

18P167

(Pages: 3)

Name:.....

Reg.No.....

FIRST SEMESTER M.A. DEGREE EXAMINATION, NOVEMBER 2018

(Regular/Supplementary/Improvement)

(CUCSS-PG)

CC15P ECO1 C04 – QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS - I

(Economics)

(2015 Admission onwards)

Time: Three Hours

Maximum: 36 Weightage

Part A

Answer all questions. Each bunch of four questions carries weightage 1

- Any square matrix A is said to be symmetric if
 - $A = -A^T$
 - $A = A^T$
 - $AA^T = -1$
 - none of these
- If $A^2 = A$, then the matrix A is called
 - nil potent
 - idem potent
 - symmetric
 - skew symmetric
- The value of the determinant $\begin{vmatrix} 1 & 2 & -3 \\ 2 & -1 & 2 \\ 3 & 2 & 4 \end{vmatrix}$ is:
 - 33
 - 23
 - 40
 - 79
- The characteristic roots of $\begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}$ are
 - 5,2
 - 5,3
 - 1,5
 - 1,4
- For the demand law $x = \frac{20}{p+1}$ the elasticity of demand with respect to price at point $p = 3$ is
 - $\frac{3}{4}$
 - $\frac{4}{3}$
 - 4
 - none of these
- The rank of the matrix $\begin{bmatrix} 5 & 2 & 1 \\ 0 & 1 & 3 \\ 2 & 1 & 0 \end{bmatrix}$ is:
 - 3
 - 1
 - 2
 - none of these
- The function $y = 3x^2 - 14x + 5$ increasing when x is equal to
 - 4
 - 5
 - 7
 - 9
- If $y = \frac{1}{x^2}$, $\frac{dy}{dx}$ is
 - $\frac{-2}{x^2}$
 - $\frac{-2}{x^3}$
 - $\frac{-2}{x^{-2}}$
 - $\frac{-2}{x^{-3}}$
- A positively sloped curve moves
 - upward
 - downward
 - horizontally
 - vertically

10. The producers surplus when the supply function is $p = 10 + 2q$ and the equilibrium price 20 is
 a) 35 b) 25 c) 100 d) 50
11. $\int_1^e \frac{1}{x} dx$ is equal to:
 a) $\log e$ b) 0 c) $\log 1$ d) None of these
12. If $A \subset B$ then $P(A/B)$ is equal to
 a) Zero b) 1 c) $\frac{P(A)}{P(B)}$ d) $\frac{P(B)}{P(A)}$

(12 × ¼ = 3 Weightage)

Part B

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

13. Define a matrix?
14. Examine whether the function $y = 100 - x - 2x^2$ is monotonic increasing or decreasing when $X > 0$
15. The marginal cost function for a certain product is $MC = 3q^2 - 4q + 5$. Find the total cost function given the fixed cost is Rs 100.
16. State Baye's theorem?
17. An unbiased coin is tossed twice. Find the probability of getting at least one head
18. Define conditional probability?
19. State multiplication theorem of probability?
20. If $P(A) = \frac{1}{4}, P(B^c) = \frac{2}{3}, P(AB) = \frac{1}{12}$ then find $P(AB^c)$

(5 × 1 = 5 Weightage)

Part C

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

21. Let X be a continuous random variable with probability density function
- $$f(x) = \begin{cases} ax & \text{for } 0 \leq x \leq 1 \\ ax^2 & \text{for } 1 \leq x \leq 2 \\ a & \text{for } 2 \leq x \leq 3 \\ 0 & \text{elsewhere} \end{cases}$$
- (i). Determine the constant a. (ii). Compute $P(X \leq 1.5)$
22. State and prove addition theorem of probability?
23. If $P(A) = 0.3, P(B) = 0.2, P(AB) = 0.1$ Find the probability of (i). At least one of the event occurs (ii). Exactly one of the events occurs

24. Differentiate $Y = \frac{x^2-1}{x^2+1}$ with respect to x.
25. If A and B are two independent events. Show that (i) A^c and B^c are independent (ii). A and B^c are independent
26. Solve the system of equations by Cramer's rule.
 $3x + y + z = 8; x + y + z = 6; 2x + y - z = 1$
27. If $MC = 32 + 18Q - 12Q^2$ find TC and AC if the fixed cost is 15.
28. Differentiate (i) $4x^3 + 3x^2 - 2x + 7$ (ii) $\log(1+x)$ (iii) $(1+x)(1+x^3)$
29. A random variable has the probability density function $f(x) = 6x(1-x); 0 \leq x \leq 1$. Find the mean and variance of x
30. A problem in statistics is given to three students A,B and C with the respective chances of solving it are $\frac{1}{2}, \frac{1}{3},$ and $\frac{1}{4}$. What is the probability that (i). The problem is solved (ii). None of them solve the problem
31. Evaluate $\int_0^2 (x^2 + 2x + 3) dx$

(8 × 2 = 16 Weightage)

Part D

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

32. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 0 & 2 & 1 \\ -1 & 2 & 2 \end{bmatrix}$. Find the determinant of A and the characteristic polynomial of A.
33. Find the adjoint of the matrix and verify that $a (Adj A) = |A|I$ if $A = \begin{bmatrix} 1 & 4 & 5 \\ 3 & 2 & 2 \\ 0 & 1 & -3 \end{bmatrix}$
34. Three countries A,B,C manufacture 25%, 35%, 40% of the total software requirement of the world. Of their output 5%, 4% and 2% are defective. An output is selected at random and it is found defective. What is the probability that it was manufactured by B.
35. Optimize the function $f(x, y) = xy$ subject to the constraint $x^2 + y^2 = 8$
36. Find the maximum profit that a company can make if the profit function is given by $P(x) = 41 - 24x - 18x^2$.

(3 × 4 = 12 Weightage)
