

Section-A

Multiple Choice Questions (MCQ's)

Q1: Choose the correct answer for each form th

- (1) A point where a function 'f' changes from an increasing function to decreasing function is called:
 (a) A point of maximum value (b) A point of minimum value
 (c) point of zero value (d) None of these
- (2) $\int x \cos x \, dx$
 (a) $x \sin x + \cos x + c$ (b) $x \sin x + \cos x + c$
 (c) $x \sin x - \cos x + c$ (d) $x \cos x - \sin x + c$
- (3) If (x_1, y_1) and (x_2, y_2) are end point of the diameter then centre of circle is:
 (a) $\left(\frac{x_1 - x_2}{2}, \frac{y_1 - y_2}{2}\right)$ (b) $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$
 (c) $\left(\frac{x_1 - x_2}{2}, \frac{y_1 - y_2}{2}\right)$ (d) $(x_1 + x_2, y_1 + y_2)$
- (4) If $P(x_1, y_1)$ and $Q(x_2, y_2)$ are any two points on parabola $y^2 = 4ax$ then eq. of the chord PQ will be:
 (a) $(y + y_1)(y - y_2) = 4a(x - x_1)$ (b) $(y - y_1)(y + y_2) = 4a(x - x_1)$
 (c) $(y - y_1)(y + y_2) = 4a(x - x_1)$ (d) $(y + y_1)(y + y_2) = 4a(x + x_1)$
- (5) The vector product of a vector by itself is always:
 (a) 1 (b) -1 (c) greater than 1 (d) 0
- (6) $\lim_{x \rightarrow 0} (1 + 3x)^{2/3}$
 (a) e^3 (b) e^{-6} (c) e^6 (d) e
- (7) The point $(-3, 0)$, $(0, 0)$ and $(5, 0)$ are:
 (a) vertices of triangle (b) collinear point (c) Non-collinear (d) None
- (8) The x-intercept of the line $3x + 4y - 7 = 0$
 (a) $-\frac{7}{3}$ (b) $\frac{7}{3}$ (c) $\frac{7}{4}$ (d) $-\frac{7}{4}$
- (9) The slope of the curve $y = 3e^{2x}$ at $x = 0$ is equal to:
 (a) 3 (b) 6 (c) 5 (d) 2
- (10) Maximum values of $f(x)$ are minimum value of:
 (a) $f(x)$ (b) $-f(x)$ (c) $f'(x)$ (d) $-f'(x)$
- (11) $\int (ax + b)^n \, dx = ?$
 (a) $\frac{(ax + b)^{n+1}}{an + 1}$ (b) $\frac{(ax + b)^{n-1}}{an + 1}$ (c) $\frac{(ax + b)^{n+1}}{an + 1}$ (d) $\frac{(ax + b)^{n+1}}{a(n + 1)}$
- (12) Two circles are said to be concentric if they have:
 (a) same radii (b) same centre
 (c) same diameter (d) different centre
- (13) The line $y = mx + c$ is tangent to ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ if
 (a) $c = a/m$ (b) $c^2 = a^2 m^2 + b^2$ (c) $c^2 = a^2 m^2 - b^2$ (d) $c^2 = a^2 (1 + m^2)$
- (14) What does scalar triple product gives:
 (a) Area of square (b) Volume of cylinder (c) Volume of square
 (d) Volume of parallelepiped
- (15) If $\lim_{x \rightarrow \infty} \frac{a^x - 1}{x} = ?$
 (a) $\ln a$ (b) $\ln x$ (c) $a \ln x$ (d) $1/a \ln a$
- (16) If two non vertical lines are parallel their inclinations and their slopes are:
 (a) Perpendicular (b) Zero (c) Not equal (d) Equal
- (17) Which one is two intercept form:
 (a) $\frac{x}{a} + \frac{y}{b} = 1$ (b) $\frac{x}{a} - \frac{y}{b} = 1$ (c) $\frac{x}{a} + \frac{y}{b} = 0$ (d) $\frac{x}{a} + \frac{y}{b} = -1$
- (18) $(-2, 5)$, $(4, 1)$ and $(5, 4)$ are the vertices of triangle its centroid is:
 (a) $\left(\frac{7}{3}, \frac{8}{3}\right)$ (b) $\left(\frac{11}{3}, \frac{8}{3}\right)$ (c) $\left(\frac{7}{3}, \frac{10}{3}\right)$ (d) $(0, 1)$
- (19) If $\int \pi d\theta = ?$ (a) $\pi + c$ (b) $\pi\theta + c$ (c) $\theta + c$ (d) $\pi/3 + c$
- (20) $\int [f(x)]^n \cdot f(x) \, dx = ?$
 (a) $\frac{[f(x)]^{n+1}}{n+1}$ (b) $\ln [f(x)]^{n+1}$ (c) $\ln [f(x)]^n$ (d) All of these
- (21) The general equation of the circle whose centre lies on x-axis:
 (a) $x^2 + y^2 + 2fy + c = 0$ (b) $x^2 + y^2 - 2gx + c = 0$
 (c) $x^2 + y^2 + 2gx + c = 0$ (d) $x^2 + y^2 + 2gx - c = 0$
- (22) The point $P(x_1, y_1)$ lies outside the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ if
 (a) $x_1^2 + y_1^2 + 2gx_1 + 2fy_1 + c > 0$ (b) $x_1^2 + y_1^2 + 2gx_1 + 2fy_1 + c < 0$
 (c) $x_1^2 + y_1^2 + 2gx_1 + 2fy_1 + c = 0$ (d) $x_1^2 + y_1^2 + 2gx_1 + 2fy_1 + c < 0$
- (23) If $a = (2, -1, 2)$ $B = (-4, 1, -1)$ then $AB = ?$
 (a) $-6i - 2j + 3k$ (b) $-6i + 2j + 3k$ (c) $6i + 2j - 3k$
 (d) $6i - 2j - 3k$
- (24) $\lim_{x \rightarrow \infty} \frac{e^x}{x} = ?$ (a) 1 (b) 0 (c) $\ln x$ (d) ∞
- (25) Two lines $5x - 3y + 8 = 0$ and $10x - 6y - 7 = 0$ are
 (a) Parallel (b) Perpendicular (c) Coincident (d) None of these
- (26) $\lim_{x \rightarrow 0} \frac{x^2 - 1}{x^2 - x} = ?$ (a) 1 (b) 2 (c) x (d) ∞
- (27) The equation of the x-axis itself is
 (a) $x = 0$ (b) $y = 0$ (c) $y = x$ (d) None of these
- (28) Three lines are concurrent if $\begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix} = ?$
 (a) 1 (b) -1 (c) \pm (d) 0
- (29) If the point on the graph $y = f(x)$ where $f(x)$ is neither increasing nor decreasing and $f(x) = 0$ then that point is called:
 (a) Maximum point (b) Minimum point
 (c) Stationary point (d) Turning point
- (30) If $d/dx [\phi(x)] = f(x)$ then function $\Theta(x)$ is called:
 (a) Derivative of $f(x)$ (b) Antiderivative of $f(x)$ (c) inverse of $f(x)$
 (d) Definite integral
- (31) The centre of the circle $x^2 + y^2 + 2gx + 2fy + c = 0$,
 (a) $(g, -f)$ (b) (g, f) (c) (g, f) (d) $(g, -f)$
- (32) $\int f(x) \, dx \forall a, b \in \mathbb{R}, a \leq b$ is called:
 (a) Definite integral (b) Indefinite integral (c) Simple integral (d) None
- (33) If $a = [P, 1, 0]$, $b = [1, 1, 3]$ and $c = [2, 1, -2]$ are coplanar then $P = ?$
 (a) $3/4$ (b) $4/5$ (c) $6/5$ (d) $8/5$
- (34) If the point $p(x, y)$, x is called.
 (a) 0 ordinate (b) abscissa (c) pole (d) None of these
- (35) If $a \neq 0$, $c \neq 0$ and $b = 0$ then $ax + by + c = 0$ represents a line:
 (a) Parallel to x-axis (b) Parallel to y-axis (c) Passing through the origin
 (d) bisecting 1st and 3rd quad
- (36) $f(x) = x^3 + 4x^2 + 3x + 9$ then $f''(x) = ?$
 (a) $6x + 8$ (b) $6x^2 + 8x$ (c) $6x - 4$ (d) $3x + 9$
- (37) Two non-zero vectors \underline{U} and \underline{V} are parallel if:
 (a) $u : v = 0$ (b) $u \times v = 0$ (c) both (a) and (b) (d) None of these
- (38) If we put $x = a + h$ in function $f(x)$ then the limit of $f(x)$ as $x \rightarrow a$ is:
 (a) the limit of $f(x)$ as $h \rightarrow 0$ (b) limit of $f(a + h)$ as $x \rightarrow a$
 (c) the limit of $f(a + h)$ as $h \rightarrow a$ (d) limit of $f(a + h)$ as $h \rightarrow 0$
- (39) y-co-ordinate of any point on the x-axis
 (a) zero (b) one (c) y (d) x
- (40) The point of concurrency of three lines $2x - 5y = 0$, $3x - 17y = 0$ and $x + 6y = 0$ is
 (a) $(-1, -1)$ (b) $(0, 0)$ (c) $(1, 1)$ (d) $(1/2, 1/2)$
- (41) The lines lying on the same plane are called:
 (a) Collinear lines (b) coplanar lines (c) Concurrent lines
 (d) Coincident lines
- (42) If $y = e^{2x} - 1$ then dy/dx is equal to:
 (a) $2e^{2x} - 1$ (b) $2e^{2x}$ (c) $2ex$ (d) None of these
- (43) The function $f(x) = \sin x$ has maximum value:
 (a) 0 (b) 1 (c) -1 (d) $-\infty$
- (44) The inverse operator of d/dx is
 (a) $\int dx$ (b) dx (c) Δ^2 (d) none of these
- (45) If the centre of circle $x^2 + y^2 + ax + by + 2 = 0$ is at $(4, -8)$ then $a + b = ?$
 (a) -4 (b) 4 (c) 8 (d) -8
- (46) The centre of circle at origin and radius r , $h = 0$, $k = 0$ then
 (a) $x^2 - y^2 - r^2 = 0$ (b) $x^2 + y^2 = r^2$ (c) $y^2 - x^2 = r^2$ (d) $x^2 - y^2 = -r^2$
- (47) The unit vector \underline{i} is:
 (a) $[0, 0, 1]$ (b) $[0, 1, 0]$ (c) $[1, 0, 0]$ (d) None of these
- (48) If $\rho(\theta) = (x, y)$ when $\theta = 180^\circ$, then $(x, y) =$
 (a) $(0, 1)$ (b) $(0, -1)$ (c) $(-1, 0)$ (d) $(1, 0)$
- (49) Find θ , if $s = 20$ cm and $r = 2$ m
 (a) 0.1 radian (b) 10 radian (c) 0.1 degree (d) 10 degree
- (50) $\cos 2\theta =$
 (a) $2\cos^2 \theta - 1$ (b) $\cos^2 \theta - \sin^2 \theta$ (c) $1 - 2\sin^2 \theta$ (d) All of these