OBJECTIVE QUESTIONS

NAME of THE FACULTY — MS. PREETI
DEPTT — APPLIED SCIENCE
SUBJECT — MATHEMATICS

UNIT-I

Ques1:→ If $y = \frac{x^2}{(x-1)^2(x+2)}$ find n^{th} derivative of y.

(a) $y_n = \frac{(-1)^n\, n+1!}{3(x-1)^{n+2}} + \frac{5}{9}\frac{(-1)^n\, n!}{(x-1)^{n+1}} + \frac{4}{9}\frac{(-1)^n\, n!}{(x+2)^{n+1}}$

(b) $y_n = \frac{(-1)^n(n+2)}{4(x-1)^{n+2}} + \frac{5}{9}\frac{(-1)^{n+1}\, n!}{(x-1)^{n+1}} + \frac{3}{9}\frac{(-1)^n\, n!}{(x+2)^{n+1}}$

(c) $y_n = \frac{(-1)^{n+1}(n+1)!}{3(x-1)^{n+2}} + \frac{5}{9}\frac{(-1)^{n+1} n!}{(x-1)^n} + \frac{2}{9}\frac{(-1)^n\, n!}{(x+2)^n}$

(d) None of these.

Ques2:→ Find the n^{th} derivative of $e^x \log x$:

(a) $\frac{d^n}{dx^n}(e^x \log x) = e^x\left[\log x + \frac{n}{x} - \frac{n(n-1)}{2}\cdot\frac{1}{x^2} + \cdots + \frac{(-1)^{n-1} n-1!}{x^n}\right]$

(b) $\frac{d^n}{dx^n}(e^x \log x) = e^x\left[\log x - \frac{n}{x} + \frac{n(n-1)}{2}\cdot\frac{1}{x^2} + \cdots + \frac{(-1)^{n-1} n-1!}{x^n}\right]$

(c) $\frac{d^n}{dx^n}(e^x \log x) = e^x\left[\log x + \frac{n}{x} + \frac{n(n-1)}{2}\cdot\frac{1}{x^2} + \cdots + \frac{(-1)^{n-1}}{x^n}(n-1)\right]$

(d) None of these.

Ques3:→ [illegible] If $y = \tan(\log y)$ then:—

(a) $(1+x^2)y_{n+1} + (2nx+1)y_n + n(n-1)y_{n-1} = 0$

(b) $(1+x^2)y_{n+1} + (2nx-1)y_n + n(n-1)y_{n-1} = 0$

(c) $(1+x^2)y_{n-1} + (2nx+1)y_n + n(n-1)y_{n-1} = 0$

(d) None of these.

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Ques4:→ If $y = x^n \log x$ then ~~prove~~ find y_{n+1}.

(a) $\frac{n!}{x}$

(b) $\frac{n^2!}{x}$

(c) $\frac{n!}{x^2}$

(d) None of these.

Ques5:→ If $u = \log(x^3+y^3+z^3-3xyz)$ then find the value of $\left(\frac{\partial}{\partial x}+\frac{\partial}{\partial y}+\frac{\partial}{\partial z}\right)^2 u =$

(a) $-\frac{9}{(x+y+z)^2}$

(b) $\frac{9}{(x+y+z)^2}$

(c) $\frac{10}{(x+y+z)^2}$

(d) $\frac{14}{(x+y+z)^2}$

Ques6:→ If $u = x \log xy$ where $x^3+y^3+3xy = 1$ find $\frac{du}{dx} = ?$

(a) $1+\log xy - \frac{x}{y}\cdot\frac{x^2+y}{y^2+x}$

(b) $1+\log xy + \frac{x}{y}\cdot\frac{x^2+y}{y^2+x}$

(c) $1-\log xy + \frac{x}{y}\cdot\frac{x^2+y}{y^2+x}$

(d) $1-\log xy - \frac{x}{y}\cdot\frac{x^2+y}{y^2+x}$

Ques7:→ If $u = f(x-y, y-z, z-x)$ then find the value of $\frac{\partial u}{\partial x}+\frac{\partial u}{\partial y}+\frac{\partial u}{\partial z} =$

(a) -1

(b) 0

(c) $+1$

(d)

Ques8:→ If $x^x y^y z^z = c$, show that at $x=y=z$,

$$\frac{\partial^2 z}{\partial x \partial y} = ?$$

(a) $-(x \log ex)^{-1}$

(b) $x[\log(ex)]^{-1}$

(c) $-(x \log ex)$

(d) $x(\log ex)^{-1}$

Ques9:→ If $x = r\cos\theta$, $y = r\sin\theta$ then $\frac{\partial^2 \theta}{\partial x^2} + \frac{\partial^2 \theta}{\partial y^2} = ?$

(a) 2

(b) 0

(c) −1

(d) 1

Ques10:→ If $z = e^{ax+by} f(ax-by)$, show that

$$b\frac{\partial z}{\partial x} + a\frac{\partial z}{\partial y} = ?$$

(a) $2abz$

(b) $4abz$

(c) $6abz$

(d) $10abz$

Ques11:→ If $u = (x^{1/4} + y^{1/4}).(x^{1/5} + y^{1/5})$ Apply Euler's theorem to find the value of $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = ?$

(a) $\frac{9}{10}u$

(b) $\frac{9}{20}u$

(c) $9|5\,u$

(d) $9|15\,u$

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Ques 12:→ If $u = \log_e\left(\frac{x^4+y^4}{x+y}\right)$, show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = ?$

(a) 4
(b) 3
(c) 2
(d) 1

Ques 13:→ If $u = f(r,s)$ and $r = x+y$, $s = x-y$; then show that $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = ?$

(a) $2\frac{\partial u}{\partial r}$

(b) $4\frac{\partial u}{\partial r}$

(c) $6\frac{\partial u}{\partial r}$

(d) $\frac{\partial u}{\partial r}$

~~Ques 14:→ If $u = u($ $y-x$~~

Ques 14:- If $u(x,y,z) = \log(\tan x + \tan y + \tan z)$, then prove that

$$\sin 2x\frac{\partial u}{\partial x} + \sin 2y\frac{\partial u}{\partial y} + \sin 2z\frac{\partial u}{\partial z} = ?$$

(a) 2
(b) 3
(c) 4
(d) 1

UNIT-2 (OBJECTIVE QUESTIONS)

Ques15:→ If $x = r\cos\theta$, $y = r\sin\theta$ find $\frac{\partial(r,\theta)}{\partial(x,y)}$ = ?

(a) $\frac{1}{r}$
(b) r
(c) r^2
(d) 1

Ques16:→ If $x = r\sin\theta\cos\phi$
$y = r\sin\theta\sin\phi$
$z = r\cos\theta$ then ~~show that~~ find the value of
$\frac{\partial(r,\theta,\phi)}{\partial(x,y,z)}$ = ?

(a) $r^2\sin\theta$.
(b) $\frac{1}{r^2}\sin\theta$.
(c) $r^2\cos\theta$.
(d) $r\sin\theta$.

Ques17:→ If $y_1 = \frac{x_2x_3}{x_1}$, $y_2 = \frac{x_1x_3}{x_2}$, $y_3 = \frac{x_1x_2}{x_3}$
then find the value of $\frac{\partial(y_1,y_2,y_3,y_4)}{\partial(x_1,x_2,x_3,x_4)}$ = ?

(a) 3
(b) 4
(c) 2
(d) 5

Ques18:→ Find the percentage error in the area of an ellipse when an error of ±1 percent is made in measuring the major and minor axes.

(a) 4%
(b) 3%

Ques 19:→ The period of a simple pendulum is $T = 2\pi\sqrt{\frac{l}{g}}$. Find the maximum error in T due to the possible errors upto 1% in l and 2.5% in g.

(a) 1.25%
(b) 1.75%
(c) 1.50%
(d) 2%

Ques 20:→ If the base radius and height of a cone are measured as 4 and 8 inches with a possible error of 0.04 and 0.08 inches respectively. Calculate the percentage (%) error in calculating volume of the cone.

(a) 2%
(b) 3%
(c) 4%
(d) 1%

Ques 21:→ What error in the common logarithm of a number will be produced by an error of 1% in the number.

(a) ·0043427
(b) ·0043429
(c) ·004213
(d) ·003214

Ques 22:→ Show that the function $f(x,y) = x^3 + y^3 - 63(x+y) + 12xy$ is ~~maximum at~~ = ?

(a) max at (-7,-7) & min at (3,3)
(b) max at (5,-1) & min at (-1,5)
(c) max at (5,2) & min at (2,2)
(d)

Ques 23:→ Show that the rectangular solid of maximum volume that can be inscribed in a given sphere is a cube. i.e.

(a) $x = y = z$

(b) $2x = 4y = 6z$

(c) $x = 2y = 3z$

(d) None of these.

Ques 24:→ If $u^3 + v^3 = x + y$, $u^2 + v^2 = x^3 + y^3$, show that $\frac{\partial(u,v)}{\partial(x,y)} = ?$

(a) $\frac{y^2 - x^2}{2uv(u-v)}$

(b) $\frac{y^2 + x^2}{2uv(u-v)}$

(c) $\frac{y^2 - x^2}{2uv(u+v)}$

(d) $\frac{y^2 + x^2}{2uv(u+v)}$

Ques 25:→ Calculate the Jacobian $\frac{\partial(u,v,w)}{\partial(x,y,z)}$ of the following:

$u = x + 2y + z$, $v = x + 2y + 3z$, $w = 2x + 3y + 5z$

(a) 4

(b) 2

(c) 3

(d) 1

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UNIT – III

Ques 26:→ Reduce the matrix $\begin{bmatrix} -1 & 2 & -2 \\ +1 & 2 & 1 \\ -1 & -1 & 0 \end{bmatrix}$ to the upper triangular form by using elementary transformation.

(a) $\sim \begin{bmatrix} -1 & 2 & -2 \\ 0 & 4 & -1 \\ 0 & 0 & 5 \end{bmatrix}$

(b) $\sim \begin{bmatrix} 1 & 2 & 4 \\ 7 & 3 & -1 \\ 0 & 0 & 2 \end{bmatrix}$

(c) $\sim \begin{bmatrix} -1 & 2 & -2 \\ 0 & 5 & 7 \\ 0 & 0 & -5 \end{bmatrix}$

(d) None of these.

Ques 27:→ Determine the values of λ and μ such that the system $2x-5y+2z=8$, $2x+4y+6z=5$, $x+2y+\lambda z=\mu$ has:–

(a) no solution.

(b) a unique solution.

(c) infinite number of solutions.

(d) None of these.

Ques 28:→ Use elementary transformation to reduce the following matrix A to triangular form and hence find the rank of A.

$$A=\begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$$

(a) 2

(b) 4

(c) 3

(d) 1

Ques29:→ Reduce the matrix A to diagonal form

$$A = \begin{bmatrix} -1 & 2 & -2 \\ 1 & 2 & 1 \\ -1 & -1 & 0 \end{bmatrix}$$

(a) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

(b) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 2 \end{bmatrix}$

(c) $\begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

(d) None of these

Ques30) Find the rank of matrix

$$\begin{bmatrix} 2 & 3 & -2 & 4 \\ 3 & -2 & 1 & 2 \\ 3 & 2 & 3 & 4 \\ -2 & 4 & 0 & 5 \end{bmatrix}$$

(a) 3

(b) 4

(c) 2

(d) 1

Ques31:→ Find the value of λ such that the following equations have unique solution.

$$\lambda x - 2y - 2z - 1 = 0$$
$$4x + 2\lambda y - z - 2 = 0$$
$$6x + 6y + \lambda z - 3 = 0$$

(a) $x = \frac{1}{2} - k$, $y = k$, $z = 0$

(b) $x = \frac{1}{2} + k$, $y = -k$, $z = 1$

(c) $x = \frac{1}{2} - k$, $y = -k$, $z = 0$

(d) $x = \frac{1}{2} + k$, $y = k$, $z = 0$

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~~Ques 32~~ :→

UNIT – IV

Ques 32:→ Evaluate $\int_0^{\pi} \int_0^{a(1-\cos\theta)} r^2 \sin\theta \, dr \, d\theta$

(a) $\frac{4}{3}a^2$

(b) $4/3\,a^3$

(c) $4/3\,a$.

(d) None of these.

Ques 33:→ Evaluate by changing the order of integration

$$\int_0^1 \int_{2y}^{2} e^{x^2} \, dx \, dy$$

(a) $\frac{e^4-1}{4}$

(b) $\frac{e^2-1}{2}$

(c) $\frac{e-1}{2}$

(d) None of these.

Ques 34:- Using Beta & Gamma functions, Prove that $\beta(l,m) \cdot \beta(l+m,n) \cdot \beta(l+m+n,p) = ?$

(a) $\frac{\lfloor l \rfloor m \lfloor n \rfloor p}{\lfloor l+m+n+p+1}$

(b) $\frac{l!\, m!\, n!\, p!}{(l+m+n+p)!}$

(c) $\frac{l!\, m!\, n!\, p!}{l+m+n+p+2!}$

(d) None of these.

~~Ques~~

Ques 35:→ Show that $\int_0^1 x^5 (1-x^3)^{10} dx = ?$

Using Beta & Gamma function.

(a) $\frac{1}{396}$

(b) $\frac{1}{392}$

(c) $\frac{1}{386}$

(d) $\frac{1}{375}$

Ques 36:- UNIT-V

Ques 36:→ A fluid motion is given by

$\vec{V} = (y+z)\hat{i} + (z+x)\hat{j} + (x+y)\hat{k}$

Show that the motion is irrotational.

(a) Curl $\vec{V} = 0$

(b) Curl $\vec{V} = 2$

(c) div $\vec{V} = 0$

(d) None of these.

Ques 37:→ Calculate the volume of the solid bounded by the surface $x=0$, $y=0$, $x+y+z=1$ and $z=0$

(a) $\frac{1}{6}$

(b) $\frac{1}{4}$

(c) $\frac{1}{2}$

(d) $\frac{1}{8}$

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Ques 38:→ Apply Green's Theorm to evaluate $\int_C [(2x^2-y^2)dx + (2x^2-y^2)dy]$ where C is the boundary of the area enclosed by the x-axis and the upper half of the circle $x^2+y^2=a^2$.

(a) $2a^2$
(b) $2a^3$
(c) a^3
(d) $2a$

Ques 39:→ Suppose $\vec{F}(x,y,z) = x^3\hat{i} + y\hat{j} + z\hat{k}$ is the force field. Find the work done by $\vec{F}$ along the line from the (1, 2, 3) to (3, 5, 7)

(a) 50.5
(b) 100
(c) 20
(d) 25

Ques 40:→ If $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$ then show that

$\vec{\nabla}(\vec{a}.\vec{r}) = ?$

where $\vec{a}$ is a constant vector.

(a) $\vec{r}$
(b) $\vec{a}$
(c) $\vec{a}.\vec{r}$
(d) None of these.

Ques41:→ If $r^2 = x^2+y^2+z^2$ then $\vec{\nabla}\left(\frac{\vec{r}}{r}\right)$ is equal to

(a) 0
(b) $3r$
(c) r^2
(d) $2/r$

Ques42:→ The value of 'a' for which the vector field $\vec{V} = a(x+y)\hat{i} + 4y\hat{j} + 3\hat{k}$ is Solenoidal, is equal to

(a) 4
(b) -4
(c) 0
(d) -3

Ques43:→ Evaluate the value of $\Gamma\frac{1}{2}$

(a) $\sqrt{\pi}$
(b) π
(c) π^4
(d) Zero

Ques44:→ Using Beta & Gamma function Evaluate $\int_0^1 (1-x^3)$

OBJECTIVE QUESTIONS

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Ques 44 → The characteristic of an orthogonal matrix A is

(a) $A^{-1}A = I$ (b) $A \cdot A^{-1} = I$ (c) $A'A^{-1} = I$ (d) $A \cdot A' = I$

Ques 45 → An $n \times n$ homogeneous system of equations $AX = 0$ is given. The rank of A is $r < n$. Then the system has

(a) $n - r$ independent solutions.
(b) r independent solutions.
(c) no solution.
(d) $n - 2r$ independent solutions.

Ques 46 The matrix is $\frac{1}{\sqrt{3}}\begin{bmatrix} 1 & 1+i \\ 1-i & -1 \end{bmatrix}$ is

(a) Unitary
(b) Hermitian
(c) Skew Hermitian
(d) None of these

Ques 47 → If $y^2 = P(x)$, a polynomial of degree 3, then $2\frac{d}{dx}\left(y^3 \frac{d^2y}{dx^2}\right)$ equals

(a) $P'''(x) + P'(x)$
(b) $P''(x) * P'''(x)$
(c) $P(x) P'''(x)$
(d) Constant.

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Ques 48 → If $y(x) = \cos \log x$ then
$f(x).f(y) - \frac{1}{2}\left[f\left(\frac{x}{y}\right) + f(xy)\right]$ has the value

(a) -1
(b) $1/2$
(c) -2
(d) None of these.

Ques 49 → If $x = at^2$, $y = 2at$ where t is parameter then $xy\left(d^2y/dx^2\right)$

(a) $-a$
(b) $+a$
(c) $\pm a$
(d) None of these

Ques 50 → If $f(x,y) = 0$ then $\frac{dy}{dx}$ is equal to

(a) $\dfrac{\frac{\partial f}{\partial x}}{\frac{\partial f}{\partial y}}$

(b) $\dfrac{\frac{\partial f}{\partial y}}{\frac{\partial f}{\partial x}}$

(c) $-\dfrac{\frac{\partial f}{\partial y}}{\partial f/\partial x}$

(d) $\dfrac{-\frac{\partial f}{\partial x}}{\frac{\partial f}{\partial y}}$

Ques 51 → If $x = r\cos\theta$, $y = r\sin\theta$ then $\frac{\partial r}{\partial x}$ is equal to

(a) $\sec\theta$
(b) $r\sin\theta$
(c) $\cos\theta$
(d) $\operatorname{cosec}\theta$

Question 2 → Fill in the blank :-

$$\frac{\partial(u,v)}{\partial(r,s)} \times \frac{\partial(r,s)}{\partial(x,y)} =$$

Question 3 → If $x = r\cos\theta$, $y = r\sin\theta$ then the value of Jacobian $\frac{\partial(x,y)}{\partial(r,\theta)}$ is

(a) r
(b) x
(c) r^2
(d) None of these.

Question 4 → $\int_0^1 dx \int_0^x e^{y/x}\, dy$

(a) $\frac{1}{2}(e-1)$
(b) $\frac{1}{4}(e-1)$
(c) $-\frac{1}{2}(e-1)$
(d) None of these

Question 5 → On Converting into polar Coordinates

$$\int_0^{2a} \int_0^{\sqrt{2ay-x^2}} dx\,dy$$

(a) $\int_0^{\pi/2} \int_0^{2a\cos\theta} r\, d\theta\, dr$
(b) $\int_0^{\pi/4} \int_0^{a\cos\theta} r\, d\theta\, dr$
(c) $\int_0^{\pi/2} \int_0^{a\cos\theta} r^2\, d\theta\, dr$
(d) $\int_0^{\pi/2} \int_0^{2a\cos\theta} r^2\, d\theta\, dr$

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Ques 6:→ By using the Transformation $x+y=u$, $y=uv$ show that $\int_0^1 \int_0^{1-x} \frac{y}{e^{x+y}}\, dy\, dx$

(a) $\frac{1}{2}(e-1)$
(b) $\frac{1}{4}(e-1)$
(c) $(e-1)$
(d) $-\frac{1}{2}(e-1)$

Ques 7:→ $\int_{-1}^{1} \int_{-2}^{2} \int_{-3}^{3} dx\, dy\, dz$

(a) 48
(b) 32
(c) 42
(d) 52

Ques 8:→ $\int_0^\infty e^{-y^{\frac{1}{m}}}\, dy$

(a) $m\sqrt{m}$
(b) $m^2\sqrt{m}$
(c) $-m\sqrt{m}$
(d) None of these.

Ques 9:- Evaluate $\sqrt{\frac{7}{2}}$

(a) $\frac{15\sqrt{\pi}}{8}$
(b) $\frac{30\sqrt{\pi}}{4}$
(c) $\frac{15\sqrt{\pi}}{4}$
(d) None of these.

Ques 67:- Using Beta & Gamma function.
Evaluate $\int_0^1 (1-x^3)^{-\frac{1}{2}} dx$

(a) $\frac{1}{3}\frac{\Gamma\frac{1}{3}\,\Gamma\frac{1}{2}}{\Gamma 5/6}$

(b) $\frac{1}{3}\frac{\Gamma 2/3\,\Gamma 1/3}{\Gamma 1}$

(c) Zero

(d) None of these.

Ques 68:- Relation between Beta & Gamma functions

(a) $B(l,m) = \frac{\Gamma l\,\Gamma m}{\Gamma l+m}$

(b) $B(l,m) = \frac{\Gamma l+1\,\Gamma m+1}{\Gamma l+m+1}$

(c) $B(l,m) = \frac{\Gamma l+2\,\Gamma m+1}{\Gamma l+m+3}$

(d) $B(l,m) = \frac{\Gamma l\,\Gamma m}{\Gamma l+m+2}$

Ques 69:- Evaluate the value of $\Gamma\frac{1}{2}$

(a) $\sqrt{\pi}$

(b) π^4

(c) π

(d) Zero

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Ques 03:- Dirichlet's integral

$$\iiint_V x^{l-1} y^{m-1} z^{n-1}\, dx\,dy\,dz = ?$$

where V is the region $x \geq 0,\ y \geq 0,\ z \geq 0$ & $x+y+z \leq 1$

(a) $\frac{\lfloor l \lfloor m \lfloor n}{\lfloor l+m+n+1}$

(b) $\frac{\lfloor l \lfloor m \lfloor n}{\lfloor l+m+n+2}$

(c) $\frac{\lfloor l \lfloor m \lfloor n}{\lfloor l+m+n+3}$

(d) $\frac{\lfloor l \lfloor m \lfloor n}{\lfloor l+m+n+4}$

Ques 04. If $r^2 = x^2+y^2+z^2$ then $\vec{\nabla}\left(\frac{\vec{r}}{r}\right)$ is equal to

(a) 0

(b) $3r$

(c) r^2

(d) $2/r$

Ques 05:→ The value of 'a' for which the vector field $\vec{V} = a(x+y)\hat{i} + 4y\hat{j} + 3z\hat{k}$ is solenoidal, is equal to

(a) 4

(b) -4

(c) 0

(d) -3

Question 65 → The vector defined by $\vec{V} = e^x \sin y\, i + e^x \cos y\, j$, is :—

(a) rotational
(b) irrotational
(c) Solenoidal
(d) rotational in part of space.

Question 66 :— Let $f(x,y,z) = c$ represent the equation of a surface. The unit normal to this surface is

(a) grad (f) / | grad f |
(b) grad (f)
(c) div [grad (f)]
(d) Curl [grad (f)]

Question 67 :— Let $\vec{V} = x^2 i + xy\, e^x j + \sin z\, k$ then $\nabla \cdot (\nabla \cdot \vec{V})$ equals

(a) $x + \cos z$
(b) 0
(c) e^x
(d) $e^z + \cos z$

Question 68 — If $f = \tan^{-1} \frac{y}{x}$ then div (grad f) is equal to

(a) 1
(b) -1
(c) 0
(d) 2

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Ques 20 - The value of Curl (grad f) where $f = 2x^2 - 3y^2 + 4z^2$ is

(a) $4x - 6y + 8z$

(b) $4x\hat{i} - 6y\hat{j} + 8z\hat{k}$

(c) 0

(d) 3

Ques 21 :→ The parametric representation of a surface is $\vec{r} = au\cosh v\hat{i} + bu\sinh v\hat{j} + u^2\hat{k}$. The equation of the surface in Cartesian form is

(a) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = z$

(b) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = z$

(c) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = u^2$

(d) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = u^2$

Ques 22 - The unit normal vector to the surface $z = x^2 + y^2$ at the point (1, 1, 2) is

(a) $2\hat{i} + 2\hat{j} - \hat{k}$

(b) $2\hat{i} + 2\hat{j} + \hat{k}$

(c) $(\hat{i} + \hat{j} + 2\hat{k})/\sqrt{6}$

(d) $(2\hat{i} + 2\hat{j} - \hat{k})/3$

Question 13 → The value of p for which the vector field $\vec{V} = (2x+y)i + (3x-2z)j + (x+pz)k$ is solenoidal is

(a) 0
(b) 2
(c) -2
(d) 1

Question 14 → The value of λ so that the vector $\vec{u} = (x+3y)\vec{i} + (y-2z)\hat{j} + (x+\lambda z)\vec{k}$ is a solenoidal vector, is

(a) -2
(b) 3
(c) 1
(d) None of these.

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