This question paper contains **2** printed pages]

PA—40—2024

FACULTY OF SCIENCE

B.Sc. (First Year) (First Semester) EXAMINATION

APRIL/MAY, 2024

(New Course)

PHYSICS

Paper–II

(Mathematical Methods in Physics)

(Tuesday, 16-04-2024) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. *:—* (*i*) *All* questions are compulsory.

(*ii*) Non-programmable calculators are allowed.

(*iii*) Figures to the right indicate full marks

(*iv*) Symbols have their usual meaning.

1. Define vector triple product of three vectors $\vec{A}, \vec{B}$ and $\vec{C}$, prove that : 15

$$\vec{A} \times \vec{B} \times \vec{C} = \vec{B}\,(\vec{A} \cdot \vec{C}) - \vec{C}\,(\vec{A} \cdot \vec{B})$$

P.T.O.

Or

(*a*) Explain multiplication of two complex number by using an Argand diagram. 8

(*b*) Explain properties of Moduli and Arguments of complex number. 7

2. Define Fourier series and evaluate the coefficient α_0, a_n and b_n in Fourier series. 15

Or

(*a*) Explain the term total differentiation. If F = $f(x, y)$. then show that total differential of F is : 8

$$dF = Fx dx + Fy dy.$$

(*b*) Explain chain rule in detail. 7

3. Attempt any *two* of the following : 10

(*a*) Explain addition of two complex numbers.

(*b*) State Gauss's divergence theorem. State Stone's theorem.

(*c*) Explain change of variable from Cartesian to polar form.

(*d*) Find Fourier series for square wave.