

Date - 04/05/2024

Full syllabus Test-2024

Course - B.Sc(CH) Physics

Teacher - NIHAL K.V.

Sem - IInd

Paper - M.P. - IInd

M.M - 20

Time - 1 hour.

Note - Attempt any Four Questions.

Q.① If $u = 2x+3$, $v = y-4$, $w = z+2$, then Prove that u, v, w are orthogonal. Also find ds^2 and scale factors.

Q.② If u_1, u_2, u_3 are orthogonal co-ordinates then Prove that $\hat{e}_1 = h_2 h_3 \nabla u_2 \times \nabla u_3$, similarly find the values of $\hat{e}_2$ & $\hat{e}_3$.

Q.③ obtain the Fourier series for the periodic function $f(x) = e^{-x}$, $-l < x < l$, where $f(x+2l) = f(x)$

Q.④ show that $\int_{-1}^1 f(x) P_n(x) dx = \frac{(-1)^n}{2^n n!} \int_{-1}^1 f^{(n)}(x) (x^2-1)^n dx$

Q.⑤ Using the generating function of the Legendre polynomials Prove that for each integral $n \geq 0$,

① $P_n(1) = 1$ ② $P_n(-1) = (-1)^n$

Q.⑥ solve the differential equation $y'' + xy = 0$ in series about $x=0$ by Frobenius method.

Q.⑦ solve $x^2 y'' + x(x+2)y' - 2y = 0$ by the Frobenius method.