विद्या सर्वार्थ साधिका

ANANDALAYA

PERIODIC TEST – 3

Class: XI

Subject : Mathematics (041) M.M : 40

Date : 08 −01−2025 Time: 1Hour 30 Minutes

General Instructions:

1. The question paper consists of 21 questions divided into 4 sections A, B, C and D
2. All questions are compulsory.
3. Section A comprises of 9 questions of 1 mark each.
4. Section B comprises of 6 questions of 2 marks each. Internal choice has been provided in two questions.
5. Section C comprises of 5 questions of 3 marks each. Internal choice has been provided in two questions.
6. Section D comprises of 1 case based integrated units of assessment (04 marks) with sub- parts of the values of 1, 1 and 2 marks each respectively.
7. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

SECTION - A

1. The equation of line whose intercepts on the axes of x *and* y are -2 *and* 3 respectively is _____. (1)

   (A) $3x - 2y = 6$ (B) $3x - 2y + 6 = 0$ (C) $3x + 2y = 6$ (D) $3x + 2y = -6$

2. The distance of the point $P(1, -3)$ from the line $2y - 3x = 4$ is_____units. (1)

   (A) $\sqrt{13}$ (B) $\frac{7}{\sqrt{13}}$ (C) $\frac{11}{\sqrt{13}}$ (D) $\frac{15}{\sqrt{13}}$

3. Find the equation of parabola whose vertex is at origin, axis along the x-axis and passes through the point (2, 3). (1)

   (A) $y^2 = 9x$ (B) $x^2 = 9y$ (C) $y^2 = -\frac{9}{2}x$ (D) $y^2 = \frac{9}{2}x$

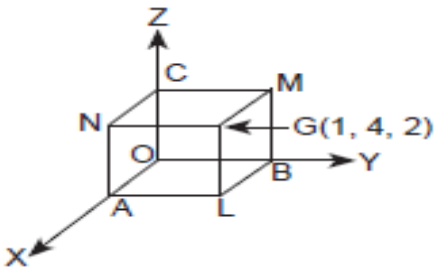
4. Find the radius of the circle $x^2 + y^2 - 4x + 6y = 5$. (1)

   (A) 18 (B) $3\sqrt{2}$ (C) 9 (D) 3

5. What will be the coordinates of the point N? (1)

   (A) $(0, 4, 2)$ (B) $(1, 4, 0)$

   (C) $(1, 0, 2)$ (D) $(0, 0, 2)$



6. What is the eccentricity of hyperbola whose vertices and foci are $(\pm 2, 0)$ and $(\pm 3, 0)$ respectively? (1)

   (A) $\frac{2}{3}$ (B) $\frac{3}{2}$ (C) $\frac{5}{2}$ (D) $\sqrt{\frac{3}{2}}$

7. Evaluate: $\lim_{x \to 0} \frac{sin2x + sin6x}{sin5x - sin3x}$ (1)

   (A) 4 (B) -4 (C) $\frac{1}{4}$ (D) $\frac{1}{2}$

8. Evaluate: $\lim_{x \to \frac{\pi}{4}} \frac{sec^2x - 2}{tanx - 1}$. (1)

   (A) 1 (B) 2 (C) 4 (D) $\frac{1}{2}$

9. The point on y-axis which is at a distance of $\sqrt{13}$ units from the point (2, 2, 3) is _____. (1)
(A) $(2,2,2)$ (B) $(2,0,0)$ (C) $(0,0,2)$ (D) $(0,2,0)$

SECTION - B

10 Find equation of a circle which passes through (3, 6) and touches the axes. (2)

11. Using distance formula, prove that the points $A(3,-2,4), B(1,1,1) and\ C(-1,4,-2)$ are collinear. (2)

12. Find the equation to the straight line passing through the point of intersection of the lines $5x - 6y - 1 = 0$ and $3x + 2y + 5 = 0$ and perpendicular to the line $3x - 5y + 11 = 0$ (2)

OR

Find the points on x − axis whose distance from the line $4x + 3y - 12 = 0$ is 8 units.

13. Find the derivative of $y = x^2 tanx$ with respect to x. (2)

OR

Find $\frac{dy}{dx}$, if $y = \frac{e^x}{1+sinx}$.

14. Find equation of the line drawn perpendicular to the line $\frac{x}{4} + \frac{y}{6} = 1$ through the point, where it meets $y - axis$. (2)

15. Find the co-ordinates of the vertices , foci , eccentricity and latus rectum of the ellipse: (2)
$4x^2 + y^2 = 100$.

SECTION - C

16. Find the equation of a circle concentric with the circle $x^2 + y^2 - 6x + 12y + 15 = 0$ and has double of its area. (3)

17. Three vertices of a parallelogram $ABCD$ are $A(0,1,2), B(2,-1,3)$ and $C(1,-3,1)$. Find the coordinates of D. Also show that $ABCD$ is a square. (3)

18. Evaluate: $\lim_{x \to 0} \ cosecx - cotx.$ (3)

OR

Find the derivative of $cosec$ x, by using first principle method.

19 Find the equation of the perpendicular bisector of the line joining the points $A(2,3) and B\ (6,-5)$. (3)

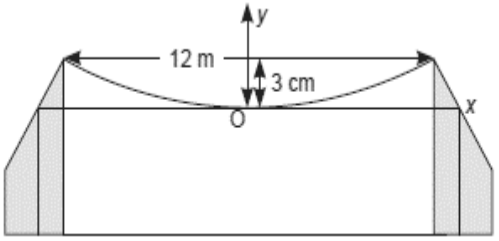
OR

Find the equation of the lines which passes through the point (3, 4) and cuts off intercepts from the coordinate axes such that their sum is 14.

20 Find the derivative of $y = \frac{2}{3} tanx - \frac{5}{cosx} - \frac{2tanx}{secx} + 10\sqrt{x}$, with respect to x. (3)

SECTION – D

21. A beam is supported at its ends by supports which are 12m apart. Since the load is concentrated at its centre, there is a deflection of 3 cm at the centre and defected beam is in the shape of parabola. Now considering the centre of beam is at origin as shown in figure. Answer the following:



(i) The equation of parabola will be of the form is _____ (1)
(ii) The focus of parabola is _____ (1)
(iii) The length of latus rectum of the parabola is____ (2)

OR

(iii) How far from the centre is the deflection 1 cm?