



**NATIONAL OPEN UNIVERSITY OF NIGERIA
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF ECONOMICS
2021_1 EXAMINATION**

**COURSE TITLE: ADVANCED MATHEMATICS ECONOMICS
COURSE CODE: ECO 459
UNITS: 2
TIME ALLOWED: 2 HOURS
INSTRUCTION: ANSWER ANY THREE QUESTIONS**

QUESTION ONE

- (a) (i) Find the 10th term of the geometric sequence 243, 81, 27, 9,? **(6.3marks)**
(ii) what is the formula of the nth term? **(5marks)**
- (b) (i) What is the sum of the first 7 terms of the sequence in question 1(a)? **(6marks)**
(ii) If the 1st and 4th terms of a G.P are 256 and 32 respectively. What is the value of r? **(6marks)**

QUESTION TWO

A firm has analyzed its operating conditions prices and cost have developed the following functions Revenue (R) = $400 - 4q^2$ (per thousands) and cost (c) = $q^2 + 10q + 30$ (per thousand naira) where q is the number of units produced and sold.

If the firm wishes to maximize profit

- (a). What quantity should be sold and at what price. **(12.3marks)**
(b). What will be the amount of profit. **(11marks)**

QUESTION THREE

Given that the demand for a product is $q = 72 - 3p$.

- (a). Calculate the revenue function. **(4.3marks)**
(b). Find the revenue when price is N2. **(7marks)**
(c). What is the marginal revenue and at what price is the marginal revenue equal to zero. **(8marks)**
(d). What is the maximum revenue? **(4marks)**

QUESTION FOUR

- (a). Given $P = 300 - 6q$ and $P = 200 + 4q$, as the demand and supply function of a firm, establish the following.
- i. Determine the elasticity of the demand. **(6marks)**
ii. The elasticity of supply. **(5.3marks)**
iii. The equilibrium price and quantity. **(3marks)**
- (b)i. With the information in (a) above, find the revenue function and determine the revenue for a sales of 30 units. **(6marks)**
ii. If the cost function for the same product $c = 25 + 8q$, then determine the profit for a sales of 30 units. **(3marks)**