

BOWEN UNIVERSITY, IWO
(Of the Nigerian Baptist Convention)
COLLEGE OF MANAGEMENT AND SOCIAL SCIENCES

ECONOMICS PROGRAMME

First Semester 2021/2022 Academic Session

Course Title: Mathematical Technique in Economics Duration: 1:45mins

Course Code: ECN 103

Credit: 3 Units

Date: March 2022

Instruction: Attempt all questions in Section A. Answer no. 1 and any other 2 in Section B.

SECTION A

1. Rewrite the following statements, using set notation

- a. X does not belong to A.
- b. R is a superset of S
- c. d is a member of E
- d. F is not a subset of G

2 Marks

2. Which of these sets are equal:

- a. {r,t,s},
- b. {s,t,r,s},
- c. {t,s,t,r},
- d. {s,r,s,t}?

1 Mark

3. Which sets are finite?

- a. The months of the year
- b. {1,2,3,.....99, 100}
- c. The people living on the earth
- d. {x | x is even}
- e. {1,2,3,.....} 30

1 Mark

5. Let $X = \{\text{Tom, Dick, Harry}\}$,
 $Y = \{\text{Tom, Marc, Eric}\}$ and
 $Z = \{\text{Marc, Eric, Edward}\}$.

- Find (a) $X \cup Y$,
(b) $Y \cup Z$
(c) $X \cup Z$

2 Marks

6. Let $U = \{1, 2, 3, \dots, 8, 9\}$,

$A = \{1,2,3,4\}$, $B = \{2,4,6,8\}$ and $C = \{3,4,5,6\}$.

Find (a) A' (b) B' (c) $(A \cap C)'$ (d) $(A \cup B)'$

4 Marks

7. A situation where some variables characterizing certain phenomenon which are so closely related and the value of such variable is determined when the values of the other variables are known is?

1 Mark

8. IMPLICIT and EXPLICIT are types of? ...

.....

1 Mark

9. An example of increasing function is ...

.....

1 Mark

10. An example of a decreasing function is

.....

1 Mark

11. Given a solution to a quadratic equation, if b^2 is less than $4ac$, we have an

- a. identical root
- b. imaginary root
- c. two distinct roots

1 Mark

12. Given Qdx as a dependent variable and (GP, w, pn, px, py, y) are independent variables, construct a functional relationship of the variables. **2 Marks**

13. Applying the laws of indices, solve:

$$\left(\frac{4}{9}\right)^{\frac{3}{2}}$$

2 Marks

14. applying the laws of indices, solve:

$$(16)^{-\frac{1}{4}}$$

2 Marks

15. Given $a = 5$, $r = 3$, find the 5th term

1 Mark

16. Find the common difference in the following sequence i). 3, 5, 7, 9, 11...

ii). 102, 99, 96, 93 ...

2 Marks

17. Find the 5th term of the GP $\frac{1}{7}, \frac{1}{14}, \frac{1}{28}$

1 Mark

Total: 25 MARKS

SECTION B

1. Using clear examples, discuss the term Function?
- a. What is an Implicit function?
 - i. Explain a Kinked function
 - b. Discuss using points the usefulness of Mathematics in Social and management sciences
 - i. Clearly discuss the Limitation and Abuse of Mathematics.

15 Marks

2. If the 4th term of the GP is 81 and the 6th term is 729. Calculate
- a. the 1st term
 - i. Common difference
 - b. Find the sum of first 11 terms of a G.P given by 1, $-\frac{1}{2}$, $\frac{1}{4}$, $-\frac{1}{8}$,..... Solve the Geometric Progression.

15 Marks

3. a. An office clerk saves 50 during her first month of employment and 10 for every month thereafter. How much money would this office clerk have saved by the end of her 50th month of employment?
- b. A sum of 1000 is borrowed at 8% per annum simple interest over 15 years. Find the total amount payable at the end of the loan period.

15 Marks

4. Suppose a factory manager is setting up a production schedule for two models, A and B, of a new product. Model A requires 4 units of labour input and 9 units of capital input. Model B requires 5 units of labour input and 14 units of capital input. The total available labour input for the production of the product is 335 manhours per day, and that of capital is 850 units per day. How many of each model should the manager plan to make each day so that all the available labour hours and capital inputs are used.

Input	Model A	Model B	TOTAL Available
Labour	4	5	335
capital	9	14	850

Hint: Simultaneous equation.

15 Marks