Cabinet?

1) Prakash Javadekar

2) Smriti Irani

3) Manohar Parrikar

4) Venkaiah Naidu

27. Who among the following defeated Muhammad Ghori near Mount Abu?

1) Bhimdev Solanki-II

2) Vijaya Dev

3) Bhimdev Solanki-I

4) Bhimdev Solanki-III

28. The ambassador of Emperor James-I, who reached in the court of Jahangir in 1615 was....
1) Sir James Hay
2) Sir Thomas Roe
3) Sir Thomas Howard
4) Sir John Digby
29. Which of the following commission was formed in 1983 to recommend the relationship and balance of power between Central and State government?
1) Kalelkar Commission
2) Sarkaria Commission
3) Narendran Commission
4) Mandal Commission
30. Which of the following is the busiest navigable river of the river?
1) Volga
2) Seine
3) Rhine
4) Danube
31. The Indian economy can be most appropriately described as a:
1) Capitalist economy
2) Socialist economy
3) Traditional economy
4) Mixed economy
32. Dinosaurs were
1) Mammals that became extinct
2) Large herbivorous creatures which gave rise to hippopotamus species
3) Egg-laying mammals
4) Reptiles that became extinct
33. Who was the founder of Nanda dynasty?
1) Mahapadmananda
2) Shishunaga
3) Dhanananda
4) Nandivardhan
34. The chemical used to remove rust stains from cloth?
1) Kerosene oil
2) Quick lime
3) Petrol
4) Oxalic acid
35. First Prime Minister of India born after Independence?
1) Manmohan Singh
2) Chandra Shekhar
3) Rajiv Gandhi
4) Narendra Damodar Das Modi
36. Which of the following acid is used in battery?
1) Hydrochloric acid
2) Hydrofluoric acid
3) Sulphuric acid
4) Sulphurous acid
37. Sexually transmitted disease caused by treponema pallidum is
1) Syphilis
2) Genital Herpes
3) Gonorrhoea
4) AIDS
38. The India's longest river bridge - the Dhola-Sadiya - is constructed over which of the following rivers?
1) Ganga
2) Barak
3) Brahmaputra
4) Manas
39. On which date, the World Milk Day is observed?
1) 1st June
2) 4th July
3) 25th October
4) 26th November

40. Who among the following edited and published the newspaper Indian Mirror in 1861?
- 1) Amitava Ghosh
 - 2) Ravindranath Tagore
 - 3) Sumit Ganguly
 - 4) Devendranath Tagore and Manmohan Ghosh
41. Rohan Bopanna is associated with which of the following games?
- 1) Badminton
 - 2) Snooker
 - 3) Table tennis
 - 4) Tennis
42. Which of the following is correct about cold blooded animals?
- 1) Their blood remains cold all the time
 - 2) Their body temperature changes in accordance with the atmosphere
 - 3) Their body temperature remains constant all the time
 - 4) They kill all the animals
43. Which country has recently declared a 3-month state of emergency in the aftermath of coup attempt?
- 1) Tunisia
 - 2) Turkey
 - 3) Libya
 - 4) Iraq
44. The state financial corporation has given assistance mainly to develop:
- 1) Medium and small-scale industries
 - 2) Cottage industry
 - 3) Agricultural farms
 - 4) Large industries
45. The hair of shaving brush cling together when removed from water is due to
- 1) Surface tension
 - 2) Viscosity
 - 3) Elasticity
 - 4) Friction
46. Which of the following is not considered as a government debt?
- 1) Provident fund
 - 2) Life insurance policies
 - 3) National saving certificate
 - 4) Long-term government bonds
47. Cell placed in hypotonic solution is
- 1) Turgid
 - 2) Flaccid
 - 3) Shrink
 - 4) None of the above
48. Michelle Kakade, who has become the first person to compete the "Indian golden Quadri lateral on foot" belongs to which city of India?
- 1) Pune
 - 2) Kochi
 - 3) Delhi
 - 4) Bengaluru
49. Radar is an object detection system, that uses radio waves to
- 1) Locate geostationary satellites
 - 2) Determine the range, altitude, direction or speed of object
 - 3) Locate submerged submarines
 - 4) All of these

50. "Oil of Mirbane" is also known as
1) Nitrobenzene 2) Aniline 3) Phenol 4) Toluene

QUANTITATIVE APTITUDE

51. The price of AR magazine is Rs.90. There is a 30% discount on becoming a customer of 45 magazines. While an another discount of 25% is also given to the customer of 26 magazines. Find the difference of the price of a magazine for a customer of 45 magazines and a customer of 26 magazines.
1) 4.30 2) 4.50 3) 3.50 4) 5.50
52. Two trains starts from place A and B, 450 km apart towards each other. Both trains start simultaneously. A crow sitting on one train start flying at the same time towards the other train and as soon as it reaches the second train, it flies back to the first train and it continues in this manner flying backward and forwards from one train to the other until the train meet. Both train travel at a speed of 45 km/h and the crow flies at 100 km/h total distance covered by the crow will be ...
1) 450 km 2) 500 km 3) 400 km 4) 360 km
53. If the compound interest on a sum for 2 years at $12\frac{1}{2}\%$ per annum is Rs.510, the simple interest on the same sum at the same rate for the same period of time is
1) Rs.460 2) Rs.400 3) Rs.480 4) Rs.450
54. A, B and C started a piece of work together. 5 days later C left the work and B left the work after working 8 days. In how many more days A would complete the rest of the work if they take 20, 60 and 30 days individually to finish the work?
1) 4 days 2) 5 days 3) 6 days 4) 8 days
55. If $n + \frac{2}{3}n + \frac{1}{2}n + \frac{1}{7}n = 97$, then the value of 'n' will be
1) 40 2) 46 3) 44 4) 42
56. If $x = 7$ then the value of $x^5 - 8x^4 + 8x^3 - 9x^2 + 7x + 5$ is
1) 44 2) 40 3) 144 4) - 44
57. The length of the two sides forming the right angle of a right angled triangle are 6 cm and 8 cm, then find the length of its circum-radius
1) 5 cm 2) 7 cm 3) 6 cm 4) 10 cm
58. If $\frac{3}{x} + \frac{x}{3} = 1$, then what will be the value of x^3 .
1) 27 2) $3x$ 3) -27 4) 3
59. There are two temples, one on each bank of a river, just opposite to each other. One temple is 54 m high. From the top of this temple, the angles of depression of the top and the foot of the other temple are 30° and 60° respectively. The length of the temple is
1) 18 m 2) 36 m 3) $36\sqrt{3}$ m 4) $18\sqrt{3}$ m
60. A wire bent in the form of a circle of radius 2 cm is cut and bent in the form of a square, then the ratio of the area of the circle to the area of the square is equal to
1) $4 : \sqrt[4]{12}$ 2) $\sqrt[4]{12} : 4$ 3) $2 : \sqrt[4]{12}$ 4) $\sqrt[4]{12} : 2$

70. Two circles of radii 4 cm and 9 cm respectively touch each other externally at a point and a common tangent touches them at the points P and Q respectively. Then the area of square with one side PQ, is
 1) 97 cm^2 2) 194 cm^2 3) 72 cm^2 4) 144 cm^2
71. Find the value of $3 \cos 80^\circ \operatorname{cosec} 10^\circ + 2 \cos 59^\circ \operatorname{cosec} 31^\circ$.
 1) 1 2) 3 3) 2 4) 5
72. The radii of two concentric circles are 9 cm and 15 cm. If the chord of the larger circle is a tangent to the smaller circle, then the length of the chord is
 1) 24 cm 2) 12 cm 3) 30 cm 4) 18 cm

Directions (Q. 73 – 75): Number of toys of five types (A to E) manufactured over the years (in thousands) is given below. Study the table and answer the following questions.

Type	A	B	C	D	E
Year					
2002	200	150	78	90	65
2003	150	80	100	105	70
2004	180	175	92	110	85
2005	195	160	120	125	75
2006	220	185	130	135	80

73. The approximate percentage increase in production of D type of toys from 2003 to 2005 was
 1) 5% 2) 19% 3) 29% 4) 25%
74. The percentage drop in production of A type of toys from 2002 to 2004 was
 1) 10% 2) 20% 3) 25% 4) 30%
75. The approximate percentage increase of the production of all types of toys from 2005 to 2006 was
 1) 9% 2) 10% 3) 11% 4) 12%

ENGLISH LANGUAGE

Directions (Q. 76 – 78): Some part of the sentences have errors and some are correct. Find out which part of a sentence has an error. If a sentence is free from error, your answer is (4).

76. 'Quit India' came not from the lips (1)/ although (2)/ the aching hurt of millions. (3)/ No error (4).
77. Decisions may be deferred (1)/ at rather through initiative (2)/ or through inertia. (3)/ No error (4).
78. The murder mystery of Sheena Bora (1)/ is so complicated that (2)/ it could not be solved immediately. (3)/ No error (4).

Directions (Q. 79 – 81): Sentences given with blanks to be filled in with an appropriate word(s). Four alternatives are suggested for each question. Choose the correct alternative out of the four and indicate it.

79. Ever since Ronaldo got out of Man United, his mother has all his little son's needs.
 1) seen to 2) seen off 3) seen by 4) seen through
80. The train before we reached to our allotted seats.
 1) left 2) had left 3) was leaving 4) would have left
81. To have a judicious decision you should always be in your dealings.
 1) discourteous 2) unfair 3) respectful 4) impartial

Directions (Q. 82 – 83): Out of the four alternatives, choose the one which best expresses the meaning of the given word.

82. What is happening now in Kashmir valley is a blatant injustice to the efforts of the makers of the constitution.

- 1) conceited 2) contorted 3) openly hostile 4) too obvious

83. Decay is an immutable factor of human life.

- 1) important 2) unchangeable 3) unique 4) awful

Directions (Q. 84 – 85): Choose the word opposite in meaning to the word given in bold.

84. Mexican forces **vanquished** the French army in a battle in Puebla.

- 1) Surrendered 2) Debased 3) Destroyed 4) Ruined

85. Lalu Prasad Yadav's statements now-a-days is supposed to be a **comic** monologue by other politicians.

- 1) Painful 2) Fearful 3) Tragic 4) Emotional

86. Four words are given, out of which only one word is spelt correctly/ wrongly out of them. Find the word spelt correct/ wrong.

- 1) Inconvenient 2) Necesiated 3) Maintenance 4) Inventiveness

Directions (Q. 87 – 89): Four alternative are given for the Idiom/ Phrase bold in below sentences. Choose the alternative which best expresses the meaning of the Idiom/ Phrase and mark it in the Answer Sheet.

87. The failure of crops in successive years put the farmers **in a tight corner**.

- 1) in a closed room 2) dejected
3) in a difficult situation 4) become insolvent

88. **To snap one's fingers**

- 1) To speak abruptly 2) To accept immediately
3) To grasp eagerly 4) To become contemptuous of

89. **To get cold feet**

- 1) To run for life 2) To be afraid
3) To fall sick 4) To become discourteous

Directions (Q. 90 – 92): A sentence/ a part of the sentence is italicised in bold. Below are given alternatives to the italicised part at (1), (2), (3) which may improve the sentence. Choose the correct alternative. In case no improvement is needed your answer is (4).

90. Hardly ***I had fallen*** asleep, when I heard about the news of emergency in the aftermath of coup attempt in Turkey.

- 1) I was fallen 2) I fell asleep
3) had I fallen 4) No improvement

91. None of those militant groups ***have reported*** accurately on the prevailing situation in Kashmir valley.

- 1) has reported 2) have been reported
3) were reporting 4) No improvement

92. ***Being worked for*** the whole day he should have taken some rest and started the worked tomorrow.

- 1) after having work 2) having worked for
3) after being worked for 4) No improvement

Directions (Q. 93 – 95): In the following questions, out of the four alternatives, choose the one which can be substituted for the given sentence.

93. A lover of rain who finds joy and peace of mind during rainy days.

- 1) Paedophile 2) Pluviophile 3) Enophile 4) Anglophile

94. The main character in a drama or other literary work.

- 1) protagonist 2) actor 3) propagandist 4) hero

95. The sound of the funeral bell

- 1) Knell 2) Spell 3) Dong 4) Ding – Dong

Directions (Q. 96 – 100): Read the passage carefully and choose the best answer to each question out of the four alternatives.

One day Emperor Sultan was taking a walk in the Royal Garden, when he accidentally stumbled upon a small rock. He was in a very bad mood that day. He summoned the gardener and sentenced him to death for not having removed the stone. The poor gardener was distraught at receiving such a harsh sentence. He pleaded with the Emperor, but Sultan was adamant. So the gardener ran to Badelal in despair and begged him to find a way to save his life. The gardener told Badelal the entire story. Badelal wondered how he could help the poor gardener. He pondered for a while and finally thought of a way. He told the gardener not to worry and then whispered some instructions in his ear. The next day, the Emperor Sultan was walking in his royal garden. The gardener came up to the Emperor and spat at his feet! The Emperor was shocked at him. He was furious to see the same gardener commit such an act of disrespect. Just then Badelal walked up to the Emperor. Sultan was even more surprised to discover that Badelal had instructed the gardener to spit on his feet. Seeing that the Emperor was furious, Badelal then explained to him as to why the gardener had done such a deed. He told the emperor that the gardener was one of the most loyal subjects who served the king. And it would have been shame on the Emperor's part for sentencing a man to death for such a petty reason as forgetting to remove a small rock. And therefore, Badelal had asked the gardener to spit at Sultan's feet. That was a vile offence and would give Emperor Sultan a genuine reason to sentence him to death. The Emperor was stunned by the whole incident and he instantly realised his mistake and forgave the gardener.

96. As mentioned in the story, Emperor Sultan sentenced the gardener to death because

- 1) the gardener was not watering the plants in the garden.
2) he thought that the gardener had failed to report to duty that day.
3) he wanted to punish him for misbehaving with Badelal a few days back.
4) None of the given options

97. Which of the following can be a suitable title to the story?

- 1) Emperor Sultan and his favourite gardener
2) Badelal and his friendship with the gardener
3) The Mischievous Gardener
4) Badelal and his Intelligence

98. As mentioned in the story, Emperor Sultan was in a bad mood before stumbling upon the rock because

- 1) he had a bad dream
2) he was not feeling well
3) he had fought with Badelal
4) Not clearly mentioned in the passage

9. $Q > P > T$ and $S > Q > R$

From the above two relations, it is clear that S runs fastest among all.

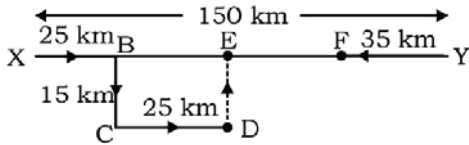
10. The word 'SHINE' can be formed.

11. Putting the proper signs in the given expression, We get: $252 \div 9 \times 5 - 32 + 92$

$$= 28 \times 5 - 32 + 92 = 140 - 32 + 92$$

$$= 232 - 32 = 200$$

12.

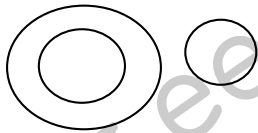


Required distance = EF

$$= 150 - (25 + 25 + 35)$$

$$= 150 - 85 = 65 \text{ kms}$$

13. All the thieves are criminals while judge is different from these.



14. $Q \$ R \rightarrow$ Q is the father of R

$R @ T \rightarrow$ R is the brother of T

Hence, Q is the father of T

$T \star M \rightarrow$ T is the daughter of M

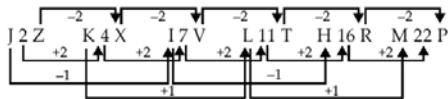
Hence, M is the mother of T

Hence, M is the wife of Q.

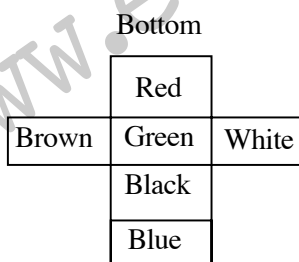
15.



16.



(17 - 18):



17. White is opposite to brown.

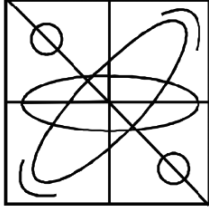
18. (Black, White, Brown and Red) are adjacent to green.

19. $(11 + 9) \times (11 - 9) = 40$

$(15 + 7) \times (15 - 7) = 176$

$(25 + 21) \times (25 - 21) = 184$

20.



21.



22. Let salary = Rs. x . Then tips = Rs. $\left(\frac{5}{4}x\right)$

Total income = Rs. $\left(x + \frac{5}{4}x\right) = \text{Rs.} \left(\frac{9x}{4}\right)$

\therefore Required fraction = $\left(\frac{5x}{4}, \frac{4}{9x}\right) = \frac{5}{9}$

23. Except the figure in option (4), all other figures can be rotated into each other.

51. Per copy cost price for the customer of 45 magazines = $\frac{7}{10} \times 90 = \text{Rs.}63$

Per copy cost price for the buyer of 26 magazines = $\frac{3}{4} \times 90 = \text{Rs.}67.50$

\therefore Required diff. = $67.50 - 63 = \text{Rs.}4.50$

52. Relative speed of both trains = $45 + 45$

= 90 km/h

\therefore time taken by trains = $\frac{450}{90} = 5 \text{ hrs.}$

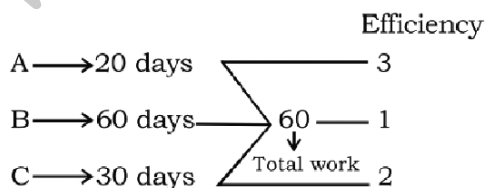
\therefore distance covered by crow = 100×5
= 500 km

53. S.I for 2 years = 25%

C.I for 2 years = 26.5625%

\therefore Required sum = $\frac{510}{26.5625} \times 25 = \text{Rs.}480$

54.



According to the question,

$$5 \text{ days work of } (A + B + C) = 6 \times 5 = 30$$

Now C left the work. So next 3 days A and B will work

$$\text{Work done by A and B} = 4 \times 3 = 12 \text{ units}$$

$$\text{Remaining work} = (60 - 42) = 18 \text{ units}$$

$$\text{Required time for A to complete the rest of the work} = \frac{18}{3} = 6 \text{ days}$$

$$55. \quad n + \frac{2n}{3} + \frac{n}{2} + \frac{n}{7} = 97$$

$$\Rightarrow \frac{42n + 28n + 21n + 6n}{42} = 97$$

$$\Rightarrow \frac{97n}{42} = 97 \quad \Rightarrow n = \frac{97 \times 42}{97} = 42$$

$$56. \quad \text{If } x = 7$$

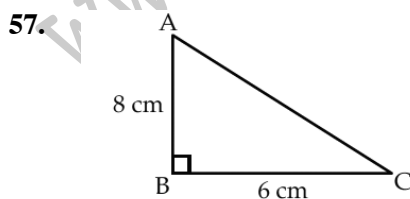
$$x^5 - 8x^4 + 8x^3 - 9x^2 + 7x + 5$$

split it in form of x

$$x^5 - 7x^4 - x^4 + 7x^3 + x^3 - 7x^2 - 2x^2 + 7x + 5$$

Put x in the place of 7, then

$$x^5 - x^5 - x^4 + x^4 + x^3 - x^3 - x^2 - x^2 + x^2 + 5 - x^2 + 5 - 49 + 5 = -44$$



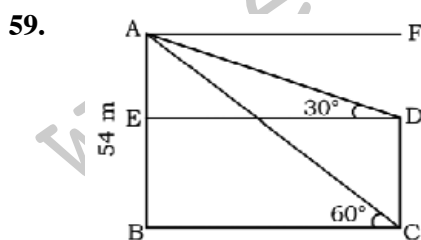
$$AC = \sqrt{6^2 + 8^2} = 10 \text{ cm}$$

$$\therefore \text{circum radius} = \frac{10}{2} = 5 \text{ cm}$$

i.e. mid-point of hypotenuse.

$$58. \quad \text{If } a + \frac{1}{a} = 1, \text{ then } a^3 = -1$$

$$\therefore \left(\frac{3}{x}\right)^3 = (-1) \Rightarrow \frac{27}{x^3} = -1 \Rightarrow x^3 = -27$$



$$AB = \text{temple} = 54 \text{ m}$$

$$CD = \text{temple} = h \text{ m}$$

BC = width of river = x m

From DABC,

$$\tan 60^\circ = \frac{AB}{BC}$$

$$\Rightarrow BC = \frac{54}{\sqrt{3}} = 18\sqrt{3} \text{ m}$$

From $\triangle ADE$,

$$\tan 30^\circ = \frac{AE}{DE}$$

$$[\because DE = BC = 18\sqrt{3}]$$

$$\Rightarrow \frac{1}{\sqrt{3}} = \frac{54 - h}{18\sqrt{3}}$$

$$\Rightarrow 54 - h = 18$$

$$\Rightarrow h = 54 - 18 = 36 \text{ m}$$

60. Area of the circle = $\pi r^2 = \pi(2)^2 = 4\pi$

The circle is cut to make a square

\therefore Perimeter of square = Perimeter of circle

$$\Rightarrow 4a = 2\pi r \Rightarrow a = \frac{2\pi \times 2}{4} = \pi$$

$$\therefore \text{Area of the square} = a^2 = \pi^2$$

$$\therefore \text{required ratio} = \frac{4\pi}{\pi^2} = 4 : \pi$$

61. $(a^2 - b^2) \sin \theta + 2ab \cos \theta = a^2 + b^2$

$$\text{or } \left(\frac{a^2 - b^2}{a^2 + b^2} \right) \sin \theta + \left(\frac{2ab}{a^2 + b^2} \right) \cos \theta = 1$$

On comparing it by

$$\sin^2 \theta + \cos^2 \theta = 1$$

$$\text{We get } \sin \theta = \frac{a^2 - b^2}{a^2 + b^2} \text{ and } \cos \theta = \frac{2ab}{a^2 + b^2}$$

$$\therefore \tan \theta = \frac{\sin \theta}{\cos \theta} = \frac{a^2 - b^2}{2ab}$$

62. Let the C.P. of each article be Rs. x

$$\therefore \frac{50x \times 120}{100} + \frac{50x \times 140}{100} - \frac{100x \times 125}{100} = 100$$

$$\Rightarrow 60x + 70x - 125x = 100$$

$$\Rightarrow 5x = 100 \Rightarrow x = \text{Rs.}20$$

63. 25% (Stolen) + 10% (Dropped)

$$\Rightarrow 35\% = \frac{7}{20}, 50\% = \frac{1}{2}$$

Sum - Remain

$$20 - 13$$

$$\frac{2 - 1}{40 - 13}$$

$$\downarrow \quad \downarrow$$

$$\times 130 \quad \times 130$$

$$5200 \quad 1690$$

$$64. \frac{M_1 D_1 T_1}{W_1} = \frac{M_2 D_2 T_2}{W_2}$$

$$\Rightarrow \frac{16 \times 6 \times 25}{150 \times 20 \times 12} = \frac{12 \times 8 \times D}{800 \times 15 \times 6}$$

After solving this $D_2 = 50$ days

$$65. \text{ Sum of temperatures on 1}^{\text{st}}, 2^{\text{nd}}, 3^{\text{rd}} \text{ and } 4^{\text{th}} \text{ days} = (58 \times 4) = 232 \text{ degrees}$$

Sum of temperatures on 2nd, 3rd, 4th and 5th days

$$= (60 \times 4) = 240 \text{ degrees}$$

Temperature on 5th day - temperature on 1st day = 8 degrees

Let the temperature on 1st and 5th days be $7x$ and $8x$ degrees respectively.

Then, $8x - 7x = 8$

$$\therefore 8 \times 8 - 7 \times 8$$

$$x = 8$$

$$\therefore \text{Temperature on 5th day} = 8 \times 8 = 64^\circ$$

$$66. \begin{array}{l} \text{Ist Worker - 9} \\ \text{IInd Worker - 10} \end{array} \begin{array}{l} \text{-----} \\ \text{-----} \end{array} \begin{array}{l} 10 \\ 9 \end{array}$$

90

According to question,

$$(\text{Ist} + \text{IInd}) = 19 \text{ unit} \quad \text{-----} \quad 1 \text{ unit}$$

$$(\text{given}) \frac{90}{5} = 18 \text{ unit}$$

$$\therefore 1 \text{ unit} = 10$$

$$\therefore \text{Total no. of gems} = 90 \times 10 = 900$$

$$67. \angle AOC = \angle BOD$$

$$\therefore \angle AOC = 40^\circ$$

According to question,

$$\angle BOE = 30^\circ$$

$$\therefore \angle COD + \angle DOB + \angle BOE = \text{Reflexive } \angle COE$$

$$\therefore 180^\circ + 40^\circ + 30^\circ = \text{Reflexive } \angle \text{COE}$$

$$\therefore \angle \text{COE} = 250^\circ$$

68. Let the numbers be $3x$ and $3y$.

$$\therefore 3x + 3y = 36$$

$$\Rightarrow x + y = 12 \dots(i)$$

$$\text{and } 3xy = 105 \dots(ii)$$

Dividing equation (i) and (ii),

$$\frac{x}{3xy} + \frac{y}{3xy} = \frac{12}{105} \Rightarrow \frac{1}{3y} + \frac{1}{3x} = \frac{4}{35}$$

69. Between 100 and 200 are 102, 105, ..., 198

Let number of terms = n

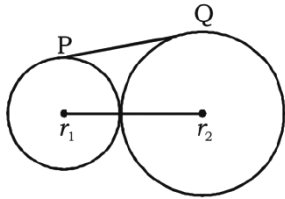
$$\therefore 198 = 102 + (n - 1)3$$

$$\Rightarrow n - 1 = \frac{198 - 102}{3} = 32$$

$$n = 33$$

$$\therefore S = \frac{n}{2} \times (a + l) = \frac{33}{2} (102 + 198) = 4950$$

70.



$$PQ = 2\sqrt{r_1 r_2} = 2\sqrt{4 \times 9} = 12 \text{ cm}$$

\therefore Area of the square

(having side $PQ = 12 \text{ cm}$)

$$= 12^2 = 144 \text{ cm}^2$$

71. $3 \cos 80^\circ \cdot \operatorname{cosec} 10^\circ + 2 \cos 59^\circ \cdot \operatorname{cosec} 31^\circ$

$$= 3 \cos (90^\circ - 10^\circ) \cdot \operatorname{cosec} 10^\circ + 2 \cos (90^\circ - 31^\circ) \cdot \operatorname{cosec} 31^\circ$$

$$= 3 \sin 10^\circ \cdot \operatorname{cosec} 10^\circ + 2 \sin 31^\circ \cdot \operatorname{cosec} 31^\circ$$

$$= 3 + 2 = 5$$

72. In $\triangle OAB$,

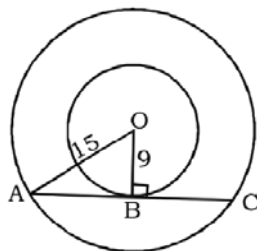
$OB \perp AB$

$$\therefore OB^2 + AB^2 = OA^2$$

$$\Rightarrow 9^2 + AB^2 = 15^2$$

$$\Rightarrow AB^2 = 225 - 81 = 144$$

$$\Rightarrow AB = 12 \text{ cm}$$



\therefore The length of the chord is $2 \times 12 = 24 \text{ cm}$

73. Percentage increase

$$= \frac{125 - 105}{105} \times 100 = \frac{20}{105} \times 100 \approx 19\%$$

74. Percentage decrease

$$= \frac{200 - 180}{200} \times 100 = \frac{20}{200} \times 100 = 10\%$$

75. Total production of toys in 2005 = 675 thousand

Total production of toys in 2006 = 750 thousand

$$\text{Percentage increase} = \frac{750 - 675}{675} \times 100 = 11\%$$

76. Replace 'although' by 'but', as but should be used here to suggest a contrast.

78. The tense of the first part (is - present tense) does not match with the second part (could - past tense), though the sentence refers a past event. Thus, replace 'is' by 'was'.

80. When two actions take place in past then earlier one takes past perfect tense and the 2nd one simple present tense.

90. Sentence starting with 'Hardly' takes an inversion form.

91. 'None' takes singular verb after it.

92. When an action is complete, it will take having + V₃ form.

This model paper was prepared by subject experts of RACE Institute, Hyderabad