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SEAT No. \_\_\_\_\_

No. of printed pages: 02

**SARDAR PATEL UNIVERSITY**  
**B.A. (Advanced) EXAMINATION**  
**SEMESTER – III**

**Wednesday, 28<sup>th</sup> November 2018**

**2.00 p.m. to 4.00 p.m.**

**MATHEMATICAL TECHNIQUES IN ECONOMICS (UA03EEEC01)**

**Total Marks: 60**

**Q.1**

1. An equation of the form  $ax^2 + bx + c = 0$ ,  $a \neq 0$  is called \_\_\_\_\_ equation. 1 mark  
 (a) Quadratic (b) Cubic (c) Linear (d) none
2. Identify which of the following is linear or nonlinear function. 3 marks  
 (a)  $y = x^2$  (b)  $y = x + 4x^3$  (c)  $y = 5 + x$  (d)  $y = 2x - 3$
3. Matrix  $\begin{bmatrix} -2 & 1 & 0 \end{bmatrix}$  called \_\_\_\_\_. 1 mark  
 (a) Zero matrix (b) Row matrix (c) Null matrix (d) Column matrix
4. Identify which of the following is monomial or polynomial. Justify. 3 marks  
 (a)  $xy^2$  (b)  $x^2y^2 + 2xy - 3$  (c)  $4x^3 - 2x + 5$
5. Functions with a single independent variable are called \_\_\_\_\_ functions. 1 mark  
 (a) (a) Univariate (b) Bivariate (c) Multivariate (d) none
6. A \_\_\_\_\_ represents a concept or an item whose magnitude can be represented by a number. 1 mark  
 (a) Matrix (b) function (c) variable (d) none
7.  $x = \log_2 8$ , then  $x =$  \_\_\_\_\_. 1 mark  
 (a) 6 (b) 2 (c) 3 (d) none of the above
8. Marginal cost curve always cuts Average cost curves at its \_\_\_\_\_ point. 1 mark  
 (a) Highest (b) Decreasing (c) Lowest (d) Increasing
9. Under perfect competition TR is a straight line rising upward because \_\_\_\_\_. 1 mark  
 (a) Price is constant  
 (b) Firm is a price taker  
 (c) Price is determined by market forces of demand & supply  
 (d) none of these
10.  $TC - TFC =$  \_\_\_\_\_. 1 mark  
 (a) AVC (b) TVC (c) AC (d) AFC
11. If  $f(x) = 3x - 5$  then  $f(-3) =$  \_\_\_\_\_. 1 mark  
 (a) 0 (b) -14 (c) -2 (d) 13

- Q.2** What is Revenue? Discuss the relationship between TR, AR & MR under imperfect competition. 15 marks

**Q.2****OR**

- (a) Solve following system of linear equations (Find
- $x, y$
- and
- $z$
- ):

10 marks

$$2x + 5y + 7z = 2$$

$$4x - 4y - 3z = 7$$

$$3x - 3y - 2z = 5$$

- (b) The production of a company at present is 50,000 tons. It aims at 7% growth rate of Production. Find out its production at the end of 9
- <sup>th</sup>
- year? 5 marks

**Q.3** What is Price Elasticity? Explain various methods of measurement of price elasticity. 15 marks**Q.3****OR**

(a)

Let  $A = \begin{bmatrix} 2 & 1 & 5 \\ 7 & 3 & 0 \\ 1 & 3 & -1 \end{bmatrix}$ . Then evaluate following Minors and Cofactor:

8 marks

(1)  $|M_{11}|$  (2)  $|M_{13}|$  (3)  $|C_{33}|$  (4)  $|C_{12}|$

- (b) A manufacturer has two machines A & B. He manufactures two products X & Y on these machines. For product X he has to use machine A for 3 hours and machine B for 6 hours & for manufacturing product Y he has to use machine A for 6 hours and machine B for 5 hours. On each unit of X he earns Rs. 4 and on each unit of Y he earns Rs. 5. How many units of X and Y should be manufactured to get maximum profit? Note that each machine cannot be used for more than 2100 hours. Formulate above LPP mathematically. 7 marks

**Q.4**

- (a) Explain the concept of TC, TFC, TVC, AFC, AVC & AC.

7 marks

- (b) Explain the concept, assumption, applications of Input-output analysis.

8 marks

**Q.4****OR**

- (a) 1. Simplify following using rules of powers and indices:

5 marks

(a)  $\frac{y^3}{y^2}$  (b)  $5^x \cdot 5^{-5}$  (c)  $y^5 \cdot (y^{-2})$

2. Identify the Supply and Demand schedule from the following:

(a)  $p = 52 - 2q$  (b)  $p = 3 + 2q$

- (b) If
- $A = \begin{bmatrix} -1 & 3 & 1 \\ 2 & -3 & 2 \\ 3 & 1 & -1 \end{bmatrix}$
- . Then find the value of determinant of Matrix A using 5 marks

Laplace expansion.

- (c) Write a Short note on Price Elasticity.

5 marks

\*\*\*\*\*X\*\*\*\*\*

(2)