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Roll No.

21271

B. Sc. (Physics) (Hons.) 2nd Semester
Examination – May, 2019

MATHEMATICAL PHYSICS - II

Paper : Phy-201

Time : Three hours] [Maximum Marks : 40

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt five questions in all, selecting at least two questions from each Section.

SECTION - I

1. Solve the differential equation :

$$y^2 dx + (x^2 - xy - y^2) dy = 0$$

8

2. Solve the differential equation :

$$\frac{d^2 y}{dx^2} + 4 \frac{dy}{dx} + 4y = e^{2x} + e^{-2x}$$

8

Roll No.

21272

B. Sc. (Physics) (Hons.) 2nd Semester
Examination – May, 2019

MECHANICS - II

Paper : Phy-202

Time : Three hours] [Maximum Marks : 40

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : (i) Each Unit have four questions in all.

attempt at least two questions from each Unit.

A student has to attempt any four questions (any two from each Unit).

(ii) Use of scientific calculator is allowed.

UNIT - I

1. Derive expressions for gravitational potential at a point inside and outside a thin uniform spherical shell.

P. T. O.

presence of the simple little girl. And so it came about that the girl would allude to his people as mother, brother, and sister, as if she had known them all her life. In fact, she had a complete picture of each one of them painted in her little heart.

OR

But then again others said there were some things which could not wait to be laid before a Council, but about which one had at once to decide whether to undertake them or not. But in order to decide that, one must know beforehand what was going to happen. It is only magicians who know that; and, therefore, in order to know the right time for every action, one must consult magicians.

- (b) At last Ratan would enter with puffed-out cheeks, vigorously blowing into a flame a live coal to light the tobacco. This would give the postmaster an opportunity of chatting with her. "Well", Ratan, perhaps he would begin, 'do you remember anything of your mother?'. That was a fertile subject. Ratan partly remembered and partly forgot. Her father had been fonder of her than her mother: him she recollected more vividly. He used to come home in the evening after his work, and one or two evenings stood out more clearly than others. Like pictures in her memory.

(2)

3. Apply the method of variation of parameters to the equation :

$$\frac{d^2y}{dx^2} + 9y = \sec 3x$$

4. Use undetermined coefficient method to solve differential equation :

$$\frac{d^2y}{dx^2} - 8\frac{dy}{dx} + 15y = 9xe^{2x}; y(0) = 5, y'(0) = 10$$

SECTION - II

5. Obtain the Fourier series of the function :

$$f(x) = \begin{cases} 0 & -\pi \leq x \leq 0 \\ 1 & 0 < x < \pi \end{cases}$$

6. Represent $f(x) = \begin{cases} 1 & 0 < x < \frac{1}{2} \\ 0 & \frac{1}{2} < x < 1 \end{cases}$ in

(a) Fourier sine series

(b) Fourier cosine series

7. Explain square Wave and Full wave rectifier.

8. (a) Define systematic and Random Errors.

(b) Discuss the standard and probable errors.

(2)