DPP
DAILY PRACTICE PROBLEMS

Class : XIth **Subject : Maths**
Date : **DPP No. :8**

Topic :-Application of Derivatives

1. A particle moves on the parabola $y^2 = 4ax$ in such a way that its projection on the y-axis has a constant velocity. Then its projection on x-axis moves with
   a) Constant velocity b) Constant acceleration c) Variable velocity d) Variable acceleration

2. The points of extremum of the function $\phi(x) = \int_1^x e^{-t^2/2}(1-t^2)dt$, are
   a) $x = 0, 1$ b) $x = 1, -1$ c) $x = 1/2$ d) $x = -1/2$

3. A stone is thrown vertically upwards and the height x ft reached by the stone in t seconds is given by $x = 80t - 16t^2$. The stone reaches the maximum height in
   a) 2s b) 2.5s c) 3s d) 1.5s

4. If $ax^2 + bx + 4$ attains its minimum value -1 at $x = 1$, then the values of $a$and b are respectively
   a) $5, -10$ b) $5, -5$ c) $5, 5$ d) $10, -5$

5. The function $f(x) = \log(1+x) - \frac{2x}{2+x}$ is increasing on
   a) $(0, \infty)$ b) $(-\infty, 0)$ c) $(-\infty, \infty)$ d) None of these

6. Let $f(x) = e^x \sin x$, slope of the curve $y = f(x)$ is maximum at $x = a$, if 'a' equals
   a) 0 b) $\pi/4$ c) $\pi/2$ d) None of these

7. The slope of the tangent to the curve $y = \sqrt{9-x^2}$ at the point where ordinate and abscissa are equal, is
   a) 1 b) -1 c) 0 d) None of these

8. If $0 < x < \frac{\pi}{2}$, then
   a) $\cos(\sin x) > \cos x$
   b) $\cos(\sin x) < \cos x$
   c) $\cos(\sin x) = \sin(\cos x)$
   d) $\cos(\sin x) < \sin(\cos x)$

9. In the mean value theorem $f(b) - f(a) = (b-a)f'(c)$, if $a = 4$, $b = 9$ and $f(x) = \sqrt{x}$, then the value of c is
a) 8.00 b) 5.25 c) 4.00 d) 6.25

10. If the function $f(x) = (2a-3)(x + 2\sin 3) + (a-1)(\sin^4 x + \cos^4 x) + \log 2$ does not possess critical points, then
a) $a \in (-\infty, 4/3) \cup (2, \infty)$
b) $a \in (4/3, 2)$
c) $a \in (4/3, \infty)$
d) $a \in (2, \infty)$

11. If $s = ae^t + be^{-t}$ is the equation of motion of a particle, then its acceleration is equal to
a) s b) $2s$ c) $3s$ d) $4s$

12. The angle of intersection of the curves $y = x^2$ and $x = y^2$ is
a) $\tan^{-1}\left(\frac{4}{3}\right)$ b) $\tan^{-1}(1)$ c) $90°$ d) $\tan^{-1}\left(\frac{3}{4}\right)$

13. A spherical balloon is expanding. If the radius is increasing at the rate of 2 cm/min, the rate at which the volume increase (in cubic centimeters per minute)when the radius is 5 cm, is
a) 10π b) 100π c) 200π d) 50π

14. If the radius of a circle be increasing at a uniform rate of 2cm/s. The area of increasing of area of circle ,at the instant when the radius is 20 cm, is
a) $70\pi cm^2/s$ b) $70 cm^2/s$ c) $80\pi cm^2/s$ d) $80\ cm^2/s$

15. The abscissa of the points, where the tangent to curve $y = x^3 - 3x^2 - 9x + 5$ is parallel to $x-$ axis , are
a) $x = 0\ and\ 0$ b) $x = 1\ and - 1$ c) $x = 1\ and\ -3$ d) $x = -1\ and\ 3$

16. If $f(x) = x^3 - 6x^2 + 9x + 3$ be a decreasing function, then x lies in
a) $(-\infty, -1) \cap (3, \infty)$ b) $(1, 3)$ c) $(3, \infty)$ d) None of these

17. If the curve $y = ax^3 + bx^2 + cx$ is inclined at 45° to x-axis at $(0, 0)$ but touches x-axis at $(1, 0)$, then
a) $a = 1, b = -2, c = 1$ b) $a = 1, b = 1, c = -2$ c) $a = -2, b = 1, c = 1$ d) $a = -1, b = 2, c = 1$

18. The value of x for which
$1 + x\log_e\left(x + \sqrt{x^2+1}\right) \geq \sqrt{x^2+1}\ are$
a) $x \leq 0$ b) $0 \leq x \leq 1$ c) $x \geq 0$ d) None of these

19. The function $f(x) = x^{-x}$, $(x \in R)$ attains a maximum, value at x which is

a) 2 b) 3 c) $\frac{1}{e}$ d) 1

20. The value of c in $(0, 2)$ satisfying the Mean value theorem for the function $f(x) = x(x-1)^2$, $x \in [0, 2]$ is equal to

a) $\frac{3}{4}$ b) $\frac{4}{3}$ c) $\frac{1}{3}$ d) $\frac{2}{3}$