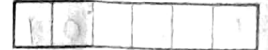


(S.S.L.C.) QUARTERLY EXAMINATION - 2017

X - STD

MATHS



Time Allowed : 2.30 Hours

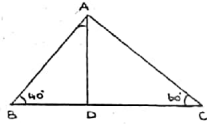
Maximum Marks : 100

Note : (i) This question paper contains Four sections.

Section - I (Marks : 15)

Answer all the questions.

15 X 1 = 15

- If  $A = \{p, q, r, s\}$ ,  $B = \{r, s, t, u\}$  then  $A \setminus B$  is a)  $\{p, q\}$  b)  $\{t, u\}$  c)  $\{r, s\}$  d)  $\{p, q, r, s\}$
- If  $f : A \rightarrow B$  is a bijective function and if  $n(A) = 5$  then  $n(B)$  is equal to a) 10 b) 4 c) 5 d) 25
- If  $a, b, c, l, m$  are in A.P then the value of  $a - 4b + 6c - 4l + m$  is a) 1 b) 2 c) 3 d) 0
- If  $a, b, c$  are in G.P, then  $\frac{a-b}{b-c}$  is equal to a)  $\frac{a}{b}$  b)  $\frac{b}{a}$  c)  $\frac{a}{c}$  d)  $\frac{c}{b}$
- If  $1 + 2 + 3 + \dots + n = k$ , then  $1^3 + 2^3 + 3^3 + \dots + n^3$  is equal to a)  $k^2$  b)  $k^3$  c)  $\frac{k(k+1)}{2}$  d)  $(k+1)^3$
- The system of equation  $x - 4y = 8, 3x - 12y = 24$  a) has infinitely many solutions b) has no solution c) has a unique solution d) may or may not have a solution
- The GCD of  $(x^3 + 1)$  and  $(x^4 - 1)$  is a)  $x^3 - 1$  b)  $x^3 + 1$  c)  $x + 1$  d)  $x - 1$
- On dividing  $\frac{x^2 - 25}{x + 3}$  by  $\frac{x + 5}{x^2 - 9}$  the Quotient is a)  $(x - 5)(x - 3)$  b)  $(x - 5)(x + 3)$  c)  $(x + 5)(x - 3)$  d)  $(x + 5)(x + 3)$
- Matrix  $A = [a_{ij}]_{m \times n}$  is a square matrix if a)  $m < n$  b)  $m > n$  c)  $m = 1$  d)  $m = n$
- If  $A$  is of order  $3 \times 4$  and  $B$  is of order  $4 \times 3$  then the order  $BA$  is a)  $3 \times 3$  b)  $4 \times 4$  c)  $4 \times 3$  d) not defined
- If the lines segment joining the points  $A(3, 4)$  and  $B(14, -3)$  meets the  $x$  axis at  $P$ , then the ratio in which  $P$  divides the segments  $AB$  is a)  $4 : 3$  b)  $3 : 4$  c)  $2 : 3$  d)  $4 : 1$
- Area of the triangle formed by the points  $(0, 0), (2, 0)$  and  $(0, 2)$  is a) 1 Sq.Unit b) 2 Sq.Units c) 4 Sq.Units d) 8 Sq.Units
- In figure, if  $\frac{AB}{AC} = \frac{BD}{DC}$ ,  $\angle B = 40^\circ$  and  $\angle C = 60^\circ$  then  $\angle BAD =$   a)  $30^\circ$  b)  $50^\circ$  c)  $80^\circ$  d)  $40^\circ$
- The sides of two similar triangles are in the ratio  $2 : 3$  then their areas are in the ratio a)  $9 : 4$  b)  $4 : 9$  c)  $2 : 3$  d)  $3 : 2$
- If  $\tan \theta = \frac{a}{x}$  then the value of  $\frac{x}{\sqrt{a^2 + x^2}} =$  a)  $\cos \theta$  b)  $\sin \theta$  c)  $\operatorname{cosec} \theta$  d)  $\sec \theta$

Section - II (Marks : 20)

Note : i) Answer 10 questions. ii) Question number 30 is compulsory. Select any 9 questions from the first 14 questions.

10 X 2 = 20

- If  $A = \{4, 6, 7, 8, 9\}$ ,  $B = \{2, 4, 6\}$  and  $C = \{1, 2, 3, 4, 5, 6\}$  then find  $A \cap (B \cup C)$ .  $(4, 6)$
- If  $A \subset B$  then find  $A \cap B$  and  $A \setminus B$  (Use Venn diagram)
- Write the first 5 terms of the sequence if  $F_1 = F_2 = 1$  and  $F_n = F_{n-1} + F_{n-2}$ ,  $n = 3, 4, 5, \dots$
- Which term of the G.P  $1, 2, 4, 8, \dots$  is 1024?
- The cost of 11 pencils and 3 erasers is Rs.50 and the cost of 8 pencils and 3 erasers is 38. Find the cost of a pencil and an eraser.
- Find the quotient and remainder when  $x^3 + x^2 - 7x - 3$  is divided by  $x - 3$ .
- Which rational expression should be added to  $\frac{x^3 - 1}{x^2 + 2}$  to get  $\frac{3x^3 + 2x^2 + 4}{x^2 + 2}$ ?
- Construct a  $3 \times 2$  matrix  $A = [a_{ij}]$  whose elements are given by  $a_{ij} = \frac{|2i - 3j|}{2}$ .

24. If  $A = \begin{pmatrix} 2 & 3 \\ -9 & 5 \end{pmatrix} - \begin{pmatrix} 1 & 5 \\ 7 & -1 \end{pmatrix}$  the find the additive inverse of A.
25. Find the centroid of the triangle whose vertices are A (4, -6), B (3, -2) and C (5, 2).
26. The side AB of a square ABCD is parallel to x axis. Find the slope of CD.
27. Find the equation of the straight line which slope is  $\frac{2}{3}$ ; and passing through (5, -4).
28. Prove that  $\operatorname{cosec}^2(90 - \theta) - \cot^2(90 - \theta) = 1$ .
29. In  $\Delta PQR$ ,  $AB \parallel QR$ , If  $AB = 3$  cm,  $PB = 2$  cm and  $PR = 6$  cm then find the length of QR.
30. a)  $A = \{-2, -1, 1, 2\}$  and  $f = \left\{ \left( x, \frac{1}{x} \right) : x \in A \right\}$ . Write down the range of f. Is f a function from A to A? (OR)
- b) Prove the identity  $\frac{\sin \theta - 2 \sin^3 \theta}{2 \cos^3 \theta - \cos \theta}$ .

SECTION - III (Marks : 45)

Note : (i) Answer 9 questions. (ii) Question number 45 is compulsory. Select any 8 questions from the first 14 questions. 9 X 5 = 45

31. Let  $A = \{10, 15, 20, 25, 30, 35, 40, 45, 50\}$ ,  $B = \{1, 5, 10, 15, 20, 30\}$ , and  $C = \{7, 8, 15, 20, 35, 45, 48\}$  verify  $A \setminus (B \cap C) = (A \setminus B) \cup (A \setminus C)$ .
32. In a group of students 65 play football, 45 play hockey, 42 play cricket, 20 play football and hockey, 25 play football and cricket, 15 play hockey and cricket and 8 play all the three games. Find the numbers of students in the group. (Assume that each student in the group plays at least one game).
33. Let  $A = \{4, 6, 8, 10\}$  and  $B = \{3, 4, 5, 6, 7\}$  If  $f : A \rightarrow B$  is defined by  $f(x) = \frac{1}{2}x + 1$  then represent f by i) an arrow diagram ii) a set of ordered pairs and iii) a table
34. Find the sum of all natural numbers between 300 and 500 which are divisible by 11.
35. Find the sum of first n terms of the series  $4 + 44 + 444 + \dots$
36. Factorize  $2x^3 - 3x^2 - 3x + 2$  into linear factors.
37. Find the GCD of the polynomials  $x^4 + 3x^3 - x - 3$  and  $x^3 + x^2 - 5x + 3$ .
38. 8 men and 12 boys can finish a piece of work in 10 days while 6 men and 8 boys can finish the same work in 14 days. Find the number of days taken by one man alone to complete the work and also one boy alone to complete the work.
39. If  $A = \begin{pmatrix} 3 & 2 \\ -1 & 4 \end{pmatrix}$ ,  $B = \begin{pmatrix} -2 & 5 \\ 6 & 7 \end{pmatrix}$  and  $C = \begin{pmatrix} 1 & 1 \\ -5 & 3 \end{pmatrix}$  verify that  $A(B + C) = AB + AC$ .
40. If  $A = \begin{pmatrix} 1 & -1 \\ 2 & 3 \end{pmatrix}$  then show that  $A^2 - 4A + 5I_2 = 0$ .
41. Find the area of the quadrilateral whose vertices are (-3, 4), (-5, -6), (4, -1) and (1, 2).
42. Find the area of the triangle formed by the line  $7x + 10y - 70 = 0$  and its co-ordinate axis.
43. State and prove "Basic Proportionality Theorem".
44. If  $\tan \theta + \sin \theta = m$ ,  $\tan \theta - \sin \theta = n$  and  $m \neq n$  then show that  $m^2 - n^2 = 4 \sqrt{mn}$ .
45. a) If a, b, c, d are in geometric sequence, then prove that  $(b - c)^2 + (c - a)^2 + (d - b)^2 = (a - d)^2$ . (OR)
- b) If  $P = \frac{x}{x+y}$ ,  $Q = \frac{y}{x+y}$  then find  $\frac{1}{P-Q} - \frac{2Q}{P^2 - Q^2}$ .

Section - IV (Marks : 20)

Note : Answer both the question choosing either of the alternatives. 2 X 10 = 20

46. a) Take a point which is 9cm away from the centre of a circle of radius 3cm and draw two tangents to the circle from that point. (OR) b) Construct  $\Delta ABC$  such that  $AB = 6$  cm,  $\angle C = 40^\circ$  and the altitude from C to AB is of length 4.2 cm.
47. a) Draw the graph of  $y = x^2 + 2x - 3$  and hence find the roots of  $x^2 - x - 6 = 0$ . (OR) b) A bank gives 10%. On deposits for senior citizens. Draw the graph for the relation between the sum deposited and the interest earned for one year. Hence find (i) the interest on deposit of Rs.650. (ii) the amount to be deposited to earn an interest of Rs.45.