15P128

Name.....

Reg.No. .....

FIRST SEM. M.A. DEGREE EXTERNAL EXAMINATION, FEB. 2016

(2015 Admission)

Economics

CC15P ECO1 C04 - QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS I

Time: 3 Hours Maximum: 36 Weightage

Part A

Answer **all** questions

*Each bunch of **four** questions carries weightage **1**.*

1. A diagonal matrix whose diagonal elements are all equal is called :
   (a) Symmetric matrix. (b) Unit matrix. (c) Scalar matrix. (d) None of these.

2. The determinant of a matrix $A = \begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 5 \\ 1 & 2 & 3 \end{pmatrix}$ is:
   (a) 0. (b) 1. (c) 2. (d) 5.

3. A square matrix A is singular if:
   (a) $|A| > 0$. (b) $|A| < 0$. (c) $|A| = 0$. (d) $|A| \neq 0$.

4. The rank of the matrix $A = \begin{pmatrix} 1 & 2 & 3 \\ 3 & 6 & 9 \\ 2 & 4 & 6 \end{pmatrix}$ is:
   (a) 1. (b) 2. (c) 3. (d) None of these.

5. $\frac{d\sqrt{x}}{dx}$ is:
   (a) $2\sqrt{x}$. (b) $\frac{1}{2\sqrt{x}}$. (c) $\sqrt{x}$. (d) $\frac{1}{\sqrt{x}}$.

6. The marginal revenue for 5 units sold from the total revenue function $R = 100x - x^2$ is:
   (a) 475. (b) 90. (c) 75. (d) 100.

7. An event whose occurrence is inevitable is called:
   (a) Certain event. (b) Impossible event. (c) Compound event. (d) None of these.

8. The point of intersection of demand and supply curves is known as:
   (a)Break-even point. (b) Equilibrium point. (c) Isoquants. (d) None of these.

9. The value of $\int_0^1 e^x dx$ is:
   (a) $e-1$. (b) $e+1$. (c) e. (d) 0.

10. The producers surplus when the supply function is $p = 10+2q$ and equilibrium price Rs. 20 is:
    (a) 35. (b) 25. (c) 100. (d) 50.

11. Probability is a measure lying between:
    (a) $[0,1]$. (b) $(-1,1)$. (c) $(0,\infty]$. (d) $(-\infty,\infty)$.

12. The probability of occurrence of two disjoint events is:
    (a) 1. (b) 0. (c) 0.5. (d) None of these.

(12×$\frac{1}{4}$= 3 weightage)

Part B(Very Short Answer Questions)

Answer any **five** questions.
*Each question carries a weightage of **1**.*

13. Define inverse of a matrix.

14. Distinguish between mutually exclusive events and equally likely events.

15. The amount of fertilizer applied (x) and yield per plot (y) of a crop are related by an equation $y = 20.38+2.5x-0.125x^2$. Find the quantity of fertilizer to be used to get maximum yield?

16. State the axiomatic definition of probability.

17. Find the total revenue function given $MR = 84-4Q-Q^2$.

18. Define distribution function of a random variable X and state any two properties.

19. Establish the degree of homogeneity of the function Z=$x_1^3+4x_1^2x_2+x_2^3$.

20. Let A and B be two events such that, $P(A\cup B)=0.8$, $P(A)=0.4$ and $P(A\cap B)=0.3$, then $P(A\cap B^c)$.

(5×1= 5 weightage)

Part C (Short Answer Questions)

Answer any **eight** questions.
*Each question carries a weightage of **2**.*

21. Evaluate k if the following is a probability density function.

X	:	0	1	2	3
$p(X)$	:	$\frac{1}{6}$	$\frac{1}{10}$	$\frac{k}{10}$	$\frac{1}{30}$

.

22. If $y = \sqrt{\dfrac{1-x}{1+x}}$, find $\dfrac{dy}{dx}$.

23. Write short notes on:
(i) Marginal Cost. (ii) Marginal Revenue. (iii) Average Revenue.

24. State and prove Bayes theorem of probability?

25. Find X and Y if $X + Y = \begin{pmatrix} 5 & 2 \\ 4 & 5 \end{pmatrix}$ and $X - Y = \begin{pmatrix} 3 & -4 \\ 2 & 1 \end{pmatrix}$.

26. If $A = \begin{pmatrix} 1 & 3 \\ -2 & 2 \end{pmatrix}$ show that it satisfies the characteristic equation?

27. Show that $\begin{vmatrix} 1 & a & a^2 \\ 1 & b & b^2 \\ 1 & c & c^2 \end{vmatrix} = (a-b)(b-c)(c-a)$.

28. Find the inverse of the matrix $A = \begin{pmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{pmatrix}$.

29. If $P(A) = 0.4$, $P(B) = 0.2$, $P(AB) = 0.1$, then find the probabilities of

(a) At least one of the events occurs

(b) Exactly one of the events occur.

30. State and prove addition theorem of probability.

31. Determine the maxima and minima values of $y = x^3 - 6x^2 + 9x - 5$.

(8×2= 16 weightage)

Part D (Essay Questions)

Answer any **three** questions.
Each question carries a weightage of ***4***.

32. Solve the system of equations by Crammer's rule.
$x + y + z = 6$
$x + 2y + 3z = 14$
$-x + y - z = -2$.

33. If the following is the probability mass function of a random variable X, find k. Also find the mean and variance of X

X	:	0	1	2	3
$P(X)$	:	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{k}{8}$	$\frac{1}{8}$

34. Integrate the following functions:
(a) $\int x^2 e^{3x} dx$ (b) $\int_0^1 (3x^2 - 4x^3) dx$ (c) $\int x \log x dx$.

35. Marginal cost function for some product is $MC = 3q^2 - 4q + 5$. Find the total cost function and average cost function if the fixed cost is Rs.10.

36. Three firms A, B,C supply certain raw material to a factory. Their share being in the ratio 4:5:1. Experience show that 10% of those supplied by A, 8% supplied by factory B and 5% supplied by factory C are defective. If an item selected from the supply is found to be defective, what is the chance that it has been supplied by 1) A 2) B 3)C?

(3×4= 12 weightage)

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