****

**NATIONAL OPEN UNIVERSITY OF NIGERIA**

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

**FACULTY OF SCIENCES**

**DEPARTMENT OF PURE AND APPLIED SCIENCE**

**2018\_2 SEMESTER EXAMINATION**

**COURSE CODE: PHY 312**

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

**CREDIT UNIT 3**

**TIME ALLOWED (2½ HRS)**

**INSTRUCTION: *Answer question 1 and any other four questions***

**QUESTION 1**

a) State when this equation is said to be:

(i) Homogeneous (2marks)

(ii) Elliptic (2marks)

(iii)Hyperbolic (2marks)

(iv) Parabolic (2marks)

b) State the generating function for the Hermite polynomials. (2 marks)

Given that:

Show that:

(6 Marks)

c) For Laguerre’s polynomials, show that that . Assume the generating function:

(6 Mrks)

Hint: Put x = 0,

**QUESTION 2**

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

(6 marks)

b) Given the values of and , find the value of . [6marks]

**QUESTION 3**

a) Explain partial differential equation (3 marks)

b) Solve the equation , subject to the boundary conditions that at

and at (9 Marks)

**QUESTION 4**

a) Give the general form of a second order linear partial differential equation with two

independent variables and . (3 marks)

b) Solve the problem:

 (9 marks)

**QUESTION 5**

Given the periodic function , assuming has

a period of

1. Find the coefficient (6 marks)
2. Find the coefficient (6 marks)

**QUESTION 6**

Evaluate the integral in terms of and . (12 marks)