

30/01/23

M.P. 1

Test (2022-23)

M.M. 20

Note:- Attempt in any 2 questions

Q.1 (a) Solve $\iint_R \sqrt{x^2+y^2} dx dy$ where R is the region bounded by the circle $x^2+y^2=9$ — (4)

(b) Let $\phi = x^2yz - 4xyz^2$. Find the directional derivative of ϕ at $(1,3,1)$ in the dirⁿ of $2\hat{i} - \hat{j} - 2\hat{k}$ — (4)

(c) Difference between axial and polar vector — (2)

Q.2 (a) state Gauss divergence theorem — (3)

(b) Evaluate $\iint_S \vec{A} \cdot \hat{n} ds$ where $\vec{A} = 18z\hat{i} - 12\hat{j} + 3y\hat{k}$ and S is that part of the plane $2x+3y+6z=12$ which is located in first octant.

Q.3 (a) A random variable X has the following probability function:

X	0	1	2	3	4	5	6	7
P(X)	0	k	2k	2k	3k	k ²	2k ²	7k ² +k

(i) Find the value of k — (6)

(ii) Evaluate $P(0 < X < 5)$

(b) Prove that $\nabla^2 \left(\frac{1}{r} \right) = 0$ — (4)

Neel Singh