RK VISION ACADEMY

NEET | IIT – JEE | FOUNDATION

CBSE PRACTICE PAPER(2024)

(Mathematics)

Grade : XII **Marks: 40**
marks
Chapter: AOD Set-1 **Time: 90**
minutes

SECTION A

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

1. If $y = x^4 - 10$ and if x changes from 2 to 1.99, what is the change in y

(A) .32 (B) .032 (C) 5.68 (D) 5.968

2. The equation of tangent to the curve $y(1 + x^2) = 2 - x$, where it crosses x-axis is:

(A) $x + 5y = 2$ (B) $x - 5y = 2$ (C) $5x - y = 2$ (D) $5x + y = 2$

3. The points at which the tangents to the curve $y = x^3 - 12x + 18$ are parallel to x-axis are:

(A) (2, –2), (–2, –34) (B) (2, 34), (–2, 0) (C) (0, 34), (–2, 0) (D) (2, 2), (–2, 34)

4. The tangent to the curve $y = e^{2x}$ at the point (0, 1) meets x-axis at:

(A) (0, 1) (B) (-1/2,0) (C) (2, 0) (D) (0, 2)

5. The slope of tangent to the curve $x = t^2 + 3t - 8$, $y = 2t^2 - 2t - 5$ at the point (2, –1) is:

(A) 22 /7 (B) 6 / 7 (C) – 6/ 7 (D) – 6

6. The two curves $x^3 - 3xy^2 + 2 = 0$ and $3x^2y - y^3 - 2 = 0$ intersect at an angle of

(A) π/4 (B) π/3 (C) π/2 (D) π /6

7. The interval on which the function $f(x) = 2x^3 + 9x^2 + 12x - 1$ is decreasing is:

(A) [–1, ∞) (B) [–2, –1] (C) (– ∞ , –2] (D) [-1,1]

8. Let the $f : R \to R$ be defined by $f(x) = 2x + \cos x$, then f :

(A) has a minimum at $x = \pi$ (B) has a maximum, at x = 0 (C) is a decreasing function (D)is an increasing function

9. $y = x(x - 3)^2$ decreases for the values of x given by :

(A) $1 < x < 3$ (B) $x < 0$ (C) $x > 0$ (D) $0 < x < 3/2$

10 The function $f(x) = \tan x - x$

(A) always increases (B) always decreases (C) never increases (D)sometimes increases and sometimes decreases.

SECTION B

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

11 A kite is moving horizontally at a height of 151.5 meters. If the speed of kite is 10 m/s, how fast is the string being let out; when the kite is 250 m away from the boy who is flying the kite? The height of boy is 1.5 m.

12 Find the approximate volume of metal in a hollow spherical shell whose internal and external radii are 3 cm and 3.0005 cm, respectively.

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 At what points on the curve $x^2 + y^2 - 2x - 4y + 1 = 0$, the tangents are parallel to the y-axis

15 Show that $f(x) = 2x + \cot^{-1}x + \log(\sqrt{1 + x^2} - x)$ is increasing on R

16 At what point, the slope of the curve $y = -x^3 + 3x^2 + 9x - 27$ is maximum? Also find the maximum slope.

SECTION D

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

17 Find the dimensions of the rectangle of perimeter 36 cm which will sweep out a volume as large as possible, when revolved about one of its sides. Also find the maximum volume.

18 AB is a diameter of a circle and C is any point on the circle. Show that the area of Δ ABC is maximum, when it is isosceles.

19 A plane started from airport O with a velocity of 120 m/s towards east. Air is blowing at a velocity of 50 m/s towards the north As shown in the figure.
The plane travelled 1 hr in OA direction with the resultant velocity. From A and B travelled 1 hr with keeping velocity of 120 m/s and finally landed at B.

1. What is the resultant velocity from O to A?
    1. 100 m/s
    2. 130 m/s
    3. 120 m/s
    4. 170 m/s
2. What is the direction of travel of plane O to A with east?
    1. $\tan^{-1}(5/12)$
    2. $\tan^{-1}(12/3)$
    3. 40^o
    4. 30^o
3. What is the total displacement from O to A?
    1. 500 km
    2. 468 km
    3. 432 km
    4. 400 km
4. What is the resultant velocity from A to B?
    1. 120 m/s
    2. 70 m/s
    3. 170 m/s
    4. 200 m/s
5. What is the displacement from A to B?
    1. 550 km
    2. 432 km
    3. 600 km
    4. 612 km