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**NATIONAL OPEN UNIVERSITY OF NIGERIA**

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

**MARCH/APRIL 2016 EXAMINATION**

**SCHOOL OF SCIENCE AND TECHNOLOGY**

**COURSE CODE: FMT309**

**COURSE TITLE: MATHEMATICAL PROGRAMMING I**

**TIME ALLOWED (3 HRS)**

**INSTRUCTION: Answer any 3 questions.**

1. A company manufactures two products A and B. These products are processed in the same machine. It takes 10 minutes to process one unit of product A and 2 minutes for each unit of product B and the machine operates for a maximum of 35 hours in a week. Product A requires 1kg and B 0.5kg of raw material per unit, the supply of which is 600kg per week. Market constraints on product B is known to be minimum of 800 units every week. Product A costs N 5 per unit and sold at N 10. Product B costs N 6 per unit and can be sold in the market at a unit price of N 8. Determine the number of units of A and B per week to maximize the profit. 23marks
2. State the steps or Procedures involved for solving LPP by graphical method. 23marks
3. Solve the following LPP by graphical method.

Minimize 

Subject to. 





with  23marks

1. Use the simplex method to solve the linear programming problem.

Minimize 

Subject to. 





with  23marks

1. A small petroleum company owns two refineries. Refinery 1 costs N 20,000 per day to operate, and it can produce 400 barrels of high-grade oil, 300 barrels of medium-grade oil, and 200 barrels of low-grade oil each day. Refinery 2 is newer and more modern. It costs N 25,000 per day to operate, and it can produce 300 barrels of high-grade oil, 400 barrels of medium-grade oil, and 500 barrels of low-grade oil each day. The company has orders totaling 25,000 barrels of high-grade oil, 27,000 barrels of medium grade oil, and 30,000 barrels of low-grade oil. How many days should it run each refinery to minimize its costs and still refine enough oil to meet its orders? 23marks.