

Roll No.

91526

B. Sc. (Hons.) Physics 2nd Sem. Latest Examination – April, 2018

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 Unit. All questions carry equal marks.

UNIT – I

- 1. State rules for finding the complementary function of a nth order differential equation of the type (D^n + k_1 D^{n-1} + ... + k_n)y = 0 in different cases. If y_1 and y_2 are two solutions of this equation, prove that c_1 y_1 + c_2 y_2 is also its solution. 8

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- 2. Find complete solution of the following differential equation, (1 - x^2)d^2y/dx^2 - 2x dy/dx + n(n + 1)y = 0; n is a constant and discuss the results. 8
3. Describe solution of Cauchy's homogenous equation. Solve x^2 d^2y/dx^2 + x(dy/dx) + y = log x sin(log x). 8
4. (i) Determine the singular points at infinity of x^2 d^2y/dx^2 - 2x(dy/dx) + p^2 y = 0 where p is an integer. https://www.haryanapapers.com 4
(ii) Find complete solution of the equation (D - 2)^2 = 8(e^{2x} + sin 2x + x^2). 4

UNIT – II

- 5. (i) Represent the following function in Fourier series. 4

f(x) = { -sin x, -pi <= x < 0; sin x, 0 < x <= pi

- (ii) Show that : 4

sum_{n=1}^{\infty} (-1)^{n+1} sin nx / n = x/2

- 6. (i) Represent the function x sin x in Fourier series. 4
(ii) Find the value of sum 1/n^2 using Fourier series for the function f(x) = x^2. 4

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7. Explain various types of errors. A balloon is form of right circular cylinder of radius 1.5 m and length 4m and is surmounted by hemispherical ends. If the radius increased by 0.01 m and length by 0.05 m, find the percentage change in volume of the balloon. **8**
8. Explain Fourier sine and cosine series. Obtain the Fourier series representation for a full wave rectifier. **8**

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