



# RK VISION ACADEMY

NEET | IIT – JEE | FOUNDATION

CBSE PRACTICE PAPER(2024)

(Mathematics)

Grade : XII

marks

Chapter: AOD Set-2

minutes

Marks: 40

Time: 90

## SECTION A

(This section comprises of Multiple-choice questions (MCQ) of 1 mark each.)

- The abscissa of the point on the curve  $3y = 6x - 5x^3$ , the normal at which passes through origin is:  
(A) 1 (B)  $1/3$  (C) 2 (D)  $1/2$
- The two curves  $x^3 - 3xy^2 + 2 = 0$  and  $3x^2y - y^3 = 0$   
(A) touch each other (B) cut at right angle (C) cut at an angle (D) cut at an angle  $4/\pi$
- The tangent to the curve given by  $x = e^t \cdot \cos t$ ,  $y = e^t \cdot \sin t$  at  $t = 4\pi$  makes with x-axis an angle  
(A) 0 (B)  $4\pi$  (C)  $3\pi$  (D)  $2\pi$
- The equation of the normal to the curve  $y = \sin x$  at  $(0, 0)$  is:  
(A)  $x = 0$  (B)  $y = 0$  (C)  $x + y = 0$  (D)  $x - y = 0$
- The point on the curve  $y^2 = x$ , where the tangent makes an angle of  $4\pi$  with x-axis is  
(A)  $\left(\frac{1}{2}, \frac{1}{4}\right)$  (B)  $\left(\frac{1}{4}, \frac{1}{2}\right)$  (C) (4, 2) (D) (1, 1)
- The sides of an equilateral triangle are increasing at the rate of 2 cm/sec. The rate at which the area increases, when side is 10 cm is:  
(A)  $10 \text{ cm}^2/\text{s}$  (B)  $\sqrt{3} \text{ cm}^2/\text{s}$  (C)  $10\sqrt{3} \text{ cm}^2/\text{s}$  (D)  $10/3 \text{ cm}^2/\text{s}$
- A ladder, 5 meter long, standing on a horizontal floor, leans against a vertical wall. If the top of the ladder slides downwards at the rate of 10 cm/sec, then the rate at which the angle between the floor and the ladder is decreasing when lower end of ladder is 2 metres from the wall is:  
(A)  $1/10$  radian/sec (B)  $1/20$  radian/sec (C) 20 radian/sec (D) 10 radian/sec
- The curve  $r = \frac{1}{5} \cos 5\theta$  has at  $\theta = \frac{\pi}{5}$   
(A) a vertical tangent (parallel to y-axis) (B) a horizontal tangent (parallel to x-axis) (C) an oblique tangent (D) no tangent
- The equation of normal to the curve  $3x^2 - y^2 = 8$  which is parallel to the line  $x + 3y = 8$  is  
(A)  $3x - y = 8$  (B)  $3x + y + 8 = 0$  (C)  $x + 3y \pm 8 = 0$  (D)  $x + 3y = 0$
- If the curve  $ay + x^2 = 7$  and  $x^3 = y$ , cut orthogonally at  $(1, 1)$ , then the value of a is  
(A) 1 (B) 0 (C) -6 (D) 6

## SECTION B

(This section comprises of very short answer type-questions (VSA) of 2 marks each.)

- 11 A spherical ball of salt is dissolving in water in such a manner that the rate of decrease of the volume at any instant is proportional to the surface. Prove that the radius is decreasing at a constant rate.
- 12 Find the approximate value of  $(1.999)^5$ .
- 13 The volume of a cube increases at a constant rate. Prove that the increase in its surface area varies inversely as the length of the side

## SECTION C

(This section comprises of short answer type questions (SA) of 3 marks each)

- 14  $\left(0, \frac{\pi}{4}\right)$
- 15 A swimming pool is to be drained for cleaning. If  $L$  represents the number of litres of water in the pool  $t$  seconds after the pool has been plugged off to drain and  $L = 200(10 - t)^2$ . How fast is the water running out at the end of 5 seconds? What is the average rate at which the water flows out during the first 5
- 16  $\left(\frac{\pi}{4}\right)$

## SECTION D

(This section comprises of long answer-type questions (LA) of 5 marks each)

- 17 An open box with square base is to be made of a given quantity of card board of area  $c^2$ . Show that the maximum volume of the box is  $\frac{c^3}{6\sqrt{3}}$  cubic units.
- 18 A telephone company in a town has 500 subscribers on its list and collects fixed charges of Rs 300/- per subscriber per year. The company proposes to increase the annual subscription and it is believed that for every increase of Re 1/- one subscriber will discontinue the service. Find what increase will bring maximum profit?
- 19 A telephone company in a town has 500 subscribers on its list and collects fixed charges of 300 per subscriber per year. The company proposes to increase the annual subscription and it is believed that for every increase of 1 one subscriber will discontinue the service.
- 1.If  $x$  be the annual subscription then the total revenue of the company after increment will be:
  - 2.How much fee the company should increase to have maximum profit?  
Rs. 150                  Rs. 100                  Rs. 200                  Rs. 250
  - 3.Find both the maximum and minimum values respectively of  $3x^4 - 8x^3 + 48x + 1$  on the interval  $[1, 4]$ .  
-63. 257                  258. -63                  257. -63                  -63. -257