

CLASS : 10Register
Number**SECOND REVISION EXAMINATION, FEBRUARY - 2024**

Time Allowed : 3.00 Hours]

MATHEMATICS

[Max. Marks : 100

SECTION - I

14x1=14

I. Answer all of the following:

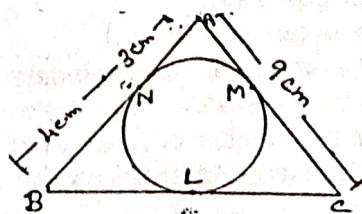
- Let $A = \{1,2,3,4\}$ and $B = \{4,8,9,10\}$. A function $f : A \rightarrow B$ given by $f = \{(1,4), (2,8), (3,9), (4,10)\}$ is a
 - Many - one function
 - Identify function
 - One - to - one function
 - Into function.
- If $f : A \rightarrow B$ is a bijective function and $n(B) = 7$ then $n(A)$ is equal to
 - 7
 - 49
 - 1
 - 14
- $7^{4k} \equiv \dots \pmod{100}$
 - 1
 - 2
 - 3
 - 4
- The value of $(1^3 + 2^3 + 3^3 + \dots + 15^3) - (1 + 2 + 3 + \dots + 15)$ is
 - 14400
 - 14200
 - 14280
 - 14520
- $\frac{3y-3}{y} \div \frac{7y-7}{3y^2}$ is
 - $\frac{9y}{7}$
 - $\frac{9y^3}{(21y-21)}$
 - $\frac{21y^2 - 42y + 21}{3y^3}$
 - $\frac{7(y^2-2y+1)}{y^2}$
- Find the matrix X if $2X + \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix} = \begin{pmatrix} 5 & 7 \\ 9 & 5 \end{pmatrix}$
 - $\begin{bmatrix} -2 & -2 \\ 2 & -1 \end{bmatrix}$
 - $\begin{bmatrix} 2 & 2 \\ 2 & -1 \end{bmatrix}$
 - $\begin{bmatrix} 1 & 2 \\ 2 & 2 \end{bmatrix}$
 - $\begin{bmatrix} 2 & 1 \\ 2 & 2 \end{bmatrix}$
- The solution of $(2x-1)^2 = 9$ is equal to
 - 1
 - 2
 - 1, 2
 - None of these
- If slope of the line PQ is $1/\sqrt{3}$ then slope of the perpendicular bisector of PQ is
 - $\sqrt{3}$
 - $-\sqrt{3}$
 - $1/\sqrt{3}$
 - 0
- $(2,1)$ is the point of intersection of two lines.
 - $x - y - 3 = 0; 3x - y - 7 = 0$
 - $x + y = 3; 3x + y = 7$
 - $3x + y = 3; x + y = 7$
 - $x + 3y - 3 = 0, x - y - 7 = 0$
- If $\sin\theta + \cos\theta = a$ and $\sec\theta + \operatorname{cosec}\theta = b$, then the value of $b(a^2-1)$ is equal to
 - 2a
 - 3a
 - 0
 - 2ab
- The total surface area of a cylinder whose radius is $1/3$ of its height is
 - $\frac{9\pi h^2}{8}$ sq. units
 - $24\pi h^2$ sq. units
 - $\frac{8\pi h^2}{9}$ sq. units
 - $\frac{56\pi h^2}{9}$ sq. units
- If the radius and height of the cylinder and cone are same then the volume of the cone will be ----- times the volume of the cylinder
 - 3
 - 2
 - $1/3$
 - $1/2$
- If the standard deviation of x, y, z is p then the standard deviation of $3x+5, 3y+5, 3z+5$ is
 - $3p+5$
 - $3p$
 - $p+5$
 - $9p+15$
- If a letter is chosen at random from the English alphabets $\{a, b, \dots, z\}$, then the probability that the letter chosen precedes x
 - $12/13$
 - $1/13$
 - $23/26$
 - $3/26$

SECTION - II

10x2=20

II. Answer any 10 questions. Question No. 28 is compulsory.

- Find K if $f \circ f(k) = 5$, where $f(k) = 2k-1$.
- Let $f(x) = 2x+5$, if $x \neq 0$ then find $\frac{f(x+2) - f(2)}{x}$
- Find the HCF of 252525 and 363636.
- Find the sum $3 + 1 + 1/3 + \dots \infty$
- Find the excluded value of the following expression $\frac{x}{x^2+1}$
- Determine the nature of the roots for the following quadratic equation $\sqrt{2}t^2 - 3t + 3\sqrt{2} = 0$.
- In figure ABC is circumscribing a circle. Find the length of BC.



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22. The line p passes through the points (3,-2), (12,4) and the line q passes through the points (6,-2) and (12,2). Is p parallel to q?
23. Find the equation of a straight line which has slope $-\frac{5}{4}$ and passing through the point (-1, 2).
24. A kite is flying at a height of 75m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60° . Find the length of the string, assuming that there is no slack in the string.
25. Find the diameter of a sphere whose surface area is 154 m^2 .
26. The slant height of a frustum of a cone is 5 cm and the radii of its ends are 4 cm and 1 cm. Find its curved surface area.
27. Find the range of the following distribution.

Age (in years)	16-18	18-20	20-22	22-24	24-26	26-28
Number of students	0	4	6	8	2	2

28. Construct a 3×3 matrix whose elements are given by $a_{ij} = \frac{(i+j)^3}{3}$

SECTION - III

III. Answer the following any 10 questions. Q.No.42 is compulsory. 10x5=50

29. Let $A = \{1,2,3,4\}$ and $B = \{2,5,8,11,14\}$ be two sets. Let $f: A \rightarrow B$ 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. Find x if $gff(x) = fgg(x)$, given $f(x) = 3x+1$ and $g(x) = x+3$.
31. The ratio of 6th and 8th term of an A.P is 7:9. Find the ratio of 9th term to 13th term.
32. Find the sum to n terms of the series $7+77+777+\dots$ to n terms.
33. Find the square roots of the following polynomial by division method $37x^2 - 28x^3 + 4x^4 + 42x + 9$.
34. If α, β are the roots of the equation $3x^2+7x-2=0$, find the values of i) $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ ii) $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}$
35. If $A = \begin{bmatrix} 5 & 2 & 9 \\ 1 & 2 & 8 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{bmatrix}$ verify that $(AB)^T = B^T A^T$.
36. State and prove Pythagoras theorem.
37. Find the value of k, if the area of a quadrilateral is 28 sq. units, whose vertices are taken in order (-4,-2), (-3,k), (3,-2) and (2,3).
38. If $\frac{\cos \alpha}{\cos \beta} = m$ and $\frac{\cos \alpha}{\sin \beta} = n$ then prove that $(m^2+n^2) \cos^2 \beta = n^2$.
39. A funnel consists of a frustum of a cone attached to a cylindrical portion 12 cm long attached at the bottom. If the total height be 20 cm, diameter of the cylindrical portion be 12 cm and the diameter of the top of the funnel be 24 cm. Find the outer surface area of the funnel.
40. The internal and external diameter of a hollow hemispherical shell are 6 cm and 10 cm respectively. If it is melted and recast into a solid cylinder of diameter 14 cm, then find the height of the cylinder.
41. Two unbiased dice are rolled once. Find the probability of getting,
 i) a doublet (equal numbers on both dice)
 ii) the product as a prime number
 iii) the sum as a prime number
 iv) the sum as 1.
42. If the vertices of a $\triangle ABC$ are $A(6,2)$, $B(-5,-1)$ and $C(1,9)$
 i) Find the equation of median
 ii) Find the equation of altitude.

SECTION - IV

IV. Answer the following:

2x8=16

43. a) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{2}{3}$ of the corresponding sides of the triangle PQR (Scale factor $\frac{2}{3} < 1$) (OR)
 b) Take a point which is 11 cm away from the centre of a circle of radius 4 cm and draw the two tangents to the circle from that point.
44. a) The following table shows the data about the number of pipes and the time taken to fill the same tank.

No. of pipes (x)	2	3	6	9
Time taken (in min) (y)	45	30	15	10

Draw the graph for the above data and hence

- i) Find the time taken to fill the tank when five pipes are used.
 ii) Find the number of pipes when the time is 9 minutes. (OR)
 b) Discuss the nature of solutions of the following quadratic equation. $x^2+2x+5=0$.