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Name.....

Reg. No.....

FIRST SEMESTER P.G. DEGREE EXAMINATION, NOVEMBER 2018

(CCSS)

Economics

ECO 1C 03—MATHEMATICS FOR ECONOMICS

(2018 Admissions)

Time : Three Hours

Maximum : 80 Marks

Part A

Answer all questions.

Each question carries 1 mark.

Multiple choice questions :

1. Two matrices A and B are multiplied to get AB if
 - (a) Both are rectangular.
 - (b) Both have same order.
 - (c) Number of columns of A is equal to number of rows of B.
 - (d) Number of rows of A is equal to number of columns of B.
2. If the number of elements in a set S are 5, the number of elements of the power set P (S) is :
 - (a) 5.
 - (b) 6.
 - (c) 16.
 - (d) 32.
3. The union of two events occurs when :
 - (a) Neither event A nor event B occur.
 - (b) Both event A and event B occur.
 - (c) Either event A or event B occur.
 - (d) Event A and event B are mutually exclusive.
4. $\int_1^3 (x^2 + 2x - 3) dx :$
 - (a) 31/3.
 - (b) 32/3.
 - (c) 30.
 - (d) 40/3.

Turn over

5. The order of the difference equation $I_t = a(Y_{t-1} - Y_{t-2})$ is :
- (a) One. (b) Two.
(c) Zero. (d) Three.
6. Let the range of possible values of a random variable X be 1 to 2, and it can take any value between 1 and 2, then X is a :
- (a) Discrete random variable. (b) Continuous random variable.
(c) Dependent variable. (d) All the above.
7. The set of positive integers is _____.
- (a) Infinite. (b) Finite.
(c) Subset. (d) Empty.
8. If $f(x) = e^{2x}$, then find $f^{-11}(x)$:
- (a) $\frac{1}{6}e^{2x}$. (b) $4e^{2x}$.
(c) $\frac{1}{4}e^x$. (d) e^{2x} .
9. Two dice are thrown simultaneously. What is the probability of getting two numbers whose product is even ?
- (a) $1/2$. (b) $3/4$.
(c) $3/8$. (d) $5/16$.
10. The order of a matrix $[1 \ 3 \ 5 \ 7]$ is :
- (a) 1×3 . (b) 3×1 .
(c) 4×1 . (d) 1×4 .

(10 × 1 = 10 marks)

Part B

*Answer all of the following.
Each question carries 2 marks.
Answer in one or two sentences each.*

Very Short Questions :

11. What are the properties of expectations ?
12. Solve $(1-x) dy - (1-y) dx = 0$.
13. If the demand function is given by $X = 20 - 5p$, find the elasticity of demand at $p = 2$ and $p = 3$.

14. Integrate $\int_2^4 (3x - 2)^2 dx$.

15. If $A = \begin{bmatrix} 2 & -2 \\ 4 & 2 \\ -5 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 8 & 0 \\ 4 & -2 \\ 3 & 6 \end{bmatrix}$, find matrix X such that $2A + 3X = 5B$.

(5 × 2 = 10 marks)

Part C

Answer any **eight** questions.
Each question carries 5 marks.

Short Answer Questions :

16. Integrate :

(a) $\int \frac{x+5}{(x+1)(x+2)} dx$.

(b) $\int x^2 e^{3x} dx$.

17. Solve the simultaneous equations using Cramer's rule :

$$2x - 3y + 5z = 11, \quad 5x + 2y - 7z = -12, \quad -4x + 3y + z = 5.$$

18. Explain mutually exclusive events, exhaustive events and dependent events with an example.

19. What is meant by consumer's surplus ? If the demand function is :

$$P = 35 - 2q - q^2 \text{ and the demand } q_0 \text{ is 3, what will be the consumer's surplus ?}$$

20. What is a determinant and what are its properties ?

21. If $U = \{1, 2, 3, 4\}$, $A = \{1, 2\}$, $B = \{2, 3\}$ and $C = \{1, 4\}$. Find :

(a) $A^c \cup (B \cap C)$.

(b) $A \cup (B \cap C)$.

(c) $A \cap B \cap C$.

(d) $(A \cap B)^c$.

(e) $(A \cup B) \cap (B \cup C)$.

(f) $(A \cap B^c) \cup (B^c \cup C)$.

22. Given $x = 700 - 2p + 0.02y$, where $p = 25$ and $y = 5000$, find the price elasticity and income elasticity of demand.

23. The probability that a contractor will get an electric contract is $2/3$ and the probability that he will not get a plumbing contract is $5/9$. If the probability of getting at least one contract is $4/5$, what is the probability that he will get both the contracts.

24. Explain the different definitions of probability.
25. Distinguish between discrete and continuous random variable.
26. Solve the difference equation $y_t = 7y_{t-1}$. Check your answer using $t = 0$ and $t = 1$. Also comment on the nature of the time path.

27. Find the Eigen values of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & -4 & 2 \\ 0 & 0 & 7 \end{bmatrix}$.

(8 × 5 = 40 marks)

Part D

*Answer any two questions.
Each question carries 10 marks.*

Essay Type Questions :

28. Solve the simultaneous equations using Inverse method :

$$2x - 3y + 5z = 11, \quad 5x + 2y - 7z = -12, \quad -4x + 3y + z = 5.$$

29. The total profit function of a firm producing two goods 'x' and 'y' is given by $\pi = 80x - 2x^2 - xy - 3y^2 + 100y$ and its maximum production capacity is $x + y = 12$.

What combination of x and y should the firm produce to maximise profit. Also estimate the effect on profit if the output capacity is expanded by 1 unit.

30. Explain in detail the application of difference equations in Economics.
31. (a) What is conditional probability ?
- (b) In an examination, two problems 1 and 2 related to quantitative aptitude are asked. 35% students solved the first problem and 15% students solved both the problems. How many students who solved the first problem will also solve the second one?

(2 × 10 = 20 marks)