Register Number

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 f and g be two functions given by f = {(0, 1), (2, 0), (3, – 4), (4, 2), (5, 7)}
   g = {(0, 2) (1, 0), (2, 4), (– 4, 2), (7, 0)} then the range of f o g is
   (1) {0, 2, 3, 4, 5} (2) {– 4, 1, 0, 2, 7} (3) {1, 2, 3, 4, 5} (4) {0, 1, 2}
2. f (x) = $(x + 1)^3 - (x - 1)^3$ represents a function which is
   (1) linear (2) cubic (3) reciprocal (4) quadratic
3. The next term of an A.P: – 12 – 9, 6, – 3, ... is
   (1) 3 (2) 6 (3) 0 (4) None of these
4. Using Euclid's division lemma, if the cube of any positive integer is divided by 9 then the possible remainders are
   (1) 0, 1, 8 (2) 1, 4, 8 (3) 0, 1, 3 (4) 1, 3, 5
   If (x − 6) is the HCF of $x^2 - 2x - 24$ and $x^2 - kx - 6$ hen the value of k is
   (1) 3 (2) 5 (3) 6 (4) 8
6. 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
7. The LCM of $6x^2 y$, $9x^2 yz$, $12x^2 y^2 z$ is
   (1) 36 $xy^2 z^2$ b (2) 36 $x^2 y^2 z$ (3) 36 $x^2 y^2 z^2$ d (4) 36 $xy^2 z$

8. If in ΔABC, DE | | BC . AB = 3.6 cm, AC = 2.4 cm and AD = 2.1 cm then the length of AE is

   (1) 1.4 cm (2) 1.8 cm (3) .2 cm (4) 1.05 cm

9. If ΔABC is an isosceles triangle with ∠C = 90° and AC = 5 cm, then AB is

   (1) 2.5 cm (2) 5 cm (3) 10 cm (4) 5 2 cm

10. When proving hat a quadrilateral is a parallelogram by using slopes you must find

    (1) The slopes of two sides (2) The slopes of two pair of opposite sides

    (3) The lengths of all sides (4) Both the lengths and slopes f two side

11. If A is a point on the Y axis whose ordinate is 8 and B is a point on the X axis whose abscissae is 5 then the equation of the line AB is

    (1) 8x + 5y = 40 (2) 8x −5y = 40 (3) x = 8 (4) y = 5

12. The straight line given by the equation y = 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. tan θ cosec^2 θ – tan θ is equal to

    (1) sec θ (2) $\cot^2$ θ (3) sin θ (4) cot θ

14. a cot θ + b cosec θ = p and b ot θ + a cos c θ = q hen $p^2 - q^2$ is equal to

    (1) $a^2 - b^2$ (2) $b^2 - a^2$ (3) $a^2 +$ ^{2} (4) b a

Part II – 2 Marks – Q.No 28 is Compulsory 10 x 2 = 20

15. A relation 'f ' is defined by f (x) = x2 – 2 here, x ∈ {– 2, – 1, 0, 3}

    (i) List the elements of f (ii) If f a function

16. Let A = {1, 2, 3, 4 ....., 45} and R b t relation defined as "is square of" on A. Write R as a subset of A × A. Al o find he domain and range of R

17. A man has 532 flower pots. He wants to arrange them in rows such that each row contains 21 flower pots Find the number of completed rows and how many flower pots are left over

8 Find the sum of 22 t rms of the A.P x + y, x y, x – 3y, ...

19. Find th squar root $16x^2 + 9y^2 - 24xy + 24x - 18y + 9$

20. A ball ro ls down a slope and travels a distance dt = $t^2 - 0.75t$ feet in t seconds Find the time when e distance travelled by the ball is 11.25 feet.

21. Determine the nature of the roots for the quadratic equations $15x^2 + 11x + 2 = 0$

22. The perimeters of two similar triangles ABC and PQR are respectively 36 cm and 24 cm. If PQ =10 cm, find AB

23. Check whether AD is bisector of ∠A of ΔABC, AB = 5 cm, AC = 10 cm, BD = 1.5 cm and CD = 3.5 cm.
24 If the three points (3, –1), (a, 3) and (1, –3) are collinear, find the value of a
25. The hill in the form of a right triangle has its foot at (19, 3) . The inclination of the hill to the ground is 45˚. Find the equation of the hill joining the foot and top.
26. Prove that $\tan^2 \theta - \sin^2 \theta = \tan^2 \theta \sin^2 \theta$
27. Prove that $2(\sin^6 \theta + \cos^6 \theta) - 3(\sin^4 \theta + \cos^4 \theta) = 0$
28. Find the intercepts made by the line $4x - 9y + 36 = 0$ on the coo dinate axes.

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

29. Let A = The set of all natural numbers less than 8, B = The set of all prime numbers less than 8, C = The set of even prime number. Verify that A×(B –C) =(A×B) – (A × C)
30. If A = {5, 6}, B = {4, 5, 6}, C = {5, 6, 7}. Show that A × A = (B × B) ∩ (C × C).
31. Use Euclid's Division Algorithm to find the Highest Common Factor (HCF) of 10224 and 9648
32. In an A.P., sum of four consective terms is 28 and their sum of their squares is 276. Find the four numbers
33. Find the square root of the polynomials by division method
$121x^4 - 198x^3 - 183x^2 + 216x + 144$
4 Solve $pqx^2 = (p + q)^2 x + (p + q)^2 = 0$ by formula method
35. A passenger train takes 1 hr more than an express train to travel a distance of 240 km from Chennai to Virudhachalam The speed of passenger train is less than that of an express train by 20 km per hour. Find the average speed of both the trains
36. ABCD is a trapezium in which AB || DC and P,Q are points on AD and BC respectively, such that PQ || DC if PD = 18 cm, BQ = 35 cm and QC = 15 cm, find AD
37. If the points P(–1, – 4), Q (b, c) and R(5, –1) are collinear and if 2b + c = 4 , then find the values of b and c.
38. Let A (3, – 4), B (9, – 4), C (5, –7) and D (7 7). Show that ABCD is a trapezium
39. Find the equation of a line pass ng through (6,–2) and perpendicular to the line joining the points (6 7) and (2,–3)
40. If $\frac{\cos \theta}{1+Sin\ \theta}$ then prove that $\frac{a^2-1}{a^2+1} = \sin \theta$
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. Theorem : Angle Bisector Theorem

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

43. a. Construct a triangle similar to a given triangle PQR with its sides equal to 6 / 5 of the corresponding sides of the triangle PQR (scale factor 6 /5) (or)

b. 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.

44. a. Draw the graph of xy = 24, x,y > 0. Using the graph find, (i) y when x =3 and (ii) x when y = 6. (or)

b. 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.

****