

કુલ સમય :- ૬૦ મીનીટ

કુલ પ્રશ્નો : ૫૦

વિદ્યાર્થીએ ટીક કરવાના પ્રશ્નો : ૩૫

નોંધ : વિદ્યાર્થીએ માત્ર ૩૫ પ્રશ્નો જ ટીક કરવાના રહેશે. જો વધારે ટીક કરેલ હશે તો પ્રથમ ૩૫ પ્રશ્નો જ ગણતરીમાં લેવામાં આવશે.

- 1) For Cauchy Mean Value theorem, functions $f(x) = \sqrt{x}$, $g(x) = 2x + 1$; $x \in [1, 4]$ then $c =$ _____.
 (a) 1 (b) 4 (c) $\frac{9}{4}$ (d) 2
- 2) Real function $f(x)$ and $g(x)$ are continuous on _____.
 (a) $[a, b]$ (b) (a, b) (c) $[a, b)$ (d) $(a, b]$
- 3) $x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \dots =$ _____.
 (a) 1 (b) $\sin x$ (c) $\cos x$ (d) 0
- 4) $\frac{1}{n} \sin x \cos^{n-1} x + \frac{n-1}{n} \int \cos^{n-2} x \, dx =$ _____.
 (a) $\int \sin^n x \, dx$ (b) $\int \sin^2 x \, dx$ (c) $\int \cos^n x \, dx$ (d) $\int \cos^2 x \, dx$
- 5) $\int_0^{\pi/3} \sin^7 \frac{3x}{2} \, dx =$ _____.
 (a) $\frac{3}{2}$ (b) $\frac{105}{32}$ (c) $\frac{7}{4}$ (d) $\frac{32}{105}$
- 6) $\int_0^{\pi/2} \sin^7 x \cos^4 x \, dx =$ _____.
 (a) $\frac{49}{16}$ (b) $\frac{16}{49}$ (c) $\frac{16}{1155}$ (d) $\frac{1155}{16}$
- 7) $\int_0^{\pi/6} \sin^4 6x \cos^2 3x \, dx =$ _____.
 (a) $\frac{\pi}{2}$ (b) 2π (c) $\frac{\pi}{32}$ (d) π
- 8) $\frac{1}{n+1} + \frac{1}{n+2} + \frac{1}{n+3} + \dots + \frac{1}{n+n} + \dots =$ _____.
 (a) $\log 1$ (b) $\log 2$ (c) 1 (d) 0
- 9) Find the length of arc of asteroid $x^{2/3} + y^{2/3} = a^{2/3}$.
 (a) $6a$ (b) $4a$ (c) $2a$ (d) a
- 10) Find the volume of solid generated by rotating one branch of cycloid $x = a(\theta - \sin \theta)$, $y = a(1 - \cos \theta)$ about X - axis.
 (a) $5\pi^2$ (b) $5\pi^2 a^3$ (c) $\frac{5\pi}{3}$ (d) 2π
- 11) Find the surface of sphere of radius 'a'.
 (a) $4a^2$ (b) $4\pi^2 a^2$ (c) $\frac{4\pi}{3}$ (d) $4\pi a^2$
- 12) If $\bar{x} = (1, 2, -1)$ and $\bar{y} = (1, 2, 2)$ then $\bar{x} \cdot \bar{y} =$ _____.
 (a) 1 (b) 2 (c) 3 (d) 4
- 13) If $\bar{x} = (1, 2, 3)$ then $\bar{x} \times \bar{x} =$ _____.
 (a) $\bar{0}$ (b) $\bar{1}$ (c) $\bar{6}$ (d) $\bar{5}$
- 14) $[\bar{y}\bar{z}\bar{x}] =$ _____.
 (a) $\bar{0}$ (b) $[\bar{x}\bar{y}\bar{z}]$ (c) $\bar{x}\bar{y}\bar{z}$ (d) $\bar{1}$
- 15) If $\bar{x} = (1, 2, 3)$ and $\bar{y} = (4, 5, 6)$ then $\bar{x} \cdot (\bar{x} \times \bar{y}) =$ _____.
 (a) 30 (b) 1 (c) 0 (d) 20
- 16) $[\bar{a}\bar{b}\bar{c}] = 0$ if and only if $\bar{a}\bar{b}\bar{c}$ are _____.
 (a) co - ordinates (b) coplanar (c) constant (d) π
- 17) $(\bar{a} \times \bar{b}) \cdot [(\bar{b} \times \bar{c}) \times (\bar{c} \times \bar{a})] =$ _____.
 (a) $[\bar{a}\bar{b}\bar{c}]$ (b) $[\bar{a}\bar{b}\bar{c}]^2$ (c) $2[\bar{a}\bar{b}\bar{c}]$ (d) 0
- 18) $(\bar{a} + \bar{b}) \cdot [(\bar{b} + \bar{c}) \times (\bar{c} + \bar{a})] =$ _____.
 (a) $[\bar{a}\bar{b}\bar{c}]$ (b) $[\bar{a}\bar{b}\bar{c}]^2$ (c) $2[\bar{a}\bar{b}\bar{c}]$ (d) 0
- 19) $\bar{a} \times (\bar{b} \times \bar{c}) + \bar{b} \times (\bar{c} \times \bar{a}) + \bar{c} \times (\bar{a} \times \bar{b}) =$ _____.
 (a) $\bar{0}$ (b) $[\bar{a}\bar{b}\bar{c}]$ (c) $\bar{a} \times \bar{b}$ (d) $\bar{c} \times \bar{a}$
- 20) Find the polar co - ordinates of the point having cartesian co - ordinates $(-1, -1)$ in R^2 .
 (a) $(\sqrt{2}, \frac{\pi}{2})$ (b) $(\sqrt{2}, \frac{\pi}{2})$ (c) $(\sqrt{2}, \frac{\pi}{\sqrt{2}})$ (d) $(\sqrt{2}, \frac{\pi}{4})$
- 21) $|\bar{a}|^2 |\bar{b}|^2 - (\bar{a} \cdot \bar{b})^2 =$ _____.
 (a) $|\bar{a} \times \bar{b}|^2$ (b) $(\bar{a} \cdot \bar{b})^2$ (c) $\bar{a} \times \bar{b}$ (d) 0
- 22) $\text{grad } \phi =$ _____. where ϕ is a scalar function
 (a) 0 (b) $\frac{\pi}{2}$ (c) $\nabla \phi$ (d) $\text{curl } \phi$
- 23) $(\text{grad } \phi) \times F + \phi(\text{Curl } F) =$ _____. where ϕ is a scalar function & F is a vector function.
 (a) $\text{grad } (\phi F)$ (b) $\text{Curl } (\phi F)$ (c) $\text{div } (\phi F)$ (d) 0
- 24) $G \cdot \text{Curl } F - F \cdot \text{Curl } G =$ _____. where F, G are vector functions.
 (a) $\text{grad } (F \times G)$ (b) $\text{Curl } (F \times G)$ (c) $\text{div } (F \times G)$ (d) 0
- 25) $\text{Curl } (\text{grad } \phi) =$ _____. where ϕ is a scalar function
 (a) 0 (b) 1 (c) $\nabla \phi$ (d) $\text{curl } \phi$
- 26) If $\bar{r} = x\hat{i} + y\hat{j} + z\hat{k}$ & $r = |\bar{r}|$ then $\nabla r =$ _____.
 (a) $\bar{r}$ (b) $\nabla^2 f(r)$ (c) $\frac{\bar{r}}{r}$ (d) 0

- 27) If $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$ & $r = |\vec{r}|$ then $f''(r) + \frac{2}{r}f'(r) =$ _____.
 (a) $\vec{r}$ (b) $\nabla^2 f(r)$ (c) $\frac{\vec{r}}{r}$ (d) 0
- 28) If $\phi(x, y, z) = 2xz^2 - 3xy - 4x$ then find $\text{grad } \phi$ at point $(1, -1, 2)$.
 (a) $(-7, -3, -8)$ (b) $(-7, -3, 8)$ (c) $(7, 3, -8)$ (d) $(7, -3, 8)$
- 29) Find the center of the circle $x^2 + y^2 + z^2 - 2y + 2z - 23 = 0, x + 2y - 2z + 5 = 0$.
 (a) $(0, -1, -1)$ (b) $(0, 1, -1)$ (c) $(0, 1, 1)$ (d) $(1, 1, 1)$
- 30) Find the radius of the sphere $x^2 + y^2 + z^2 - 2x + 8y - 10z - 58 = 0$.
 (a) 2 (b) 8 (c) 10 (d) 58
- 31) What is the condition of orthogonal sphere?
 (a) $u_1u_2 + v_1v_2 + w_1w_2 = d_1 + d_2$ (b) $2u_1u_2 + 2v_1v_2 + 2w_1w_2 = d_1 + d_2$
 (c) $u_1u_2 + v_1v_2 + w_1w_2 = d_1d_2$ (d) $2u_1 + 2v_1 + 2w_1 = d_1 + d_2$
- 32) The intersection of sphere and a plane is _____.
 (a) sphere (b) circle (c) curve (d) cylinder
- 33) If the plane $kx + y - 2z = 9$ touches the sphere $x^2 + y^2 + z^2 = 9$ then find the value of k .
 (a) ± 2 (b) ± 3 (c) 9 (d) 0
- 34) If $y = (ax + b)^m; a \neq 0 \in R$ then $y_n =$ _____.
 (a) $\frac{m!}{(m+n)!} a^n (ax + b)^{m+n}$ (b) $\frac{m!}{(m-n)!} a^n (ax + b)^{m-n}$
 (c) $\frac{m!}{(m+n+1)!} a^n (ax + b)^{m+n+1}$ (d) $\frac{m!}{(m-n-1)!} a^n (ax + b)^{m-n-1}$
- 35) Write name of the following statement?
 If u and v are functions of x & there n^{th} derivatives exist then
 $(uv)_n = \binom{n}{0} u_n v + \binom{n}{1} u_{n-1} v_1 + \dots + \binom{n}{r} u_{n-r} v_r + \dots + \binom{n}{n} u v_n$
 (a) Maclaurin's theorem (b) Leibnitz's theorem (c) Euler theorem (d) Taylor's theorem
- 36) Write name of the following statement? For real function $f(x)$,
 (i) $f^{(n-1)}(x)$ is continuous on $[a, a+b]$ & (ii) $f^{(n-1)}(x)$ is differentiable on $(a, a+b)$ then
 $f(a+h) = f(a) + hf'(a) + \frac{h^2}{2!} f''(a) + \dots + \frac{h^{n-1}}{(n-1)!} f^{(n-1)}(a) + R_n$
 (a) Maclaurin's theorem (b) Leibnitz's theorem (c) Euler theorem (d) Taylor's theorem
- 37) Find the equation of the cylinder having axis $\frac{x}{1} = \frac{y}{-1} = \frac{z}{-1}$ and curve $2x^2 + 3y^2 = 1, z = 0$.
 (a) $(x+z)^2 + 3(y-z)^2 = 1$ (b) $2(x+z)^2 + 3(y-z)^2 = 1$ (c) $x+z=0$ (d) $z=0$
- 38) Which is the equation of the tangent plane at the point (α, β, γ) of a central conicoid.
 (a) $aax + b\beta y + c\gamma z = 0$ (b) $ax + \beta y + \gamma z = 1$ (c) $aax + b\beta y + c\gamma z = 1$ (d) $\alpha = 0$
- 39) If $y = (2x+3)^7$ then $y_{10} =$ _____.
 (a) 2 (b) 3 (c) 7 (d) 0
- 40) If $y = e^{2x+3}$ then $y_{10}(0) =$ _____.
 (a) $e^3 2^{10}$ (b) $e^2 2^{10}$ (c) 10 (d) 0
- 41) $n! x^n \sum_{r=0}^n \left\{ \binom{n}{r} \right\}^2 =$ _____.
 (a) $(x^{2n})_1$ (b) $(x^{2n})_n$ (c) $(x^n)_1$ (d) $(x^{2n})_{2n}$
- 42) If $y = (2x+1)^5$ then $y_5 =$ _____.
 (a) $5! 2^2$ (b) $5! 2^5$ (c) $5! 2^{25}$ (d) 0
- 43) Find the length of arc of curve $y = \log \cos x$.
 (a) $\log x$ (b) $\log 2$ (c) $\log(\sqrt{2} + 1)$ (d) 10
- 44) Find the surface area of solid generated by rotating loop of the curve $x = t^2, y = t - \frac{1}{3}t^3$ about X -axis.
 (a) $\frac{\pi}{2}$ (b) 2π (c) 3π (d) 4π
- 45) Find the volume of solid generated by rotating one loop of the curve $8y^2 = x^2(1-x^2)$ about X -axis.
 (a) $\frac{\pi}{8}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{2}$ (d) $\frac{\pi}{60}$
- 46) The radius and centers of two spheres are r_1, r_2 and c_1, c_2 respectively. Give the condition that two sphere touches externally.
 (a) $c_1 c_2 < r_1 - r_2$ (b) $c_1 c_2 = r_1 - r_2$ (c) $c_1 c_2 = r_1 + r_2$ (d) $c_1 c_2 > r_1 + r_2$
- 47) Cartesian co-ordinates are _____.
 (a) (x, y) (b) (r, θ) (c) $\frac{\pi}{2}$ (d) π
- 48) Sphere $x^2 + y^2 + z^2 + 2x + 8y + 4z + 19 = 0$ and $x^2 + y^2 + z^2 + 8x + 10y + 6z + 41 = 0$ are _____.
 (a) cone (b) Orthogonal sphere (c) cylinder (d) volume
- 49) The equation of cone having vertices at origin curve $x^2 + y^2 = 4, z = 2$ is _____.
 (a) $x^2 + y^2 = z^2$ (b) $x^2 + y^2 = 8$ (c) $x^2 + z^2 = 0$ (d) $x^2 + y^2 = 1$
- 50) General equation of sphere $x^2 + y^2 + z^2 + 2ux + 2vy + 2wz + d = 0$, center = _____.
 (a) (u, v, w) (b) $(u, -v, w)$ (c) $(-u, -v, -w)$ (d) (x, y, z)