

**Topic : Mathematical Tools**

**Type of Questions**

Single choice Objective ('-1' negative marking) Q.1 to Q.3	(3 marks, 3 min.)	M.M., Min. [9, 9]
Subjective Questions ('-1' negative marking) Q.4 to Q.8	(4 marks, 5 min.)	[20, 25]
Comprehension ('-1' negative marking) Q.9 to Q.10	(3 marks, 3 min.)	[6, 6]

- $y = x^3 + 2x^2 + 7x + 8$  then  $\frac{dy}{dx}$  will be -  
 (A)  $3x^2 + 2x + 15$       (B)  $3x^2 + 4x + 7$       (C)  $x^3 + 2x^2 + 15$       (D)  $x^3 + 4x + 7$
- Differentiation of  $2x^2 + 3x$  w.r.t.  $x$  is :  
 (A)  $4x + 3$       (B)  $4x$       (C)  $3$       (D)  $4x + 1$
- Equation of straight line is  $2x + 3y = 5$ . Slope of the straight line is :  
 (A)  $3/2$       (B)  $2/3$       (C)  $-2/3$       (D)  $-3/2$
- $y = x^4 + 3x^2 + \pi + 2$ . Find  $\frac{dy}{dx}$  :
- $y = 4 + 5x + 7x^3$ . Find  $\frac{dy}{dx}$  :
- Find slope of a straight line  $2x - 5y + 7 = 0$
- $y = x + x^2 + \frac{1}{x} + \frac{1}{x^3}$ . Find  $\frac{dy}{dx}$
- $y = x^2 + \frac{1}{x^2}$ . Find  $\frac{dy}{dx}$

**COMPREHENSION**

If  $S = ut + \frac{1}{2}at^2$

Where ;  $S$  is displacement,  $u$  - initial velocity (constant) ,  $v$  - final velocity ,  $a$  - acceleration(constant) &  $t$  - time taken then -

- Differentiation of 'S' w.r.t. 't' will be -  
 (A)  $u + \frac{at}{2}$       (B)  $u + at$       (C)  $u + 2at$       (D)  $\frac{ut^2}{2} + \frac{at^3}{6}$
- Differentiation of above result w.r.t. 't' will be -  
 (A)  $a$       (B)  $u + a$       (C)  $u$       (D) none



# Answers Key

## DPP NO. - 2

1. (B)    2. (A)    3. (C)    4.  $4x^3 + 6x$
5.  $5 + 21x^2$     6.  $\frac{2}{5}$     7.  $\frac{dy}{dx} = 1 + 2x - \frac{1}{x^2} - \frac{3}{x^4}$
8.  $\frac{dy}{dx} = 2x - \frac{2}{x^3}$     9. (B)    10. (A)

# Hint & Solutions

## DPP NO. - 2

1.  $y = x^3 + 2x^2 + 7x + 8$

$$\frac{dy}{dx} = 3x^2 + 4x + 7$$

2.  $y = 2x^2 + 3x$

$$\frac{dy}{dx} = 4x + 3$$

3.  $y = -\frac{2}{3}x + \frac{5}{3} \Rightarrow \frac{dy}{dx} = -\frac{2}{3}$

**Alter :**  $y = mx + c$

(slope)  $m = -\frac{2}{3}$

4.  $y = x^4 + 3x^2 + \pi + 2$  ;  $\frac{dy}{dx} = 4x^3 + 6x$



5.  $y = 4 + 5x + 7x^3$  ;  $\frac{dy}{dx} = 5 + 21x^2$

6.  $y = \frac{2}{5}x + \frac{7}{5} \Rightarrow \frac{dy}{dx} = \frac{2}{5}$

7.  $y = x + x^2 + \frac{1}{x} + \frac{1}{x^3}$  ;  $\frac{dy}{dx} = 1 + 2x - \frac{1}{x^2} - \frac{3}{x^4}$  .

8.  $y = x^2 + \frac{1}{x^2}$  .  $\frac{dy}{dx} = 2x - \frac{2}{x^3}$

9.  $S = ut + \frac{1}{2}at^2$

$$v = \frac{dS}{dt} = u + \frac{1}{2}a \times 2t = u + at$$

10.  $\frac{dv}{dt} = a$