SK-MDU-QP2

REGISTER NUMBER | | | | | | |

SK MODEL QUARTERLY - 10th 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) ***C**hoose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.*

1. Let A = {1, 2, 3, 4} and B = {4, 8, 9, 10}. A function f : A → B given by f = {(1, 4), (2, 8), (3, 9), (4, 10)} is a
   (1) Many-one function (2) Identity function
   (3) One-to-one function (4) Into function
2. f : X → Y where X = {– 1, – 2, – 3}, Y = {3, 4, 5} is given by f (x) = x+6, x ∈ X, then f is
   (1) onto (2) many to one (3) constant function (4) bijective
3. If $a_1 = a_2 = 2$, $a_n = a_{n-1} - 1$, then a_5 is
   (1) 1 (2) – 1 (3) 0 (4) – 2
4. The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is
   (1) 2025 (2) 5220 (3) 5025 (4) 2520
5. The solution of $(2x - 1)^2 = 9$ is equal to
   (1) − 1 (2) 2 (3) –1, 2 (4) None of these
6. For what value of k, will the system of equations 2x + 3y = k and (k - 1) x + (k + 2) y = 3k has infinite solutions ?
   (1) -7 (2) 5 (3) 7 (4) 0
7. Graph of a Quadratic polynomial is a
   (1) Straight line (2) circle (3) parabola (4) hyperbola
8. In a ΔABC, AD is the bisector of ∠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
9. In ΔLMN, L = 60°, M = 50° . If ΔLMN ~ ΔPQR then the value of ∠R is
   (1) 40^0 (2) 70^0 (3) 30^0 (4) 110^0

10. When proving that a quadrilateral is a trapezium, it is necessary to show
    (1) Two sides are parallel. (2) Two parallel and two non-parallel sides.
    (3) Opposite sides are parallel. (4) All sides are of equal length.
11. The point of intersection of $3x - y = 4$ and $x + y = 8$ is
    (1) (5,3) (2) (2,4) (3) (3,5) (4) (4,4)
12. 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
13. $(1+ \tan\theta + \sec\theta)(1+ \cot\theta - \operatorname{cosec}\theta)$ is equal to
    (1) 0 (2) 1 (3) 2 (4) –1
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 – Q.No 28 is Compulsory 10 x 2 = 20

15. If $B \times A = \{(-2, 3), (-2, 4), (0, 3), (0, 4), (3, 3), (3, 4)\}$ find A and B
16. Let $A = \{1, 2, 3, 4\}$ and $B = N$. Let $f : A \to B$ be defined by $f(x) = x^3$ then,
    (i) find the range of f (ii) identify the type of function
17. Solve $3x - 2 \equiv 0 \pmod{11}$
18. Evaluate : $1^2 + 3^2 + 5^2 + \ldots\ldots\ldots 29^2$
19. The hypotenuse of a right angled triangle is 25 cm and its perimeter 56 cm. Find the length of the smallest side.
20. Find the sum and product of the roots for each of the quadratic equations :
    $x^2 + 8x - 65 = 0$
21. If ΔABC is similar to ΔDEF such that BC = 3 cm, EF = 4 cm and area of $\Delta ABC = 54\ cm^2$. Find the area of ΔDEF
22. If AD is the bisector of $\angle BAC$. If AB = 10 cm, AC = 14 cm and BC = 6 cm, find BD and DC
23. If the area of Δ formed by (x, y), (1, 2), (2, 1) is 6 sq.units, prove that $x + y = 15$.
24. Find the intercepts made by the line $4x - 9y + 36 = 0$ on the coordinate axes.
25. Show that the straight lines $x - 2y + 3 = 0$ and $6x + 3y + 8 = 0$ are perpendicular.
26. Prove that $\sec^4\theta (1 - \sin^4\theta) - 2\tan^2\theta = 1$
27. Prove the identity $\frac{Sec\theta}{\text{Sin }\theta} - \frac{Sin\ \theta}{\text{Cos }\theta} = \cot\theta$
28. Find the LCM of each pair of the polynomials $a^2 + 4a - 12$, $a^2 - 5a + 6$ whose GCD is $a - 2$

Part III – 5 Marks – Q.No 42 is Compulsory 10 x 5 = 50

29. If $A = \{a, d\}$, $B = \{b, c, e\}$, $C = \{b, c, f\}$, then verify $A \times (B \cup C) = (A \times B) \cup (A \times C)$
30. If $f(x) = x^2$, $g(x) = 3x$ and $h(x) = x - 2$. Prove that $(f \circ g) \circ h = f \circ (g \circ h)$.
31. In an A.P., sum of four consective terms is 28 and their sum of their squares is 276. Find the four numbers
32. Evaluate : $8^3 + 9^3 + \ldots\ldots + 17^3$
33. Find the GCD of the given polynomial $3x^4 + 6x^3 - 12x^2 - 24x$, $4x^4 + 14x^3 + 8x^2 - 8x$

34. If $9x^4 + 12x^3 + 28x^2 + ax + b$ is a perfect square, find the values of a and b
35. An Aeroplane left 30 min 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. Find the original speed.
36. State and Prove Thales theorem
37. Rhombus PQRB is inscribed in DABC such that ∠B is one of its angle. P, Q and R lie on AB, AC and BC respectively. If AB = 12 cm and BC = 6 cm, find the sides PQ, RB of the rhombus
38. Without using Pythagoras theorem, show that the points (1,-4) , (2, –3) and (4, –7) form a right angled triangle.
39. A line makes positive intercepts on coordinate axes whose sum is 7 and it passes through (–3, 8). Find its equation.
40. If cosec θ + cot θ = P, then prove that $\frac{p^2-1}{p^2+1}$ = cos θ
41. If $\frac{cos^2\theta}{\sin\theta}$ =p $\frac{\sin\theta}{\cos\theta}$ = q the $p^2 q^2 (p^2 + q^2 + 3) = 1$
42. The area of a triangle is 5 sq.units. Two of its vertices are (2,1) and (3, –2). The third vertex is (x, y) where y = x + 3 . Find the coordinates of the third vertex.

Part IV – Answer All the Questions 2 x 8 = 16

43. a) Draw a triangle ABC of base BC = 8 cm, ∠A = 600 and the bisector of ∠A meets BC at D such that BD = 6 cm.
    b) Construct a triangle similar to a given triangle PQR with its sides equal to 2 / 3 of the corresponding sides of the triangle PQR (scale factor 2 / 3)
44. a) A garment shop announces a flat 50% discount on every purchase of items for their customers. Draw the graph for the relation between the Marked Price and the Discount. Hence find (i) the marked price when a customer gets a discount of ₹3250 (from graph) (ii) the discount when the marked price is ₹2500
    b) Draw the graph of xy = 36, x,y > 0. Using the graph find, (i) y when x =9 and (ii) x when y = 6