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**NATIONAL OPEN UNIVERSITY OF NIGERIA**

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

**SEPTEMBER/OCTOBER 2015 EXAMINATION**

**SCHOOL OF SCIENCE AND TECHNOLOGY**

**COURSE CODE: MTH 421**

**COURSETITLE: ORDINARY DIFFERENTIAL EQUATIONTOTAL:**

**TIME: 3 HOURS**

**70 MARKS**

**CREDIT UNIT: 3**

**INSTRUCTION:ANSWERS ANY FIVE QUESTIONS.**

1. a) When will a set of points A of the xy plane said to be CONNECTED? 3marks

b) When is a set of points A of the xy plane said to be OPEN? 3marks

c) what do you call an OPEN and CONNECTED set in the xy plane? 2.5marks

d) when is a point P said to be a BOUNDARY POINT of a domain D? 3marks

e) what will you call a DOMAIN PLUS its BOUNDARY POINTS? 2.5marks

1. Solve the non-homogenous linear differential equations

(a)  7 marks

(b)  7marks

3. Find the solution of the initial value problem.

(a)  7marks.

(b) Solve the equation  7 marks

1. (a) State and prove the fundamental theorem for the homogeneous Linear Ordinary differential equations. 7 marks.

(b) Find the non- trivial solution of the Sturm-Liouvals problem.

. 7 marks.

1. (a) Solve the equation. . 5marks

(b) Show that the roots of (5a) are Linearly Independent. 9marks marks.

1. Giving the initial value problem.



1. Does the initial value problem Exist? Otherwise go to (6b). 3marks
2. Find the integrating factor. 4marks
3. Solve the IVP completely. 6 marks
4. (a) Solve the differential equation  7marks

(b) Show that  is a solution to the differential equation.

 Also find a second independent solution  7marks