D 11918   (Pages : 4)   Name..

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THIRD SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION NOVEMBER 2021

Economics

ECO 3B 03—QUANTITATIVE METHODS FOR ECONOMIC ANALYSIS—I

(2014—2018 Admissions)

Time : Three Hours   Maximum : 80 Marks

Section A (Objective Type)

Answer **all** *questions.*
Each question carries ½ mark.

1. The value of $(0.0001)^{\frac{1}{4}}$ is :

   (a) 0.001.   (b) 0.01.

   (c) 0.1.   (d) 1.

2. The logarithm of 243 to the base 3 is :

   (a) 3.   (b) 4.

   (c) 5.   (d) 6.

3. If log 3 = 0.4771, find the number of digits in 3^{62} :

   (a) 27.   (b) 28.

   (c) 29.   (d) 30.

4. The degree of a quadratic equation is :

   (a) 1.   (b) 2.

   (c) 3.   (d) 4.

5. Let the matrix A is of order 2×4 and another matrix B is of order 4×5, then the product AB is of order :

   (a) 2×4.   (b) 2×5

   (c) 4×4.   (d) 4×5.

Turn over

6. Let A be a matrix such that $|A| \neq 0$, then 4 is said to be :

    (a) Orthogonal.   (b) Symmetric.

    (c) Singular.   (d) Non-singular.

7. Pie-chart represents the components of a factor by :

    (a) Percentages.   (b) Angles.

    (c) Sectors.   (d) Circles.

8. Sum of squares of the deviations about mean is :

    (a) Zero.   (b) Minimum.

    (c) Maximum.   (d) One.

9. The percentage of items in a frequency distribution lying between upper and lower quartiles is :

    (a) 80 %.   (b) 40 %.

    (c) 50 %.   (d) 25 %.

10. Mean deviation is minimum when deviations are taken from :

    (a) Mean.   (b) Median.

    (c) Mode.   (d) Zero.

11. If the correlation co-efficient $r = 1$, the angle between the two lines of regression is :

    (a) 0.   (b) 90.

    (c) 60.   (d) 30.

12. The term 'regression' was introduced by :

    (a) R.A. Fisher.   (b) Karl Pearson.

    (c) Sir Francis Galton.   (d) Pascal.

$(12 \times \frac{1}{2} = 6 \text{ marks})$

Section B (Short Answer Type)

Answer any **ten** *questions.*
Each question carries 2 *marks.*

13. Simplify $15x^7 y^3 \div \frac{5}{3} x^3 y^{-1}$.

14. Simplify $\dfrac{(3)^5 \, (27)^3 \, (9)^4}{3 \, (81)^4}$.

15. Give the rules of logarithm.

16. If $\log 2 = 0.3010$ and $\log 3 = 0.4771,$ find $\log 45.$

17. Find the equilibrium price and the quantity exchanged at the equilibrium price, if supply and demand functions are given by $S = 20 + 3p$ and $D = 160 - 2p$ where p is the price charged.

18. Define square matrix with an example.

19. Define minor and co-factor.

20. Show that the matrix $A = \begin{bmatrix} 5 & 7 & 2 \\ 2 & 3 & 1 \\ 4 & 6 & 2 \end{bmatrix}$ is singular.

21. Arithmetic mean of 100 items is 34. At the time of calculation, three items 118, 70 and 19 were wrongly taken as 180. 17 and 90 respectively. What is the correct mean ?

22. Define range and quartile deviation.

23. Distinguish between positive correlation and negative correlation.

24. Find the mean of variables x and y from the regression equations given by $2y - x - 50 = 0$ and $3y - 2x - 10 = 0.$

$(10 \times 2 = 20 \text{ marks})$

Section C (Short Essay/Problem Type)

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

25. Find the value of $\left[\dfrac{a^{-1}b^2}{a^2b^{-4}} \right] \div \left[\dfrac{a^3b^{-5}}{a^{-2}b^3} \right]^{-5}.$

26. Find the value of $\dfrac{36.52 \times 25.43}{15.31 \times 2.56}$ using logarithm.

Turn over

27. A man sells 7 tables and 8 chairs at Rs. 2,940 and 5 tables anti 6 chairs at Rs. 2,150. What is the selling price of each ?

28. Let $P = \begin{bmatrix} 0 & 1 \\ 2 & 3 \end{bmatrix}$, $Q = \begin{bmatrix} -1 & 2 \\ 4 & 3 \end{bmatrix}$ and $R = \begin{bmatrix} 2 & -1 \\ 6 & 5 \end{bmatrix}$. Find $P(Q + R)$ and $PQ + PR$. Hence prove that $P(Q + R) = PQ + PR$.

29. A company sells x tins of chocolate powder each day at Rs.15 a tin. The cost of manufacturing and selling these tins is Rs. 10 per tin plus a fixed daily overhead cost of R.s. 1,000. Determine (i) Cost function ; (ii) Revenue function ; and (iii) Profit function. What is the total cost, total revenue and total profit when 500 tins are manfactured and sold a day.

30. The marks obtained by seven students are 5, 10, 15, 20, 25, 30, 45. Find the harmonic mean.

31. Obtain the standard deviation for the data on scores given below :

Score	:	0–10	10–20	20–30	30–40	40–50	50–60	60–70
No. of students	:	10	15	25	25	10	10	5

32. Find the rank correlation coefficient between poverty and overcrowding from the table given below :

Town	:	A	B	C	D	E	F	G	H	I	J
Poverty	:	17	13	15	16	6	11	14	9	7	12
Overcrowding	:	36	46	35	24	12	18	27	22	2	8

(6 × 5 = 30 marks)

Section D (Essay Type)

Answer any **two** *questions.*
Each question carries 12 *marks.*

33. Solve the following system of equations :

$3x - 2y + 7z = 5$; $7x + y + 9z = 6$; $3x + 3y - 7z = 0$.

34. Find the inverse of A, where $A = \begin{bmatrix} 3 & 5 & 7 \\ 2 & -3 & 1 \\ 1 & 1 & 2 \end{bmatrix}$.

35. Explain the graphs of frequency distributions.

36. In a partially destroyed record of an analysis of correlation data the following results are legible. Variance of $x = 9$ and the regression equations are $8x - 10y + 66 = 0$; $40x - 18y = 214$. Find (i) The mean values of x and y ; (ii) The co-efficient of correlation ; and (iii) The standard deviation of y.

(2 × 12 = 24 marks)