

10

Time : 3.00 Hrs.

Second Revision Examination - 2024
MATHEMATICS

Register No.

Marks : 100

14 x 1 = 14

I. Choose the best answer

- If $n(A \times B) = 6$ and $A = \{1, 3\}$ then $n(B)$ is
a) 6 b) 3 c) 2 d) 1
- $f(x) = (x+1)^3 - (x-1)^3$ represents a function which is
a) cubic b) linear c) quadratic d) reciprocal
- The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \dots$ is
a) $\frac{2}{3}$ b) $\frac{1}{24}$ c) $\frac{1}{27}$ d) $\frac{1}{81}$
- The sum of first n terms of the series $a, 3a, 5a, \dots$ is
a) na b) $(2n-1)a$ c) n^2a d) n^2a^2
- If $(x-6)$ is the HCF of $x^2 - 2x - 24$ and $x^2 - kx - 6$, the value of k is
a) 8 b) 6 c) 5 d) 3

6. Find the matrix x if $2x + \begin{bmatrix} 1 & 3 \\ 5 & 7 \end{bmatrix} = \begin{bmatrix} 5 & 7 \\ 9 & 5 \end{bmatrix}$

a) $\begin{bmatrix} 2 & 1 \\ 2 & 2 \end{bmatrix}$ b) $\begin{bmatrix} 1 & 2 \\ 2 & 2 \end{bmatrix}$ c) $\begin{bmatrix} -2 & -2 \\ 2 & -1 \end{bmatrix}$ d) $\begin{bmatrix} 2 & 2 \\ 2 & -1 \end{bmatrix}$

7. Which of the following be added to make $x^4 + 64$ perfect square
a) $4x^2$ b) $8x^2$ c) $-8x^2$ d) $16x^2$

8. In $\triangle ABC$ & $\triangle EDF$, $\frac{AB}{DE} = \frac{BC}{FD}$ they will be similar, when

a) $\angle B = \angle D$ b) $\angle A = \angle D$ c) $\angle B = \angle E$ d) $\angle A = \angle F$

9. The equation of a line passing through the origin and perpendicular to the line $7x - 3y + 4 = 0$ is
a) $7x - 3y + 4 = 0$ b) $3x - 7y + 4 = 0$ c) $7x - 3y = 0$ d) $3x + 7y = 0$

10. In a Right angled Triangle, right angled at B. If the side BC is parallel to x-axis then the slope of AB is

a) $\sqrt{3}$ b) $\frac{1}{\sqrt{3}}$ c) 1 d) not defined

11. If the ratio of the height of a tower and the length of its shadow is $\sqrt{3} : 1$, then the angle of elevation of the sun has measure

a) 90° b) 60° c) 45° d) 30°

12. The ratio of the volume of a cylinder, cone and a sphere. If each has same diameter and height is

a) 1 : 2 : 3 b) 3 : 1 : 2 c) 2 : 1 : 3 d) 1 : 3 : 2

13. If the probability of non-happening of an event is q , then the probability of happening of the Event is

a) $1 - q$ b) q c) $\frac{q}{2}$ d) $2q$

14. The variance of first 20 natural numbers is

a) 32.25 b) 33.25 c) 44.25 d) 30

II. Answer any 10 from the following

15. If $A = B = \{p, q\}$ then find $A \times A$, $B \times A$

16. If $a^b \times b^a = 800$ then find the value of a, b

17. Find the sum of $6 + 13 + 20 + \dots + 97$

18. Find the GCD of $9a^3b^2, 12a^2b^2c$

19. Solve $2x^2 - x - 1 = 0$ by completing square method.

20. $A = \begin{bmatrix} 0 & 4 & 9 \\ 8 & 3 & 7 \end{bmatrix}$, $B = \begin{bmatrix} 7 & 3 & 8 \\ 1 & 4 & 9 \end{bmatrix}$ find $B - 5A$

21. A man goes 18m due east and then 24 m due north. Find the distance of his current position from the starting point.

22. Find the slope of a line joining the points $(5, \sqrt{5})$ and the origin.

23. Show that $2x + 3y - 8 = 0$ and $4x + 6y + 18 = 0$ are parallel.

Show that $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} = \sec\theta + \tan\theta$

If the total surface area of a cone of radius 7cm is 704 cm^2 , then find its slant height.

Find the range and coefficient of range of the following data. 25, 67, 48, 53, 18, 39, 44

What is the probability that a leap year selected at Random will contain 53 Saturdays.

Let $A = \{-1, 1\}$ and $B = \{0, 2\}$. If the function $f: A \rightarrow B$ defined by $f(x) = ax + b$ is onto function find a and b.

Answer any 10 from the following

10 x 5 = 50

29. A function $f: [-5, 9] \rightarrow R$ is defined as follows.

$$f(x) = \begin{cases} 6x + 1, & -5 \leq x < 2 \\ 5x^2 - 1, & 2 \leq x < 6 \\ 3x - 4, & 6 \leq x \leq 9 \end{cases}$$

i) $2f(4) + f(8)$ ii) $\frac{2f(-2) - f(6)}{f(4) + f(-2)}$

30. If $f(x) = x^2$, $g(x) = 3x$, $h(x) = x - 2$, then prove that $(f \circ g) \circ h = f \circ (g \circ h)$

31. The sum of three consecutive terms that are in A.P is 27 and their product is 288. Find the three terms.

32. Rekha has 15 squares colour papers of sizes 10cm, 11cm, 12cm, ... 24 cm. How many area can be decorated with there colour papers.

33. Solve : $3x - 2y + z = 2$, $2x + 3y - z = 5$, $x + y + z = 6$.

34. $36x^4 - 60x^2 + 61x^2 - mx + n$ is a perfect square. Find the value of m and n.

35. Find the equation of straight line parallel to Y axis and passing through the point of intersection of the lines $4x + 5y = 13$ and $x - 8y + 9 = 0$

36. State and prove Angle bisector theorem.

37. If the points $P(-1, -4)$, $Q(b, c)$, $R(5, -1)$ are collinear and if $2b + c = 4$, then find value of b & c.

38. The top of 15m high Tower makes an angle of elevation of 60° with the bottom of an electric pole and angle of elevation of 30° with the top of the pole. What is the height of the electric pole?

39. Arul has to make arrangements for the accomodation of 150 person for his family function for this purpose, he plans to build a Tent which is in the shape of cylinder surmounted by a cone. Each person occupies 4 sq.m of the space on ground and 40 cu. meter of air to breathe. What should be the height of the conical part of the Tent if the height of cylinder part is 8m?

40. The mean and variance of seven obseration are 8 and 16 respectively. If five of there are 2, 4, 10, 12 and 14 then find the remaining two observations.

41. In a class of 50 students, 28 opted for NCC, 30 opted for NSS and 18 opted for both NCC & NSS. If one of the student is selected at random. Find the probability that the students

1) opted for NCC but not NSS 2) opted for NSS but Not NCC. 3) opted for Exactly one of them

42. Solve : $px^2 - (p+q)x + (p+q)^2 = 0$

IV. Answer all the questions.

2 x 8 = 16

43. a) Draw a triangle ABC of base $BC = 8\text{cm}$, $\angle A = 60^\circ$ and the bisector of $\angle A$ meets BC at D such that $BD = 6\text{cm}$.
(OR)

b) Draw the two tangents from a point which is 5cm away from the centre of a circle of diameter 6cm. Also measure the lengths of the tangents.

44. a) Graph the following linear equation $y = \frac{1}{2}x$. Identify the constant of variation and verify it with the graph. Also

1) Find y when $x = 9$ 2) Find x when $y = 7.5$

(OR)

b) Draw the graph of $y = x^2 + 4x + 3$ and hence find the roots of $x^2 + x + 1 = 0$