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

GA—53—2023

FACULTY OF SCIENCE AND TECHNOLOGY

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

APRIL/MAY, 2023

(New)

PHYSICS

Paper II

(Mathematical Methods in Physics)

(Tuesday, 02-05-2023)   **Time : 10.00 a.m. to 12.00 noon**

Time— Two Hours   *Maximum Marks—*40

N.B. :— *All* questions are compulsory.

1. Explain Argand diagram for sum and product of two complex numbers. 15

Or

(a) Explain vector triple product and show that : 8

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

(b) If $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$, then find $\vec{\nabla} \cdot \vec{r}$ and $\vec{\nabla} \times \vec{r}$. 7

2. Explain chain rule and derive change of variables from Cartesian coordinate to Polar coordinate. 15

Or

(a) Evaluate coefficients of Fourier series a_o, a_n and b_n. 8

(b) Find Fourier series for square wave. 7

P.T.O.

3. Write short notes on (any *two*) : 10

   (*a*)   Division of two complex numbers.

   (*b*)   Explain surface integral and volume integral.

   (*c*)   Condition for maxima and minima.

   (*d*)   Sine and cosine series for Fourier series.