2021/TDC/CBCS/ODD/ ECOHCC–303T/456

TDC (CBCS) Odd Semester Exam., 2021 held in March, 2022

ECONOMICS

(3rd Semester)

Course No. : ECOHCC–303T

(Statistical Methods for Economics)

Full Marks : 70
Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION—A

Answer any *ten* questions :   2×10=20

1. State two demerits of mean.

2. Find the value of median for the following observations :

   2, 6, 8, 10, 12, 16, 18, 20

3. Define coefficient of variation.

(Turn Over)

(2)

4. Define conditional probability.

5. If A and B are mutually exclusive events and $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$, then find *(i)* $P(A \cup B)$ and *(ii)* $P(A \cap B)$.

6. State axiomatic definition of probability.

7. Define continuous random variable.

8. Show that $E(a) = a$, where a is any arbitrary constant.

9. State any two points of differences between binomial distribution and Poisson distribution.

10. Define joint probability distribution function.

11. Distinguish between sample and sampling.

12. State two merits of sample survey over census.

13. Define population parameter.

14. What do you mean by an unbiased estimator?

15. Do population parameters have sampling distributions? Justify your answer.

(3)

SECTION—B

Answer any *five* of the following questions : 10×5=50

16. *(a)* If A, G and H be the arithmetic mean, geometric mean and harmonic mean of two positive numbers a and b respectively, then prove that $A \geq G \geq H$.

(b) Calculate standard deviation for the following data which shows the age distribution of 542 members :

Age in Years	No. of Members
20–30	3
30–40	61
40–50	132
50–60	153
60–70	140
70–80	51
80–90	2

5+5=10

17. *(a)* Show that variance is independent of change of origin but not of scale.

(b) Distinguish between positive skewness and negative skewness. Find the coefficient of variation of a frequency distribution given that its mean is 120, mode is 123 and Karl Pearson's coefficient of skewness is −0·3. 5+(2+3)=10

(4)

18. (a) An unbiased coin is tossed 2 times. Construct the relevant sample space and obtain the probability of finding at least one head.

(b) State and prove compound theorem of probability. (2+2)+6=10

19. (a) State and prove Bayes' theorem of probability.

(b) A town has two doctors X and Y operating independently. If the probability that doctor X is available is 0·9 and that for Y is 0·8, then find the probability that at least one doctor is available when needed. 6+4=10

20. (a) State the properties of normal distribution.

(b) Given the following table, compute the values of $E(X)$ and $V(X)$:

x	P(x)
−3	0·05
−2	0·10
−1	0·30
0	0
1	0·30
2	0·15
3	0·10

5+5=10

(5)

21. (a) State the properties of Poisson distribution. Why is Poisson distribution called the distribution of rare events?

(b) Let X be a discrete random variable with the following probability distribution :

x :	0	1	2	3	4	5
P(x) :	a	2a	3a	4a	5a	6a

Find the values of a and $E(X)$.

(4+2)+(2+2)=10

22. Discuss the principal steps in a sample survey. 10

23. Distinguish between random sampling and non-random sampling. Explain the procedure of sample selection under stratified random sampling method. 4+6=10

24. Write short notes on the following : 5+5=10

(a) Parameter vs. Statistic

(b) Standard Error vs. Standard Deviation

25. (a) Define sampling distribution of a statistic.

(b) Distinguish between point estimation and interval estimation. Add a note on the utility of standard error in statistics. 2+(4+4)=10

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