

# 2020 January 8 Shift 1

EE24BTECH11001 - ADITYA TRIPATHY

16. Let two points be  $A(1, -1)$  and  $B(0, 2)$ . If a point  $P(x', y')$  be such that area of  $\Delta PAB = 5$  sq. units and it lies if the line,  $3x + y - 4\lambda = 0$ , then the value of  $\lambda$  is :

- a) 4                                      b) 1                                      c) -3                                      d) 3

17. The shortest distance between the lines

$$\frac{x-3}{3} = \frac{y-8}{-1} = \frac{z-3}{-1}$$

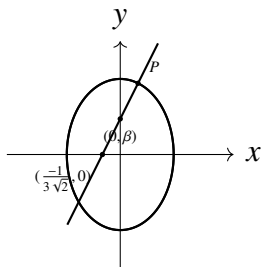
And

$$\frac{x+3}{3} = \frac{y+7}{2} = \frac{z-6}{1} \quad (1)$$

- a)  $2\sqrt{30}$                                       b)  $\frac{7\sqrt{30}}{2}$                                       c) 3                                      d)  $3\sqrt{30}$

18. Let the line  $y = mx$  and the ellipse  $2x^2 + y^2 = 1$  intersect a point  $P$  in the first quadrant. If the normal to this ellipse at  $P$  meets the co-ordinate axes at  $(\frac{-1}{3\sqrt{2}}, 0)$  and  $(0, \beta)$ , then  $\beta$  is equal to

- a)  $\frac{2}{\sqrt{3}}$                                       b)  $\frac{2}{3}$   
c)  $\frac{2\sqrt{2}}{3}$                                       d)  $\frac{\sqrt{2}}{3}$



19. If  $c$  is a point at which Rolle's Theorem holds for the function,

$$f(x) = \log_e \left( \frac{x^2 + \alpha}{7x} \right) \quad (2)$$

in the interval  $(3, 4)$ , where  $\alpha \in R$ , then  $f''(c)$  is equal to :

- a)  $\frac{-1}{24}$                                       b)  $\frac{-1}{12}$                                       c)  $\frac{\sqrt{3}}{7}$                                       d)  $\frac{1}{12}$

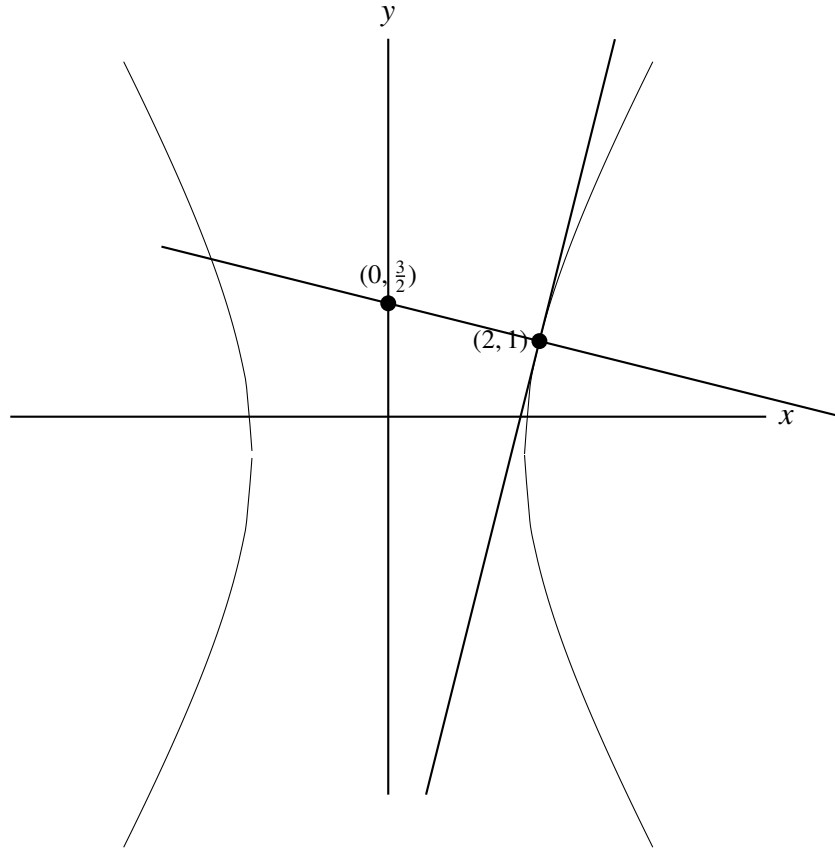
20. Let

$$f(x) = x \cos^{-1}(\sin(-|x|)), x \in \left( \frac{-\pi}{2}, \frac{\pi}{2} \right) \quad (3)$$

, then which of the following is true

- a)  $f(0) = \frac{-\pi}{2}$   
b)  $f'$  is decreasing in  $(\frac{-\pi}{2}, 0)$  and increasing in  $(0, \frac{\pi}{2})$   
c)  $f$  is not differentiable at  $x = 0$   
d)  $f'$  is increasing in  $(\frac{-\pi}{2}, 0)$  and decreasing in  $(0, \frac{\pi}{2})$

21. An urn contains 5 red marbles, 4 black marbles and 3 white marbles. Then the number of ways in which 4 marbles can be drawn so that at most three of the are red is.
22. Let the normal at a point  $P$  on the curve  $y^2 - 3x^2 + y + 10 = 0$  intersect the  $y$ -axis at  $(0, \frac{3}{2})$ . If  $m$  is the slope of the tangent at  $P$  to the curve, te  $|m|$  is equal to



23. The least positive value of ' $a$ ' for which the equation

$$2x^2 + (a - 10)x + \frac{33}{2} = 2a \quad (4)$$

has real roots is

24. The sum

$$\sum_{k=1}^{20} (1 + 2 + 3 + \cdots + k) \quad (5)$$

is

25. The number of all  $3 \times 3$  matrices  $A$ , with entries from the set  $\{-1, 0, 1\}$ , such that the sum of the diagonal elements of  $(AA^T)$  is 3, is