NATIONAL OPEN UNIVERSITY OF NIGERIA
14-16 AHMADU BELLO WAY, VICTORIA ISLAND LAGOS
MARCH/APRIL 2016 EXAMINATION

SCHOOL OF SCIENCE AND TECHNOLOGY

COURSE CODE: **FMT313**
COURSE TITLE: **Introduction to Mathematical Modelling in Finance**

TIME ALLOWED **(3 HRS)**
INSTRUCTION: **Answer any 3 questions.**

1. a) Explain the term risk/return trade off. Of what significance is the financial system to any developing country's economy? 9marks

   b) Given an investor's marginal cost function $MC=Q^2+2Q+4$, find the total cost function if the fixed costs are 100. 14marks

2. The following table is a demand schedule for XYZ shares. It gives a correspondence between the price (p) of a unit and the quantity (q) that investors are willing to purchase at that price.

   (i) If P=$f(q)$, list the numbers in the domain of f, find *f (2900) and* $f(3000)$.

   (ii) If $q=g(p)$, list the numbers in the domain of g, find $g(10)\wedge g(17)$.

Price/Unit (P)₦	Quantity Demanded / week (q)
10	3,000
12	2,900

17	2,300
20	2,000

23marks

3. a).List and explain the types of models that are useful to operations managers.

   9marks

   b).Given that P=N3, AVC (Average Variable Cost) = N1.80 and the TFC (Total Fixed Cost) = N60,000, (i) What is the breakeven level of output? (ii) Graphically illustrate your answer.

   13marks

4. Given the function $y=4x^2+9$

   (i) Find the derivative $\frac{dy}{dx}$

   7marks

   (ii) Find $f'(3)$ and $f'(4)$

   8marks

   (iii) Find $f(2$ and $f(3$ 8marks

5. Given the total cost incurred by an investor for putting up shares for subscription as: TC = 120q – q^2 + 0.02q^3 and the volume of subscriptions as: P = 114 – 0.25q,

   (i) Obtain the marginal cost and marginal revenue (return) functions. 9marks

   (ii) At what levels of volume is MC = MR?

   13marks