ANANDALAYA
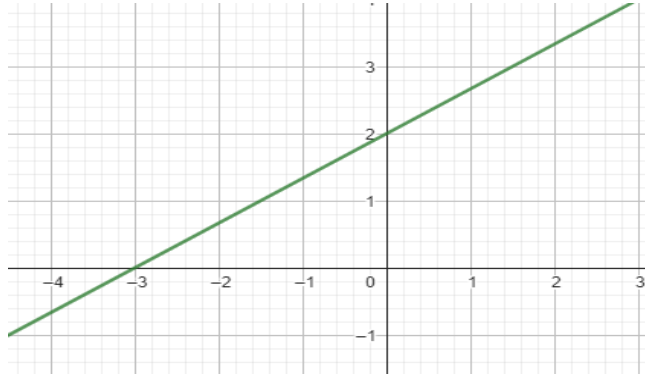## PERIODIC TEST – 3
Class: XI

Subject : Mathematics	M. M : 40
Date : 08 – 01 – 2024	Time :1 Hr 30 min

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 mark) with sub- parts of the values of 2, 1 and 1 marks each respectively.
7. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

SECTION - A

1. What is the length of the latus rectum of the ellipse $16x^2 + y^2 = 16$? (1)
   (A) $-\frac{1}{2}$ (B) $\frac{1}{2}$ (C) 2(D) $\frac{1}{4}$

2. Slope of the given line is _____ (1)

   (A) $-\frac{2}{3}$ (B) $\frac{2}{3}$

   (C) $\frac{3}{2}$ (D) $-\frac{3}{2}$

3. If distance of point between the points $(a, 0, 1)$ and $(0, 1, 2)$ is $\sqrt{27}$, then value(s) of a is _____. (1)
   (A) ± 7 (B) 25   (C) ± 5 (D) 27

4. Find the value of k, if the straight line $2x + 3y + 4 + k(6x - y + 12) = 0$ is perpendicular to the line $7x + 5y - 4 = 0$. (1)
   (A) $-\frac{29}{37}$ (B) $\frac{29}{37}$ (C) $\frac{37}{29}$ (D) 3

5. What will be the coordinates of point on x-axis which is equidistant from the points $P(2, 2, 2)$ and $Q(5, 5, 4)$. (1)
   (A) $(9, 0, 0)$ (B) $(0, 9, 0)$(C) $(-9, 0, 0)$ (D) $(8, 0, 0)$

6. Find the radius of the circle $2x^2 + 2y^2 = 25$. (1)
   (A) 5   (B) $\frac{5}{\sqrt{2}}$ (C) $\frac{5}{2}$ (D) $\sqrt{\frac{5}{2}}$

7. Evaluate: $\lim_{\theta \to 0} \frac{1 - \cos m\theta}{1 - \cos n\theta}$ (1)
   (A) $\frac{m^2}{n^2}$ (B) $-\frac{m^2}{n^2}$ (C) $\frac{n^2}{m^2}$ (D) $\frac{m}{n}$

8. Evaluate : $\lim_{x \to 3} \frac{x^5 - 243}{x^3 - 27}$. (1)
   (A) 81   (B) 30   (C) 15   (D) $\frac{5}{3}$

9. Equation of a circle with centre C $(3, 3)$ and touches both the axes is _____. (1)
(A) $x^2 + y^2 - 6x - 6y + 9 = 0$
(B) $x^2 - y^2 - 6x - 6y + 9 = 0$
(C) $x^2 + y^2 + 6x + 6y + 9 = 0$
(D) $x^2 + y^2 - 6x - 6y - 9 = 0$

SECTION - B

10. Evaluate: $\lim\limits_{x \to 0} \dfrac{tanx - sinx}{x^3}$. (2)

11. Show that the points $(5, -1, 1),\ (7, -4, 7),\ (1 - 6, 10)\ and\ (-1, -3, 4)$ are the vertices of a rhombus. (2)

12. Find the equation of the line passing through $(-3, 5)$ and perpendicular to the line through the points $(2, 5)\ and\ (-3, 6)$. (2)

OR

Find the equation of the lines through the point $(3, 2)$ which make an angle of $45°$ with the line $x - 2y = 3$.

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

OR

Evaluate: $\lim\limits_{x \to 0} \dfrac{tan3x - sinx}{3x - sin^2 x}$.

14. Find the coordinates of the focus, the equation of directrix, vertex and length of latus rectum for the parabola $y^2 = -12x$. (2)

15. Find the equation of the line passing through the mid-point of the line segment joining the points $(1, 3)\ and\ (2, -1)$ and parallel to the line $3x - y = 7$. (2)

SECTION - C

16. Find the equation of the line passing through the point $(1, 3)$ such that the intercept on the *y*-axis exceeds the intercept on the *x*-axis by 4. (3)

17. Determine the point in YZ-plane which is equidistant from three points $A\ (2, 0, 3), B\ (0, 3, 2)$ and $C\ (0, 0, 1)$. (3)

18. Evaluate: $\lim\limits_{x \to \frac{\pi}{2}} \dfrac{1 + cos\ 2\ x}{(\pi - 2x)^2}$. (3)

OR

Find the derivative of cot *x*, by using first principle method.

19. Find the equation of the circle which passes through the centre of the circle $x^2 + y^2 + 8x + 10y - 7 = 0$ and is concentric with the circle $2x^2 + 2y^2 - 8x - 12y - 9 = 0$. (3)

OR

Find the equation of a circle whose centre is $(3, -2)$ and which passes through the inter-section of the lines $5x + 7y = 3\ and\ 2x - 3y = 7$.

20. Find the derivative of $y = \dfrac{sinx + cosx}{sinx - cosx}$, with respect to x. (3)

SECTION - D

21. A man is running on a race course such that the sum of distances of two flags posts from him is always 26 m and distance between two flag post is 10 m.

i) The equation of the path is _____ (2)
ii) The eccentricity of the path is _____ (1)
iii) The length of latus rectum of the curve is_____ (1)