Estd. 1861

TIME 2:30 Hours   MM: 80

Note: Attempt All Questions from Section A and any Four Questions from Section B.

Section A (40 Marks)

(Attempt All Questions from this section)

Q.1 Choose the correct answer to the questions from the given options.

(Do not copy the question, write the correct answer only)   [15]

(i) The marked price of an article is Rs 3000. A dealer paid Rs 180 as CGST to the central government. If the sale of the article is an intra state sale, then the rate of GST is:

a) 6%

b) 10%

c) 12%

d) 16.67%

(ii) The value of 'm' so that the quadratic equation $3x^2-5x-2m=0$ has two distinct real roots is:

a) $m > \frac{25}{24}$

b) $m < \frac{25}{24}$
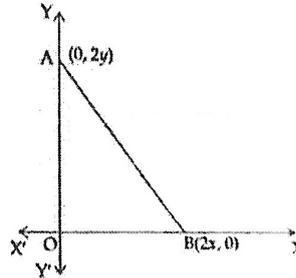
c) $m > \frac{-25}{24}$

d) $m < \frac{-25}{4}$

(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) If A $= \begin{bmatrix} 0 & 0 \\ 1 & 0 \end{bmatrix}$, then $A^2 =$

(a) A   (b) O   (c) I   (d) 2A

(v) The coordinates of the point which is equidistant from the three vertices of $\Delta A0B$ (shown in the diagram) are:

(a) (x, y)   (b) (y, x)   (c) $(\frac{x}{2}, \frac{y}{2})$ (d) $(\frac{y}{2}, \frac{x}{2})$

(vi) **Assertion (A):** The 7th term from the end of the A.P. 5, 2, -1, -4........, -67 is -46.

Reason (R): In an A.P. with first term 'a' common difference 'd' and last term 'l' the nth term from the end = l - (n-1) d:

(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.

(vii) If on dividing $4x^2-3Kx+5$ by x+2, the remainder is -3, then the value of K is :

(a) 4

(b) -4

(c) 3

(d) -3

(viii) P is the point of intersection of the line 3x-5y=3 and x-axis.

Assertion (A) : P is invariant with respect to the given line.

Reason (R) : Coordinates of P are (0, 1)

(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.

(ix) If $x \in w$, then the solution set of the inequation 5 - 4x ≥ 2 - 3x is :

(a) {...........-2, -1, 0, 1, 2. 3}

(b) {1, 2, 3}

(c) {0, 1, 2, 3}

(d) {0, 1, 2}

(x) The third proportional to $6\frac{1}{4}$ and 5 is :

(a) 4

(b) $7\frac{1}{2}$

(c) 3

(d) 8

(xi) If the lines $2x + 3y = 5$ and $kx - 6y = 7$ are perpendicular then the value of k is:

(a) 9   (b) -9   (c) $\frac{1}{9}$ (d) $-\frac{1}{9}$

(xii) Amit deposits Rs 800 every month in a recurring deposit account for 6 months. If he receives Rs 4884 at the time of maturity, then the interest he earns is Rs:

(a) 84   (b) 42   (c) 24   (d) 284

(xiii) Which of the following is/are in Arithmetic Progression (A.P.) ?

(I) 5, 9, 12, 18………

(II) $\frac{1}{2}, 1, \frac{3}{2},$………..

(III) $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}$………

(IV) -11, -8, -5…………..

(a) Only II

(b) Only II and IV

(c) Only I, II, and IV

(d) All of them.

(xiv) Piyush has some shares of Rs 50 of a company paying 15% dividend. If his annual income is Rs 3000, then the number of shares he possesses is:

(a) 80   (b) 400   (c) 600   (d) 800

(xv) 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)

Q.2 (a) If $A=\begin{bmatrix} 2 & 3 \\ 5 & 7 \end{bmatrix}$, $B=\begin{bmatrix} 0 & 4 \\ -1 & 7 \end{bmatrix}$ and $C=\begin{bmatrix} 1 & 0 \\ -1 & 4 \end{bmatrix}$, find $AC + B^2 - 10C$ [4]

(b) Ayush deposits Rs 2000 per month in a recurring deposit account in a bank. The bank pays interest at the rate of 8% per annum. If Ayush gets Rs 1040 as interest at the time of maturity, find the (i) total time (in years) for which the account was held, (ii) the maturity amount received by him.   [4]

(c) The 4th term of an A.P. is 22 and 15th term is 66. Find the first term and the common difference. Hence, find the sum of the series to 8th terms.   [4]

Q.3 (a) Using factor theorem, factorise completely the following polynomial.

$\qquad 3x^3 + 2x^2 - 19x + 6$ [4]

(b) Solve the following quadratic equation for 'x' and give your answer correct to 2 decimal places:

$\qquad 2x^2 - 10x + 5 = 0$ [4]

(c) Use a graph paper for this question, Take 2cm= 1unit on both x and y axes. The triangle OAB is reflected in the origin O to triangle OA'B'. A' and B' have coordinates (-3, -4) and (0, -5) respectively.

(i) Find the coordinates of A and B.

(ii) Draw a diagram to represent the given information.

(iii) What kind of figure is the quadrilateral AB A' B'?

(iv) Find the coordinates of A", the reflection of A in the origin followed by reflection in the y-axis.

(v) Find the coordinates of B", the reflection of B in the x-axis followed by reflection in the origin.   [5]

SECTION- B (40 Marks)
(Attempt any FOUR questions for this section)

Q.4 (a) Solve the following inequation, write the solution set and represent it on the number line.

$-3 (x - 7) \geq 15 - 7x > \frac{x+1}{3}, x \in R$ [3]

(b) If $\begin{bmatrix} 1 & 4 \\ -2 & 3 \end{bmatrix} + 2M = 3\begin{bmatrix} 3 & 2 \\ 0 & -3 \end{bmatrix}$, then find the matrix M.   [3]

(c) The marked price of an article is Rs 5000. A dealer in Agra sells the article to a consumer in the same city at a profit of 10%. If the rate of GST is 18%, then calculate the
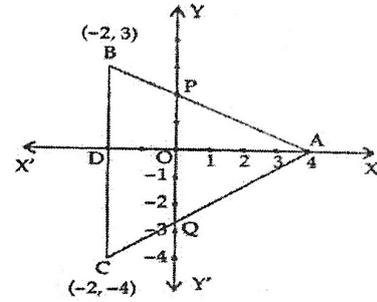
(i) CGST, SGST and IGST paid by the dealer.

(ii) the amount which the consumer pays for the article.   [4]

Q.5 (a) Show that (x-1) is factor of $x^3 - 7x^2 + 14x - 8$. Hence, completely factorise the above expression.   [3]

(b) In the figure given, ABC is a triangle and BC is parallel to y-axis. AB and AC intersect the y-axis at P and Q respectively.

[3]

(i) write the coordinates of A.
(ii) find the slope of AB.
(iii) find the equation of the line AB.
(c) Mr. Arora invests Rs 8500 in 10%, Rs 100 shares at Rs 170. He sells the shares when the price of each share rises by Rs 30. He invests the proceeds excluding divdend in 12% Rs 100 shares at Rs 125, find:
(i) original number of shares.
(ii) the sales proceeds.
(iii) the number of Rs 125 shares Mr. Arora buy.
(iv) the charge in Mr. Arora's annual income. [4]

Q.6 (a) Praveen deposits Rs 2500 per month for 2 years, in a recurring deposit account in a bank. If he gets Rs 66250 at the time of maturity, find [3]
(i) the interest paid by the bank.
(ii) the rate of interest.
(b) The first and the eighth term of a G.P. are 4 and 512, respectively, Find:
(i) the common ratio.
(ii) the sum of its first 5 terms. [3]
(c) Find the value of k for which the following quadratic equation has real and equal roots.
         kx (x-2)+6=0
Hence find the roots of the equation. [4]

Q.7 (a) In what ratio does the x-axis divide the line segment joining the points
(-4, -6) and (-1, 7) ?
Also find the coordinates of the point of division. [3]
(b) The difference of two natural numbers is 7 and their product is 450, find the numbers.

[3]

(c) If P= $\frac{4xy}{x+y}$, find the value of $\frac{p+2x}{p-2x}+\frac{p+2y}{p-2y}$ [4]

Q.8 (a) Find the equation of a line parallel to the line 2x+y-7=0 and passing through that point of intersection of the line x + y − 4 = 0 and 2x − y = 8. [3]
(b) Shreya invests a sum of money in Rs 50 shares paying 15% dividend quoted at 20% premium. If her annual dividend is Rs 600, Calculate.
(i) the number of shares, she bought.
(ii) her total investment.
(iii) the rate of return on her investment. [3]
(c) A man repays a loan of Rs 3250 by depositing Rs 20 in the first month and then increases the payment by Rs 15 every month. How long will it take him to clear the loan?

[4]

Q.9 (a) Using properties of proportion, solve for 'x'
$\frac{\sqrt{2-x} \ + \ \sqrt{2+x}}{\sqrt{2-x} \ - \ \sqrt{2+x}} = 3$ [3]
(b) Which term of the G.P.   5, 10, 20, 40, ...is 5120? [3]
(c) Find the coordinates of the points which divide the line segment joining the points A (-2, 2) and B (2, 8) into four equal parts. [4]

Q.10 (a) Two years ago, Ravi's age was three times the square of his son's (Alok) age. Three years hence, Ravi's age will be four times Alok's age. Find the present ages of Ravi & Alok.

[5]

(b) The marked price of an almirah is Rs 50,000. The wholesaler allows a discount of 10% to a shopkeeper. The shopkeeper sells the almirah to a consumer at 4% above the marked price. If the rate of GST is 18% & the sales are intra-state, then find.
(i) the amount inclusive of tax (under GST) which the shopkeeper pays for the almirah.
(ii) the selling price fixed by the shopkeeper for the consumer.
(iii) the amount paid by the consumer for the almirah.
(iv) the amount of tax (Under GST) paid by the shopkeeper to the Central Government.
(v) the amount of tax (Under GST) received by the State Government. [5]