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X—53—2019

FACULTY OF SCIENCE

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

OCTOBER/NOVEMBER, 2019

(New Pattern)

PHYSICS

Paper II

(Mathematical Methods in Physics)

(Monday, 18-11-2019)

Time : 10.00 a.m. to 12.00 noon

Time—2 Hours

Maximum Marks—40

N.B. :— (i) Attempt all questions.

(ii) Illustrate your answers with suitably labelled diagrams wherever necessary.

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

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

Or

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

$$dF = F_x dx + F_y dy$$

(b) Define partial differentiation. Explain first and second order partial differentiation. 7

2. Define fourier series. Evaluate the coefficients a_0 , a_n and b_n of Fourier series. Give physical application of Fourier series to the square wave. 15

Or

- (a) What is an Argand diagram ? Explain addition of two complex numbers by using an Argand diagram. 8
- (b) Explain division of two complex numbers by using an Argand diagram. 7
3. Attempt any *two* of the following : 10
- (a) Explain properties of moduli and arguments.
- (b) Define curl of a vector field and explain physical significance of the curl of vector field.
- (c) Explain condition for maxima and minima with graph.
- (d) Explain sine series in fourier series.