

SK-MDU-QP4

Register Number

SK MODEL QUARTERLY - 10<sup>th</sup> STANDARD - PART - III - MATHEMATICS

Time Allowed: 3 Hours

Maximum Marks: 100

- Instructions:** (1) Check the Question paper for fairness of printing. If there is any lack of fairness, inform the Hall supervisor immediately.
- (2) Use **Blue** or **Black** ink to write and underline and pencil to draw diagrams.

## PART I

**Note : (i)** All questions are compulsory **14 X 1 = 14**

(ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

- If  $f : A \rightarrow B$  is a bijective function and if  $n(B) = 7$ , then  $n(A)$  is equal to  
(1) 7 (2) 49 (3) 1 (4) 14
- If  $\{(a, 8), (6, b)\}$  represents an identity function, then the value of  $a$  and  $b$  are respectively  
(1) (8, 6) (2) (8, 8) (3) (6, 8) (4) (6, 6)
- If 6 times 6<sup>th</sup> term of an A.P. is equal to 7 times the 7<sup>th</sup> term, then the 13<sup>th</sup> term of the A.P. is (1) 0 (2) 6 (3) 7 (4) 13
- Given  $F_1 = 1, F_2 = 3$  and  $F_n = F_{n-1} + F_{n-2}$  then  $F_5$  is (1) 3 (2) 5 (3) 8 (4) 11
- A system of three linear equations in three variables is inconsistent if their planes  
(1) intersect only at a point (2) intersect in a line  
(3) coincides with each other (4) do not intersect
- Graph of a linear polynomial is a  
(1) straight line (2) circle (3) parabola (4) hyperbola
- If the roots of the equation  $q^2 x^2 + p^2 x + r^2 = 0$  are the squares of the roots of the equation  $qx^2 + px + r = 0$ , then  $q, p, r$  are in \_\_\_\_\_  
(1) A.P (2) G.P (3) Both A.P and G.P (4) none of these
- In a  $\triangle ABC$ ,  $AD$  is the bisector of  $\angle BAC$ . If  $AB = 8$  cm,  $BD = 6$  cm and  $DC = 3$  cm. The length of the side  $AC$  is  
1) 6 cm 2) 4 cm 3) 3 cm 4) 8 cm
- In  $\triangle LMN$ ,  $L = 60^\circ, M = 50^\circ$ . If  $\triangle LMN \sim \triangle PQR$  then the value of  $\angle R$  is  
1)  $40^\circ$  2)  $70^\circ$  3)  $30^\circ$  4)  $110^\circ$

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## **SK QUESTION PAPER &**

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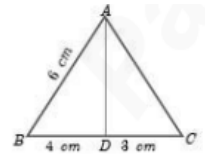
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10. If (5,7), (3,p) and (6,6) are collinear, then the value of p is  
 (1) 3 (2) 6 (3) 9 (4) 12
11. The area of triangle formed by the points (-5,0), (0,-5) and (5,0) is  
 (1) 0 sq.units (2) 25 sq.units (3) 5 sq.units (4) none of these
12. The straight line given by the equation  $x = 11$  is  
 (1) parallel to X axis (2) parallel to Y axis  
 (3) passing through the origin (4) passing through the point (0,11)
13.  $a \cot \theta + b \operatorname{cosec} \theta = p$  and  $b \cot \theta + a \operatorname{cosec} \theta = q$  then  $p^2 - q^2$  is equal to  
 (1)  $a^2 - b^2$  (2)  $b^2 - a^2$  (3)  $a^2 + b^2$  (4)  $b - a$
14. If  $\tan \theta + \cot \theta = 5$ , then the value of  $\tan^2 \theta + \cot^2 \theta$  is  
 1) 23 2) 25 3) 27 4) 15

**Part II - 2 Marks - Qn No 28 is Compulsory****10 X 2 = 20**

15. Let  $A = \{1, 2, 3, 4, \dots, 45\}$  and R be the relation defined as "is square of" on A. Write R as a subset of  $A \times A$ . Also, find the domain and range of R
16. Let  $A = \{-1, 1\}$  and  $B = \{0, 2\}$ . If the function  $f : A \rightarrow B$  defined by  $f(x) = ax + b$  is an onto function? Find a and b.
17. Solve  $5x \equiv 4 \pmod{6}$
18. Find the sum  $3 + 6 + 9 + \dots + 96$
19. Find the LCM  $21x^2y, 35xy^2$
20. Find the sum and product of the roots for the quadratic equations  
 $kx^2 - k^2x - 2k^3 = 0$
21. In the figure, AD is the bisector of  $\angle A$ . If  $BD = 4$  cm,  $DC = 3$  cm and  $AB = 6$  cm, find AC
22. In  $\triangle ABC$ , D and E are points on the sides AB and AC respectively such that  $DE \parallel BC$ . If  $AD = 8x - 7$ ,  $DB = 5x - 3$ ,  $AE = 4x - 3$  and  $EC = 3x - 1$ , find the value of x.
23. Show that the points  $P(-1.5, 3)$ ,  $Q(6, -2)$ ,  $R(-3, 4)$  are collinear.
24. Find the equation of a straight line passing through (5, -3) and (7, -4)
25. Find the equation of a straight line which is parallel to the line  $3x - 7y = 12$  and passing through the point (6, 4).
26. Prove the identity  $\frac{\operatorname{Sec} \theta}{\operatorname{Sin} \theta} - \frac{\operatorname{Sin} \theta}{\operatorname{Cos} \theta} = \cot \theta$
27. Prove the identity  $\cot \theta + \tan \theta = \sec \theta \operatorname{cosec} \theta$
28. Pari needs 4 hours to complete a work. His friend Yuvan needs 6 hours to complete the same work. How long will it take to complete if they work together?

**Part III - 5 Marks - Qn No 42 is Compulsory****10 X 5 = 50**

29. Let  $A = \{x \in W \mid x < 2\}$ ,  $B = \{x \in N \mid 1 < x \leq 4\}$  and  $C = \{3, 5\}$ . Verify that  
 $A \times (B \cap C) = (A \times B) \cap (A \times C)$
30. If the function  $f : R \rightarrow R$  defined by  $f(x) = \begin{cases} 2x + 7, & x < -2 \\ x^2 - 2, & -2 \leq x < 3 \\ 3x - 2, & x \geq 3 \end{cases}$   
 then find the values of (i)  $f(4)$  (ii)  $f(-2)$  (iii)  $f(4) + 2f(1)$  (iv)  $\frac{f(1) - 3f(4)}{f(-3)}$
31. Find the sum of all natural numbers between 100 and 300 which are divisible by 8

32. Rekha has 15 square colour papers of sizes 10 cm, 11 cm, 12 cm,..., 24 cm. How much area can be decorated with these colour papers?
33. If  $9x^4 + 12x^3 + 28x^2 + ax + b$  is a perfect square, find the values of a and b
34. Solve  $pqx^2 = (p + q)^2 x + (p + q)^2 = 0$  by formula method
35. State and Prove Theorem: Angle Bisector Theorem
36. In  $\Delta ABC$  if  $DE \parallel BC$ ,  $AD = x$ ,  $DB = x - 2$ , and  $EC = x - 1$  then find the lengths of the sides AB and AC.
37. If the points A (2, 2), B (-2, -3), C (1, -3) and D (x, y) form a parallelogram then find the value of x and y.
38. Find the value of k, if the area of a quadrilateral is 28 sq.units, whose vertices are (-4, -2), (-3, k), (3, -2) and (2, 3)
39. A (-3, 0) B(10,-2) and C(12, 3) are the vertices of DABC . Find the equation of the altitude through A and B
40. Prove that  $(\sin \theta + \sec \theta)^2 + (\cos \theta + \operatorname{cosec} \theta)^2 = 1 + (\sec \theta + \operatorname{cosec} \theta)^2$
41. If  $\operatorname{cosec} q + \cot q = P$ , then prove that  $\cos \theta = \frac{p^2-1}{p^2+1}$
42. If the roots of the equation  $(c^2 - ab) x^2 - 2(a^2 - bc) x + b^2 - ac = 0$  are real and equal prove that either  $a = 0$  (or)  $a^3 + b^3 + c^3 = 3abc$

**Part IV - 8 Marks - All Questions are Compulsory**

**2 X 8 = 16**

43. a) Construct a triangle similar to a given triangle PQR with its sides equal to  $7/4$  of the corresponding sides of the triangle PQR (scale factor  $7/4 > 1$ ) (or)  
b) Draw a triangle ABC of base BC = 5.6 cm,  $\angle A = 40^\circ$  and the bisector of  $\angle A$  meets BC at D such that CD = 4 cm
44. a) A bus is travelling at a uniform speed of 50 km/ hr . draw the distance time graph and hence find i. the constant of variation ii. How far will it travel in 90 minutes ? iii. The time required to cover a distance of 300 km from the graph (or)  
b) Draw the graph of  $xy = 24$ ,  $x, y > 0$  using the graph find, i. y when  $x = 3$  and ii . x when  $y = 6$

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