BOWEN UNIVERSITY, IWO
COLLEGE OF MANAGEMENT AND SOCIAL SCIENCES
ECONOMICS PROGRAMME

2020/2021 B.Sc. SECOND SEMESTER EXAMINATION

COURSE TITLE: Mathematical Techniques for Economists II

COURSE CODE: ECN 204

TIME ALLOWED: $2\frac{1}{2}$ HOURS   **CREDIT:** 3units

DATE: August, 2021

INSTRUCTIONS: Answer questions one and any other three questions.

1. Transpose of a rectangular matrix is a
   - (a) Rectangular matrix
   - (b) Diagonal matrix
   - (c) Square matrix
   - (d) Scalar matrix

   Ans: rectangular matrix

2. In matrix, columns are denoted by
   - a) A
   - b) B
   - c) R
   - d) C

   Ans: D

3. Two matrices A and B are multiplied to get AB if
   - a) Both are rectangular
   - b) Both have same order
   - c) No columns of A is equal to column of B
   - d) No of rows of A is equal to no of column of B

   Ans: No columns of A is equal to column of B

4. Transpose of a row matrix is
   - a) Zero matrix
   - b) Diagonal matrix
   - c) Column matrix
   - d) Row matrix

   Ans: Column matrix C

5. If A and B are matrices, then which from the following is true?
   - a) $AB \neq BA$
   - b) $(At)t \neq A$
   - c) $A + B \neq B + A$
   - d) all are true

   Ans: $AB \neq BA$

6. Two matrices A and B are added if
   - a) both are rectangular
   - b) both have same order
   - c) no of columns of A is equal to columns of B

d) no of rows of A is equal to no of columns of B

   Ans: both have same order

7. A square or a rectangular array of numbers written within square brackets in a definite order in rows and columns is known as

   a) Determine
   b) Formula
   c) Matrix
   d) Equation

   Ans: Matrix

8. If A is a symmetric matrix, then $A^T=$

   a) 0
   b) A
   c) $|A|$
   d) diagonal matrix

   Ans: B

9. A square matrix in which all elements except at least one element in diagonal are zeros is said to be a

   a) Identical matrix
   b) Null/zero matrix
   c) Column matrix
   d) Diagonal matrix

   Ans: Diagonal matrix

10. If the order of matrix A is m × p. And the order of B is p × n. Then the order of matrix AB is?

    a) n x p
    b) m x n
    c) m x p
    d) n x m

    Ans: m x n

11. using $d(x^n) = nx^{n-1}$, select an anti-derivative of x^6

    a) $6x^5$

    b) $\frac{1}{5}x^5$

    c) $\frac{1}{7}x^7$

    d) $\frac{1}{6}x^7$

    Ans: C

12. Select the correct result for the indefinite integral $\int \frac{1}{\sqrt{x}} dx$

a) $\sqrt[2]{x} + C$

b) $-\frac{1}{2}x^{-\frac{3}{2}} + C$

c) $\frac{1}{2}x^{\frac{1}{2}} + C$

d) $\frac{2}{\sqrt{x^2}} + C$

   Ans: A

13. Use this property to find the general anti-derivative of $3\chi^2 - 2\chi^3$
    a) C
    b) $\chi^3 - \frac{1}{2}\chi^4 + C$
    c) $\frac{3}{2}\chi^3 - \frac{2}{3}\chi^4 + C$
    d) $\chi^3 + \frac{2}{3}\chi + C$
       Ans: b

14. If $y = \int 3X\,dx$ and at $x = 2$, it is measured that $y = 4$, calculate the integration constant.
    a) $C = 2$
    b) $C = 4$
    c) $C = -2$
    d) $C = 10$
       Ans: C

15. Given $m(u) = x^2 + 3x$ find the TC
    a) $\frac{1}{8}\chi^8 + C$
    b) $\frac{\chi^3}{3} + \frac{3x^2}{2} + C$
    c) $\frac{1}{a}e^{ax} + c$
       Ans: b

16. Given $\int_b^a (fx)\,dx$
    What is a and b are called?
    a) The constants
    b) The limits
    c) The variables
    d) Discrete terms
       Ans: B

17. The equation in qtn (16) above is called a.............?
    a) Definite integral
    b) Indefinite integral
    c) Definite differential
    d) Indefinite differential
       Ans: A

18. The first order, first degree differential equation $y' = f(x, y)$ is said to be homogeneous, if
    a) $f(x, y)$ is a homogeneous function of degree zero.
    b) $f(x, y)$ is a homogeneous function of second degree
    c) $f(x, y)$ is a homogeneous function of first degree
    d) $f(x, y)$ is a homogeneous function of third degree
       Ans: C

19. All but one is not a role of Linear algebra (Matrix)
    a) Permits expression of a complicated system of equations in a succinct, simplified way,

b) Provides a shorthand method to determine whether a solution exists before it is attempted
c) Furnishes the means of solving the equation system
d) Checks for causality

Ans: D

20. $Y_t = by_{t-1} + a$, is an example of?
a) Differential equation
b) Quadratic equation
c) Simultaneous equation
d) Difference equation

Ans: D

21. All but one of the following is not an Economic application of first order difference equation.
a) The Domar consumption model
b) When compounding annually
c) Harrod growth model
d) The cobweb model

Ans: A

22. Given two equations $C_t = 300 + 0.5Y_t + 0.4Y_{t-1}$ and $Y_{t+3} - 9Y_{t+2} + 6Y_t = 8$ what is the order of these equations respectively?
a) 3, 8
b) 1, 8
c) 1, 1
d) 1, 3

Ans:D

23. the differential equation of the type $x^n \frac{d^n y}{dx^n} + a1x^{n-1} \frac{d^{n-1}y}{dx^{n-1}} + \cdots \ldots + any = x$ where x is either a constant or a function of x only, is
a) linear but not homogenous
b) homogeneous but not linear
c) both homogeneous and linear
d) neither linear not homogeneous

Ans: C

24. solve $\int_{-1}^{4}(4x + 1) \, dx$
a) 46
b) 28
c) 35
d) 72

Ans: C

2 marks

25. If dy/dx = (2 - x) (4 – 3x), what is y?
a) $2x + x^2 + c$
b) $8x - 5x^2 + c$
c) $8x - 5x^2 + x^3 + c$
d) $x - 5x^2 + x^3 + c$

Ans: C

2 Marks

26. the general solution to the differential equation $\frac{d^2y}{dx^2} + \frac{dy}{dx} - 6y = x$ is given by

    a) $y = c_1e^{3x} + c_2e^{-3x}$

    b) $y = c_1e^{-3x} + c_2e^{2x}$

    c) $y = c_1e^{3x} + c_2e^{-2x}$

    d) $y = c_1e^{2x} + e^{-3x}$

    Ans: b or c

3 marks

SECTION 2:

1. $\int xe^{3x^2}\,dx$

    a) $\frac{1}{6}e^{3x^2} + C$

    b) $e^{3x^2} + C$

    c) $6\log 3x + C$

    d) $2e^{3x^2} + C$

    Ans: A

2   Marks

2. A manufacturer determines that the firm's MC $= 200 + 0.4x$, find the change in cost that results when the sales level is increased from 10 to 50 units.

    a) 7,560

    b) 7,520

    c) 8,240

    d) 6,240

    Ans: B

4 marks

3. A manufacturer determines that the firm's MR $= 200 + 0.2x$, find the change in revenue that results when the sales level is increased from 10 to 50 units.

    a) 8,060

    b) 7,560

    c) 8,240

    d) 8,000

    Ans: C

4 marks