

**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**14/16 AHMADU BELLO WAY, VICTORIA ISLAND, LAGOS**

**SCHOOL OF SCIENCE AND TECHNOLOGY**

**JUNE/JULY EXAMINATION**

**COURSE CODE: MTH423**

**COURSE TITLE: Integral Equation (3 units)**

**TIME ALLOWED: 3 HOURS**

**INSTRUCTION: COMPLETE ANSWERS TO ANY FIVE (5) QUESTIONS BEAR FULL MARKS**

1(a) With proper integration and differentiation, convert the understated differential equation into integral equation.

y”(x) + a1(x) + a2(x)y(x) = f(x) with the initial condition y(0) = 0; y(0) = y1 -7marks

1(a) Using appropriate method, form the integral equation corresponding to

Y” + 2xy’ + y = 0, y(0) = 1, y’(0) = 0. -7marks

2(a) Solve the integral equation

 -5marks

2(b) Solve the integral equation

 -9marks

3 Find the eigenvalues and eigenfunction of the system defined by

 -14marks

4(a) Find an integral formulation for the problem defined by

 + 4y = f(x), , y = 0 at x = 0 and y = 0 at x =  -7marks

4(b) Transform the problem defined through  + λy = 0 when y = 0 at x = 0 and

y’ = 0 at x = 1 into integral equation form. -7marks

5 Solve the integral equation

 -14marks

6(a) Solve the integral equation  -7marks

6(b) Solve the integral equation 3sinx + 2cosx =  - 7marks

7 Let  be an orthogonal system, and let be continuous.

Set  .Show that, 

and are known as the Fourier’s coefficient. -14marks