B.Sc. 3rd Sem. (CBCS) Sessional Exam. 2021

Sub: Physics (Honours) Paper: PHY-HC-3016

Mathematical Physics II

Time: 1 hr Full marks: 20

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

(a) what is ordinary point for a second order differential equation?

(b) what do you mean by analytic of a rational function?

(c) what is called singular point of a second order differential equation?

(d) Define a symmetric matrix.

(e) what do you mean by inverse matrix.

(f) what is the condition of Hermitian matrix.

2. Answer the following questions (any Three) $3 \times 5 = 15$

(a) Prove That $P_2(x) = \frac{1}{2}(3x^2 - 1)$, satisfies the Legendre's differential equation.

(b) Prove That $(1 - 2xh + h^2)^{-\frac{1}{2}} = \sum_{n=0}^{\infty} P_n(x) h^n$

(c) Find the inverse of the matrix given below

$$A = \begin{bmatrix} 3 & 2 & 1 \\ 1 & 1 & 1 \\ 5 & 1 & -1 \end{bmatrix}$$

(d) What is eigen value and eigen vector. Find the eigen value of the matrix given below

$$A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$$