KATWA COLLEGE

SEM-I MAJOR

INTERNAL ASSESSMENT EXAMINATION-2023

SUBJECT: PHYSICS

PAPER CODE: PHYS1011

Time: 1h FM-15

Answer any three questions:

a) If $\vec{r}$ is the position vector of a point then show that the div ($r^4\vec{r}$)=7r^4.
Show that $r^n\vec{r}$ is irrotational vector.

b) If f (x, y) =0 and φ (y, z) =0. Show that $\frac{\partial f}{\partial y}\frac{\partial \varphi}{\partial z}\frac{dz}{dx}=\frac{\partial f}{\partial x}\frac{\partial \varphi}{\partial y}$.

Solve (1+xy)ydx+(1-xy)xdy=0

c) Show that linearly independent solutions of $y''-3y'+2y=0$ are e^x and e^{2x}. Find the solution of y(x) with the property that y(0)=0, $y'(0)=1$.

d) Prove that cylindrical coordinate system is orthogonal.

e) Solve : $y''-y'-2y= \sin 2x$