2021
B.A./B.Sc.
First Semester
CORE – 1
PHYSICS
Course Code: PHC 1.11
(Mathematical Physics - I)

PART–B
Total Mark: 30

Answer the following questions. 6×5=30

1. Solve the differential equation $\dfrac{d^3 y}{dx^3} + 3\dfrac{d^2 y}{dx^2} + 3\dfrac{dy}{dx} + y = e^{-x}$

2. Calculate the directional derivative of the function $A(x, y, z) = xy^2 + yz^3$ at the point (1, –1, 1) in the direction of the tangent to the curve $x = t^3, y = t, z = -\dfrac{t^2}{2}$ at $t = 1$.

3. Verify divergence theorem, given that $\vec{A} = 4xz\hat{i} - y^2\hat{j} + yz\hat{k}$ and S is the surface of the cube bounded by the planes $x = 0, x = 2, y = 0, y = 2, z = 0, z = 2$.

4. Express $2xy\hat{i} - z\hat{j} + 2yz\hat{k}$ in spherical co-ordinate system.

5. Show that in the limit $n \to \infty$ and $p \to 0$ so that the mean value $np \to \mu$ stay finite, the binomial distribution becomes a Poisson distribution.

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