Sessional Exam 2021

B.Sc 1st Sem (CBCS)

Sub:- physics (H)

Paper:- PHY-HC-1016 (Mathematical Physics I)

Full marks - 20

Time - 1hr

1. Answer any five from the following questions. $5 \times 1 = 5$

(a) Find the order and degree of the equation.

$$\frac{d^3y}{dx^3} + \frac{d^2y}{dx^2} + \frac{dy}{dx} - 10y = e^{-3x} \sin x$$

(b) what is the difference between ordinary and partial differential equation.

(c) check the Linearity of the equation

$$y = \sqrt{x} \left(\frac{dy}{dx}\right) + \frac{k}{\left(\frac{dy}{dx}\right)}$$

(d) whether the equation $x^2 dy + y (x+y) dx = 0$ is homogenous or non-homogeneous.

(e) what do you mean by Divergence of a vector.

(f) Find the divergence of position vector $\vec{r}$.

(g) what is meant by Line integration of a vector.

2. Answer any three from the following questions. $3 \times 5 = 15$

(a) $\frac{dy}{dx} = e^{x-y} + e^{-y}$

(b) $\frac{dy}{dx} = \frac{\sin x + x \cos x}{y(2\log y + 1)}$

(c) if $v = (3x^2 + 6y)i - 14yz j + 20 x z^2 k$, then find the $\int_c v \cdot dr$, where c is a curve (St. Line) joining $(0,0,0)$ to $(1,1,1)$.

(d) State and Prove Gauss's divergence theorm.

(e) if $\phi = x^2 + y^3 + z^3 - 3xyz$, Find div (grad ϕ) and curl (grad ϕ).

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