Test 1 MAS 916 SET B NAME

Mark-10 ID:

1.By using elementary row operations, find the solutions if they exist for the following.

$x+2y+3z = 14$, $3x+y+2z = 11$, $2x+3y+z = 11$

2. Find the rank of the following matrix by reducing to normal form

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

3.Examine the following system of vectors for linear dependence. IF dependent find the relation between them

$X_1 = (3, 1, -4)$. $X_2 = (2, 2, -3)$, $X_3 = (0, -4, 1)$

Test 1 MAS 416 SET A NAME

Mark-10 ID: 1

1.By using elementary row operations, find the solutions if they exist for the following.

$2x + y + z = 8$, $-x + 2y + z = 4$, $3x + y - 4z = 0$

2. Find the rank of the following matrix by reducing to normal form

$$\begin{bmatrix} 1 & 0 & 2 & 1 \\ 1 & 1 & -2 & 1 \\ 1 & -1 & 4 & 1 \\ -2 & 2 & 8 & 0 \end{bmatrix}$$

3.Examine the following system of vectors for linear dependence. IF dependent find the relation between them

$X_1 = (1, -1, 1)$, $X_2 = (2,1,1)$, $X_3 = (3,0,2)$

Sel-A Test-2

1. Find $\frac{d^4y}{dx^4}$ if $y = x^5 + 7x^2 - 3x + 8$

2. If $u = \tan^{-1}\left(\frac{x^3+y^3}{\sqrt{x}+\sqrt{y}}\right)$ find the value of $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$

3. If $u = \sin^{-1}\frac{x}{y}$ find $\frac{\partial u}{\partial x}$

4. If $y = a\cos(\log x) + b\sin(\log x)$ show that $x^2 y_{n+2} + (2n+1)x\, y_{n+1} + (n^2+1)y_n = 0$

5) Find the nth derivative of $\cos^2 x$

Set- B Test - 2

1. If $u = \tan^{-1} y/x$ find $\frac{\partial u}{\partial y}$

2. Find the n^{th} derivative of $\sin^2 x$

3. If $u = \sin^{-1} \frac{(x+y)}{\sqrt{x} + \sqrt{y}}$ find the value of $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$

4. If $y = x^8 + 7x^4 - 4x + 18$ find $\frac{d^3 y}{dx^3}$

5. If $y = \cos(m \log x)$ show that $x^2 y_{n+2} + (2n+1) x y_{n+1} + (m^2 + n^2) y_n = 0$

Set A

1. State green's theorem and evaluate
$$\int_C (x^2+xy)\,dx + (x^2+y^2)\,dy$$
where C is the square formed by the lines $y=\pm 1$, $x=\pm 1$

2. Find a unit normal vector to the surface $z^2 = x^2+y^2$ at the point $(1, 0, -1)$

3. Prove that
$$(y^2 - z^2 + 3xyz - 2x)\vec{i} + (3xz + 2xy)\vec{j} + (3xy - 2xz + 2z)\vec{k}$$
is both solenoidal

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

5) State Gauss's theorem of Divergence. using it evaluate
$$\iint_S \vec{F}\cdot\vec{n}\,ds \quad \text{where } \vec{F} = 4xz\vec{i} - y\vec{j} + yz\vec{k}$$
and S is the surface of the cube bounded by $x=0$, $x=1$, $y=0$, $y=1$, $z=0$, $z=1$

Sec- B

1. State Gauss theorem of divergence. using it Find $\iint \vec{F}.\vec{n}\, ds$ where $\vec{F} = (2x+3z)\vec{i} - (xz+y)\vec{j} + (y^2+2z)\vec{k}$ and S is the surface of the sphere having centre (3, -1, 2) and radius 3.

2. Evaluate grad ϕ if $\phi = \log(x^2+y^2+z^2)$

3. Prove that $(y^2 - z^2 + 3xyz - 2x)\vec{i} + (3xz + 2xy)\vec{j} + (3xy - 2xz + 2z)\vec{k}$ is irrotational

4. If $\vec{A} = (3x^2+6y)\vec{i} - 14yz\vec{j} + 20xz^2\vec{k}$ evaluate $\oint \vec{A}.d\vec{r}$ from (0,0,0) to (1,1,1) along the curve C $x = t$, $y = t^2$, $z = t^3$

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I.d.

1. A Field F is termed as irrotational if ________

2, If $x = r\cos\theta$, $y = r\sin\theta$, then the value of $\frac{\partial(x,y)}{\partial(r,\theta)}$ is -----

3, Stoke's theorem relates ________ to ________

4, The n^{th} derivative of $\cos(ax+b)$ is ________

5, If z is homogeneous function of (x,y) of order n then $x\frac{\partial z}{\partial x} + y\frac{\partial z}{\partial y} =$ ----

6, $\int_0^a \int_0^x xy\, dy\, dx =$ -----

7, The eigen values of $\begin{bmatrix} 3, & 0 \\ 8 & -1 \end{bmatrix}$ are - ________

8, The 5^{th} derivative of x^5 is -----

9, $\int_{-1}^{1} \int_{-2}^{2} \int_{-3}^{3} dx\, dy\, dz =$ -- ________

10 Normal to the surface $xy^3z^2 = 4$ at $(-1, -1, 2)$ is ________

MAS 416 Set A Quiz Name

I.d

1) The n^{th} derivative of x^m is .....

2) The eign values of $\begin{bmatrix} 3 & 0 \\ 8 & -1 \end{bmatrix}$ are ______

3) The n^{th} derivative of $\log(ax+b)$ is ....

4) If $u = x^2$ $v = y^2$ then $\frac{\partial(u, v)}{\partial(x, y)}$ is ......

5) If z is a homogeneous function of x, y of degree n and $z = f(u)$ then

$$x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \text{....}$$

6 Gauss theorem of divergence relation ______ to ______

7) $\int_0^1 \int_0^x e^x \, dx \, dy = \text{......}$

8) $\int_{-1}^{1} \int_{-2}^{2} \int_{-3}^{3} dx \, dy \, dz = \text{......}$

9) V is called a solenoidal vector function if ...

10) The eigen values of A is $1, 2, 3$ then the eigen values of A^2 is ______