

NAME OF STUDENT: Riddhima

MAX. MARKS: 80

DATE:-----

TIME: $2\frac{1}{2}$ HOURS

NOTE: You will not be allowed to write during the first 15 minutes. This time is to be spent in reading the question paper. The time given at the head of this paper is the time allowed for writing the answers. Attempt all questions from Section A and any four questions from Section B.

Section: A [40marks]

(Attempt all questions from this Section)

Q1. Choose the correct answers to the questions from the given options:

[15]

(i) The product AB of two matrices A and B is possible if

- (a) A and B have same no of rows.
- (b) A and B have same no of columns.
- (c) The number of columns of A is equal to the number of rows of B.
- (d) The number of rows of A is equal to the number of columns of B.

(ii) If x, 12, 8 and 32 are in proportion, then the value of x is

- (a) 6 (b) 4 (c) 3 (d) 2

(iii) If $x+1$ is a factor of $3x^3 + kx^2 + 7x + 4$, then the value of k is

- (a) -1 (b) 0 (c) 6 (d) 10

(iv) A shopkeeper bought a TV from a distributor at a discount of 25% of the listed price of Rs 32000. The shopkeeper sells the TV to a consumer at the listed price. If the sales are intra-state and the rate of GST is 18%, find the selling price of the TV including tax (under GST) by the distributor is

- (a) Rs 32000 (b) Rs 24000 (c) Rs 28320 (d) Rs 26160

(v) Mrs. Asha Mehta deposits Rs 250 per month for one year in a bank's recurring deposit account. If the rate of (simple) interest is 8% per annum, then the interest earned by her on this account is

- (a) Rs 65 (b) Rs 120 (c) Rs 130 (d) Rs 260

(vi) 1. Shares of company A, paying 12%, Rs 100 shares are at Rs 70.

* 2. Shares of company B, paying 12%, Rs 100 shares are at Rs 100.

3. Shares of company C, paying 12%, Rs 100 shares are at Rs 110.

Shares of which company are at par?

- (a) Company A (b) Company B (c) Company C (d) Company A and C

(vii) If the equation $(k+1)x^2 - 2(k-1)x + 1 = 0$ has equal roots, then the values of k are

- (a) 1, 3 (b) 0, 3 (c) 0, 1 (d) $0, \frac{3}{4}$

(viii) The sum of first five multiples of 3 is

- (a) 45 (b) 55 (c) 65 (d) 75

(ix) The 11th term of the G.P. $\frac{1}{8}, \frac{1}{4}, 2, -1, \dots$ is

- (a) 64 (b) -64 (c) 128 (d) -128

(x) If the image of the point P under reflection in the x-axis is $(-3, 2)$, then the coordinates of the point P are

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

(xi) The point which lies on the perpendicular bisector of the line segment joining the points A(-2, -5) and B(2, 5) is

- (a) (0, 0) (b) (0, 2) (c) (2, 0) (d) (-2, 0)

(xii) The point where the medians of a triangle meet is called the ----- of the triangle.

- (a) orthocenter (b) centroid (c) Altitude (d) none of these

(xiii) The slope of a line perpendicular to the line $3x = 4y + 11$ is

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

(xiv) If Jagbeer invests Rs 10320 on Rs 100 shares at a discount of Rs 14, then the number of shares he buys is

- (a) 110 (b) 120 (c) 130 (d) 150

(xv) **Assertion(A):** A line drawn parallel to any one side of a triangle intersects the other two sides proportionally.

Reason(R) : Parallel lines cannot be drawn to any one side of a triangle.

- (a) A is true, R is false
(b) A is false, R is true
(c) both A and R are true
(d) both A and R are false

Q2.(i) Solve the quadratic equation $4x^2 - 7x + 2 = 0$; give your answer correct to two significant figures. [4]

(ii) The first term of a G.P. is 27 and its 8th term is $\frac{1}{81}$. Find the sum of its 10 terms [4]

(iii) Prove that: $\frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta} = \tan\theta$ [4]

Q3.(i) The value of a T.V. set (including tax) is Rs 88,500. Rate of GST is 18%. What is the price of the T.V. set excluding tax? [4]

(ii) Find the equation of the line parallel to the line $3x + 2y = 8$ and passing through the point (0,1). [4]

(iii) The point P(3,4) is reflected to P' in the x-axis; and O' is the image O (the origin) when reflected in the line PP'. Using graph paper, give: [5]

(a) The coordinates of P' and O'.

(b) Give the geometrical name for the figure POP'O'.

Section B

(Attempt any four questions from this Section.)

Q4.(i) Find the equation of the line with x-intercept = 5 and passing through the point (4, -7). [3]

(ii) If the sum of the first 14 terms of an A.P. is 1050 and its first term is 10, find the 20th term. [3]

(iii) By increasing the speed of a car by 10km/hr, the time of journey for a distance of 72km is reduced by 36 minutes. Find the original speed of the car. [4]

Q5.(i) In the figure given below, $AB \parallel DC$. $AO = 10\text{cm}$, $OC = 5\text{cm}$, $AB = 6.5\text{cm}$ and $OD = 2.8\text{cm}$. [3]

(a) Prove that $\Delta OAB \sim \Delta OCD$.

(b) Find CD and OB.

(c) Find the ratio of areas of ΔOAB and ΔOCD .

(iii) Solve the following in equation and write the solution set: [3]

$$11x - 4 < 15x + 4 < 13x + 14, x \in W.$$

(iii) Using the properties of proportion, solve for x, given: $\frac{2x + \sqrt{4x^2 - 1}}{2x - \sqrt{4x^2 - 1}} = 4$. [4]

Q6.(i) If $A = \begin{bmatrix} 3 & x \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 9 & 16 \\ 0 & -y \end{bmatrix}$, find x and y when $A^2 = B$. [3]

(ii) Find the equation of the right bisector of the line segment joining the points A(3, -4) and B(5, -6). [3]

(iii) A man invests Rs 4500 in shares of a company which is paying 7.5% dividend. If Rs 100 shares are

available at a discount of 10%, find:

[4]

(a) The number of shares he purchases.

(b) His annual income.

Q7.(i) If b is the mean proportion between a and c , show that: $\frac{a^4 + a^2b^2 + b^4}{b^4 + b^2c^2 + c^4} = \frac{a^2}{c^2}$. [3]

(ii) How many terms of the G.P. $3, \frac{3}{2}, \frac{3}{4}, \dots$ are needed to give the sum $\frac{3069}{512}$? [3]

(iii) A retailer buys a TV from a manufacturer for Rs 25000. He marks the price of the TV 20% above his cost price and sells it to a consumer at 10% discount on the market price. If the sales are intra-state and rate of GST is 12%, find: (a) the marked price of the TV.

(b) Consumer's cost price of TV inclusive of tax (under GST).

(c) GST paid by the retailer to the Central and State Governments. [4]

Q8.(i) A model of a high rise building is made to a scale of 1 : 50.

(a) If the height of the model is 0.8m, find the height of the actual building.

(b) If the floor area of a flat in the building is $20m^2$, find the floor area of that in the model. [3]

(ii) The midpoint of the line segment joining the points $(3m, 6)$ and $(-4, 3n)$ is $(1, 2m-1)$. Find the values of m and n . [3]

(iii) Given $A = \begin{bmatrix} 2 & -6 \\ 2 & 0 \end{bmatrix}$, $B = \begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix}$ and $C = \begin{bmatrix} 4 & 0 \\ 0 & 2 \end{bmatrix}$. Find the matrix X such that $A + 2X = 2B + C$. [4]

Q9.(i) Given a line segment AB joining the points $A(-4, 6)$ and $B(8, -3)$. Find the ratio in which AB is divided by the y -axis. [3]

(ii) Given that $(x + 2)$ and $(x + 3)$ are factors of $2x^3 + ax^2 + 7x - b$. Determine the values of a and b . [3]

(iii) Mr. Sonu has a recurring deposit account and deposit Rs 750 per month for 2 years.

If he gets Rs 19125 at the time of maturity, find the rate of interest. [4]

Q10.(i) Find the values of k so that the equation $3x^2 + kx + 2 = 0$ has equal roots. [3]

(ii) Prove the following identity: $\frac{\sin A}{1 + \cos A} + \frac{1 + \cos A}{\sin A} = 2 \operatorname{cosec} A$. [3]

(iii) The shadow of a tower standing on a level ground is found to be 40m longer when the sun's altitude is 30° than when it is 60° . Find the height of the tower. [4]

END

