

SECTION 'A' (Attempt all the questions)

1. Choose the correct answer from the given options. (15)

1. If the goods are purchased by a dealer in Lucknow(UP) from the manufacturer in West Bengal,

a. I.G.S.T. b. C.G.S.T. c. S.G.S.T. d. Both C.G.S.T. and I.G.S.T.

2. Mr. Ramesh deposits Rs. 250 per month for one year in a bank's recurring deposit account at the rate of 8% per annum. Then the interest earned by him is

- a. Rs. 65 b. Rs. 120 c. Rs. 130 d. Rs. 260

3. Identify the correct solution set of the below number line.



2. $\{x : x \in \mathbb{Z}, -4 < x < 5\}$

b. $\{x : x \in \mathbb{Z}, -4 \leq x \leq 5\}$

c. $\{x : x \in \mathbb{R}, -4 < x < 5\}$

d. $\{x : x \in \mathbb{R}, -4 \leq x \leq 5\}$

4. Which of the following equations has 2 as a root?

a. $x^2 - 4x + 5 = 0$

b. $x^2 + 3x - 12 = 0$

c. $2x^2 - 7x + 6 = 0$

d. $3x^2 - 6x - 2 = 0$

5. The quadratic equation $2x^2 - \sqrt{5}x + 1 = 0$ has

a. Two distinct real roots

b. Two equal real roots

c. More than two real roots

d. Imaginary roots

6. If $2x + 1$ is a factor of $2x^2 + ax - 3$, the value of 'a' is

a. 6 b. -5 c. 4 d. -2

7. If $A : B = 3 : 4$, $B : C = 6 : 7$. Then $A : B : C$ is

a. 9 : 12 : 14 b. 3 : 4 : 7 c. 8 : 15 : 13 d. 2 : 5 : 7

8. If $(x+5)$ is the mean proportion between $(x+2)$ and $(x+9)$, Then the value of ' x '

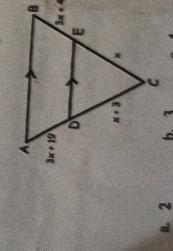
a. 3

b. 5 c. 7 d. 11

9. If the order of matrix A is $m \times n$ and the order of Matrix B is $n \times p$. Then the order of matrix $A \times B$ will be

a. $(n \times p)$ b. $(m \times p)$ c. $(n \times m)$ d. $(p \times m)$

10. Find the value of ' x ' if DE is parallel to AB.



a. 2 b. 3 c. 4 d. 5

11. $\tan^2 \theta - \sec^2 \theta$ is equal to
 a. 1 b. $\cot^2 \theta$ c. $\sec^2 \theta$ d. -1
12. The Median and Mode of the following data is 4, 7, 7, 8, 9, 9, 7, 10.
 a. 7 and 8 b. 8, 5 and 7 c. 7, 5 and 7 d. 7 and 9
13. The probability that a number selected at random from the numbers 1, 2, 3, 4... 15 is a multiple of 4 is
 a. $4/15$ b. $3/4$ c. $4/5$ d. $1/15$
14. Point P (4, 3) is reflected on the line $x = 1$ to Q. Then the coordinate of Q will be
 a. (4, -3) b. (2, -3) c. (-2, 3) d. (3, -4)
15. In the adjoining diagram, length of BC is
 a. $3\sqrt{3}$ cm b. $4\sqrt{3}$ cm c. 3 cm d. $2\sqrt{3}$ cm
- 89
52
- II.
- Akash in Bihar buys an article for 2000. He sells it to Sanjeev in Bihar at a profit of 10%. Sanjeev sells the article to Reitman in Odisha at a profit of 15%. If the rate of GST on the article is 18%, find
 - The GST paid by Sanjeev
 - The GST collected by Sanjeev
 - The GST paid by Sanjeev to the Government
 - Using factor theorem, show that $(x - 2)$ is a factor of $x^3 + x^2 - 4x - 4$. Hence factorize the polynomial completely.
 - Prove that $(\sin \theta + \cos \theta)(\tan \theta + \cot \theta) = \sec \theta + \csc \theta$
- III.
- Calculate the mean of the following distribution by shortcut method.

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	8	5	12	35	24	16

 - If $x = \frac{\sqrt{a+3b} + \sqrt{a-3b}}{\sqrt{a+3b} - \sqrt{a-3b}}$
 Prove that $3bx^2 - 2ax + 3b = 0$.
 - Use the graph paper for this question.
 Marks obtained by 200 students in an examination are given below.
- Draw an Ogive for the given distribution from the graph. Find,
- the median
 - number of students scoring above 65 marks
- SECTION 'B' (Attempt any 4 questions)
- $(3 + 3 + 4 = 10)$
- IV.
- A person deposits Rs. 2000 in a post office. Recurring Deposit Scheme for 5 years. If the rate of interest is 8% per annum, find the maturity amount he receives.
 - Solve the following inequation and graph the solution set on the number line

$$-\frac{x^2}{2} \leq x + \frac{1}{3} < 3 + \frac{1}{3}, x \in \mathbb{R}$$

- An airplane left 30 minutes later than its scheduled time, and in order to reach its destination 1500 km away in time, it has to increase its speed by 250 km/hr from its usual speed. Determine its usual speed.

$$(3+3+4=10)$$

- Solve the equation $3x^2 - x - 7 = 0$ and give your answer correct up to 2 decimal places.

$$\text{If } A = \begin{bmatrix} 2 & a \\ 3 & 5 \end{bmatrix}, B = \begin{bmatrix} -2 & 3 \\ 7 & b \end{bmatrix}, C = \begin{bmatrix} c \\ -1 \\ -11 \end{bmatrix}$$

- And $SA + 2B = C$, find the value of a, b, and c.

- Use the graph paper for this question. Mark the points A(0, 2) and B(1, 5) on your graph paper.

- i. Reflect B(3, 5) on the 'X' axis to B' and write the co-ordinate of B'.

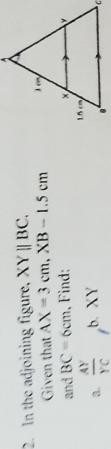
- ii. Reflect A(0, 2) on a line BH to A' and write the coordinate for A'.

- iii. Name the figure AB'A'B'

- iv. Find the area of figure AB'A'B'

$$(3+3+4=10)$$

$$1. \frac{3a+4b}{3c+4d} = \frac{3a-4b}{3c-4d} \quad P.T. \quad \frac{a}{b} = \frac{c}{d}$$



2. In the adjoining figure, $XY \parallel BC$.

Given that $AX = 3$ cm, $XB = 1.5$ cm
and $BC = 6$ cm. Find:

$$\begin{array}{l} \text{a. } \frac{AY}{YC} \\ \text{b. } XY \end{array}$$

$$3. \text{ Let } A = \begin{bmatrix} 2 & 1 \\ 0 & 2 \end{bmatrix}, B = \begin{bmatrix} 4 & 1 \\ -3 & -2 \end{bmatrix} \text{ and } C = \begin{bmatrix} -3 & 2 \\ -1 & 4 \end{bmatrix}$$

$$\text{Find } A^2 + AC - 5B$$

$$(3+3+4=10)$$

$$\text{VII. } 1. \text{ Evaluate } \frac{\sin 22^\circ + \sin 268^\circ}{\cos 22^\circ + \cos 268^\circ} + \sin^2 63^\circ + \cos^2 63^\circ + \sin 27^\circ - 30^\circ$$

2. Given $c = \{1, 2, 3, \dots, 20\}$

Find the probability of

- i. Prime numbers
- ii. Numbers divisible by 3 or 4
- iii. Numbers divisible by 3 and 4

3. A man observes the top of a monument which is opposite side of a river at an elevation of 60° . He retreats from the bank of river by 100m, then the angle of elevation of the top of the monument becomes 30° . Find the width of the river and height of the monument. (draw an approximate diagram)

VIII.

1. A man has an RD account in a bank with Rs. 500 per month for 4 years. At the time of maturity, he gets to Rs. 28410. Find the Rate of interest.

2. From a pack of 52 Playing cards, all cards whose numbers are multiples of 3 are removed. A card is now drawn at random. What is the probability that the card drawn is

- i. a face card
- ii. an even numbered red card

$$3. \text{ (Use Graph paper for this question)}$$

Class	50-60	60-70	70-80	80-90	90-100
f	5	16	24	12	5

Draw a histogram of the above data and find

- i. the mode class
- ii. mode

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