CLASS : 10

Register Number

# FIRST REVISION EXAMINATION, JANUARY - 2024

## MATHEMATICS

Time Allowed : 3.00 Hours] [Max. Marks : 100

### SECTION – I

I. Answer all of the following: 14x1=14

1. Let $f(x) = x^2-x$, then $f(x-1) - f(x+1)$ is
   (a) $4x$ (b) $2-2x$ (c) $2-4x$ (d) $4x-2$
2. If there are 1024 relations from a set A = {1, 2, 3, 4, 5} to a set B, then the number of elements in B is
   (a) 3 (b) 2 (c) 4 (d) 8
3. The first term of an arithmetic progression is unity and the common difference is 4. Which of the following will be a term of this A.P.?
   (a) 4551 (b) 10091 (c) 7881 (d) 13531
4. If $2 + 4 + 6 + \ldots\ldots\ldots + 2k = 90$, then the value of k is
   (a) 8 (b) 9 (c) 10 (d) 11
5. $\frac{a^2}{a^2-b^2} + \frac{b^2}{b^2-a^2} =$
   (a) a-b (b) a+b (c) $a^2 - b^2$ (d) 1
6. Transpose of a column matrix is
   (a) unit matrix (b) diagonal matrix (c) column matrix (d) row matrix
7. The two tangents from an external points P to a circle with centre at O are PA and PB. If $\angle APB = 70^\circ$ then the value of $\angle AOB$ is
   (a) $100^\circ$ (b) $110^\circ$ (c) $120^\circ$ (d) $130^\circ$
8. The straight line given by the equation x = 11 is
   (a) parallel to X axis (b) parallel to Y axis
   (c) passing through the origin (d) passing through the point (0,11)
9. The perimeter of a triangle formed by the points (0,0), (1,0) and (0,1) is
   (a) $\sqrt{2}$ (b) 2 (c) $2 - \sqrt{2}$ (d) $2 + \sqrt{2}$
10. The angle of depression of the top and bottom of 20 m tall building from the top of a multistoried building are $30^\circ$ and $60^\circ$ respectively. The height of the multistoried building and the distance between two buildings (in metres) is
    (a) $20, 10\sqrt{3}$ (b) $30, 5\sqrt{3}$ (c) 20, 10 (d) $30, 10\sqrt{3}$
11. The total surface area of a hemi-sphere is how much times the square of its radius.
    (a) $3\pi$ (b) $2\pi$ (c) $\pi$ (d) $4\pi$
12. A child reshapes a cone made up of clay of height 24cm and radius 6cm into sphere, then the radius of sphere is
    (a) 24cm (b) 12cm (c) 6cm (d) 48cm
13. The range of first 10 prime number is
    (a) 9 (b) 20 (c) 27 (d) 5
14. Kamalam went to play a lucky draw contest. 135 tickets of the lucky draw were sold. If the probability of Kamalam winning is $1/9$, then the number of tickets bought by Kamalam is
    (a) 5 (b) 10 (c) 15 (d) 20

### Part - B

**Note: Answer any 10 Question. Question No. 28 is compulsory.** 10x2=20

15. Let A={1,2,3,4,...,45} and R be the relation defined as "is square of" on A. Write R as a subset of AxA Also, find the domain and range of R.
16. Show that the function A: N $\rightarrow$ N defined by $f(x) = m^2+m+3$ is one-one function.
17. If $p^2 \times q^1 \times r^4 \times s^3 = 315000$ then find p, q, r and s.
18. Find the 8th term of the G.P. 9,3,1,.....
19. Determine the quadratic equations, whose sum and product of roots are -9, 20
20. If $A = \begin{bmatrix} 5 & 2 & 2 \\ -\sqrt{17} & 0.7 & 5/2 \\ 8 & 3 & 1 \end{bmatrix}$ then verify $(A^T)^T = A$.
21. A vertical stick of length 6 m casts a shadow 400 cm long on the ground and at the same time a tower casts a shadow 28 m long. Using similarity, find the height of the tower.

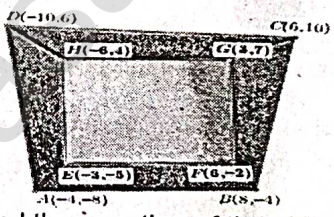
CP / 10 / Mat / 1

22. Find the Slope of a line joining the points $(5, \sqrt{5})$ with the origin.
23. Calculate the slope and y intercept of the straight line $8x - 7y + 6 = 0$
24. Check whether the given lines are parallel or perpendicular. $\frac{x}{3} + \frac{y}{4} + \frac{1}{7} = 0$ and $\frac{2x}{3} + \frac{y}{2} + \frac{1}{10} = 0$
25. Prove that $\sqrt{\frac{1 + \cos\theta}{1 - \cos\theta}} = \text{cosec}\theta + \cot\theta$
26. Find the maximum volume of a cone that can be carved out of a solid hemisphere of radius r units.
27. The standard deviation and mean of a data are 6.5 and 12.5 respectively. Find the coefficient of variation.
28. The height of a cylindrical pillar is 15 m and the diameter of its base is 350 cm. What will be the cost of painting the curved surface of the pillar at Rs.25 perm²?

## Part - C

**Note: Answer any 10 Question. Question No. 42 is compulsory.** **10x5=50**

29. Let A = {1, 2, 3, 4} and B = {2, 5, 8, 11, 14} be two sets. Let $f : A \to B$ be a function given by $f(x) = 3x - 1$. Represent this function (i) by arrow diagram (ii) in a table form (iii) as a set of ordered pairs (iv) in a graphical form.
30. 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 $(A \cap B) \times C = (A \times C) \cup (B \times C)$
31. The houses of a street are numbered from 1 to 49. Senthil's house is numbered such that the sum of numbers of the houses prior to Senthil's house is equal to the sum of numbers of the houses following Senthil's house. Find Senthil's house number?
32. Find the values of a and b if the polynomials are perfect square $ax^4 + bx^3 + 361x^2 + 220x + 100$.
33. If $A = \begin{pmatrix} 1 & -1 \\ 2 & 3 \end{pmatrix}$ show that $A^2 - 4A + 5I_2 = 0$.
34. State and prove Thales theorem.
35. An Aeroplane leaves an airport and flies due north at a speed of 1000 km/hr. At the same time, another aeroplane leaves the same airport and flies due west at a speed of 1200 km/hr. How far apart will be the two planes after 1½ hours?
36. In the figure, the quadrilateral swimming pool shown is surrounded by concrete patio. Find the area of the patio.




37. A(-3,0) B(10, -2) and C(12,3) are the vertices of $\Delta ABC$. Find the equation of the altitude through A and B.
38. The top of a 15 m high tower makes an angle of elevation of 60° with the bottom of an electronic pole and angle of elevation of 30° with the top of the pole. What is the height of the electric pole?
39. A toy is in the shape of a cylinder surmounted by a hemisphere. The height of the toy is 25 cm. Find the total surface area of the toy if its common diameter is 12 cm.
40. Find the mean and variance of the first n natural numbers.
41. Two dice are rolled together. Find the probability of getting a doublet or sum of faces as 4.
42. Iniya bought 50 kg of fruits consisting of apples and bananas. She paid twice as much per kg for the apple as she did for the banana. If Iniya bought ₹ 1800 worth of apples and ₹ 600 worth bananas, then how many kgs of each fruit did she buy?

## Part - D

**Note: Answer all the questions:** **2x8=16**

43. (a) 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 $^2/_3 < 1$) **(OR)**
    (b) Draw the two tangents from a point which is 10 cm away from the centre of a circle of radius 5 cm. Also, measure the lengths of the tangents.
44. (a) A school announces that for a certain competitions, the cash price will be Distributed for all the participants equally as show below.

| No. of participants (x) | 2 | 4 | 6 | 8 | 10 |
|---|---|---|---|---|---|
| Amount for each participant in ₹ (y) | 180 | 90 | 60 | 45 | 30 |

    (i) Find the constant of variation.
    (ii) Graph the above data and hence, find how much each participant will get if the number of participants are 12.
    **(OR)**
    (b) Draw the graph of $y = x^2+3x-4$ and use it to solve $x^2+3x-4=0$