



12th Science- : Maths
Applications of Derivatives

DATE:

TIME: 1 Hours

MARKS: 25

SEAT NO:

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Note:-

1. All Questions are compulsory.
2. Numbers on the right indicate full marks.

Section A

Q.1 Select and write the correct answer.

(4)

1. The function $f(x) = x + \frac{4}{x}$ has _____.
A) a local maximum at $x = 2$ and a local minimum at $x = 3$
B) local minimum at $x = 2$ and a local maximum at $x = 2$
C) absolute maximum at $x = 2$ and absolute minimum at $x = -2$
D) absolute minimum at $x = 2$ and absolute minimum at $x = -2$
2. The two parts when the number 84 is divided into 2 parts such that the product of one part and the square of the other is maximum are _____.
A) 42 and 42 B) 56 and 28
C) 80 and 4 D) 50 and 34

Q.2 Answer the following.

(3)

1. Find the approximate value of $3^{2.01}$ given that $\log_e 3 = 1.0986$
2. Find the approximate value of $\tan^{-1}(1.001)$
3. Find the approximate value of $e^{2.1}$ given that $e^2 = 7.389$

Section B
Attempt any Four

- Q.3 Find the equations of the normal to the curve $3x^2 - y^2 = 8$ which are parallel to the line $x + 3y = \frac{4}{4}$ **(2)**
- Q.4 Find the value of x for which the $f(x) = x^3 - 6x^2 - 36x + 7$ is strictly increasing. **(2)**
- Q.5 Find the value of x for which the $f(x) = x + \frac{25}{x}$ is strictly increasing. **(2)**
- Q.6 Find the approximate value of $\log_e(9.01)$ given that $\log 3 = 1.0986$ **(2)**
- Q.7 A particle moves along the curve $6y = x^3 + 2$. Find the points on the curve at which y - coordinate is changing 8 times as fast as the x co-ordinate. **(2)**
- Q.8 Find the approximate value of $\sqrt[3]{28}$ at required point. **(2)**

Section C
Attempt any Two

- Q.9 Find the maximum and minimum of $f(x) = x \log x$ **(3)**

Q.10 Find the equation of tangent and normal to the curve at the point on it. $y = x^2 + 2e^x + 2$ at $(0, 4)$ **(3)**

Q.11 Find the maximum and minimum of $f(x) = x^2 + \frac{16}{x^2}$ **(3)**

Section D
Attempt any One

Q.12 Find the values of x for which $f(x) = 2x^3 - 15x^2 - 144x - 7$ is (a) Strictly increasing (b) Strictly decreasing. **(4)**

Q.13 Find the equation of tangent and normal to the curve at the point on it. **(4)**

$$x = \sqrt{t}, y = t - \frac{1}{\sqrt{t}} \text{ at } t = 4$$