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**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**PLOT 91, CADASTRAL ZONE, NNAMDI AZIKIWE EXPRESSWAY, JABI - ABUJA**

**FACULTY OF SCIENCES**

**DEPARTMENT OF PURE AND APPLIED SCIENCE**

**JULY 2018 EXAMINATIONS**

**COURSE CODE: PHY 312**

**COURSE TITLE: MATHEMATICAL METHODS FOR PHYSICS II**

**CREDIT UNIT 3**

**TIME ALLOWED (21/2 HRS)**

**INSTRUCTION: *Answer question one (1) and any other four (4) questions***

**QUESTION 1**

1. ai) Give the general form of a second order linear partial differential equation with two independent variables and . [2marks]

aii) State when this equation is said to be

1. Homogeneous [2marks]
2. Elliptic [2marks]
3. Hyperbolic [2marks]
4. Parabolic [2marks]

b) Define the term ‘periodic function’ and give three examples each of periodic function and phenomena. [4 marks]

c) Find the Fourier coefficients of the periodic function having the period of

[4 marks]

d )Given the values of and , find the value of . [4 marks]

**QUESTION 2**

2. a) Solve the partial differential equation

[5 marks]

b) Use the Laplace transform to solve the problem

[7 marks]

With the boundary conditions ,

**QUESTION 3**

3. a) Prove that is a general solution of

[6 marks]

b) Find the Fourier sine series for

[6 marks]

**QUESTION 4**

4.a) Prove that the period of [6 marks]

b) Define the half-range Fourier series for a and give the respective functions representing the even and odd periodic functions of period. [6 marks]

**QUESTION 5**

5. Given the periodic function , assuming has a

period of

1. Find the coefficient [6 marks]
2. Find the coefficient [6 marks]

**QUESTION 6**

1. a)State Fourier theorem [3 marks]

b) Find the Fourier series for , [9 marks]