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F – 1865

Reg. No. : ....

Name : ....

First Semester B.Sc. Degree Examination, November 2018
First Degree Programme Under CBCSS
Complementary Course for Mathematics
ST 1131.1 : DESCRIPTIVE STATISTICS AND INTRODUCTION TO
PROBABILITY
(2014 Admn. – 2017 Admn.)

Time : 3 Hours

Max. Marks : 80

SECTION – A

Answer **all** the questions. **Each** carries **one** mark.

1. Give one advantage of primary data over secondary data.

2. 'Histogram can be drawn only for continuous data'. Is the statement true or false ?

3. What do you mean by a time series data ?

4. Define non-sampling errors.

5. Which average is suitable for ordinal data ?

6. Define geometric mean.

7. A set of 10 observations has standard deviation 3. If all the values in the set are multiplied by 10 then find the standard deviation of the new set of observations.

8. Give an example of exhaustive events.

9. Who introduced empirical definition of probability ?

10. Let $P(A) = 0.4$ and $P(A \cup B) = 0.6$. For what value of $P(B)$ are A and B mutually exclusive ?

(1×10=10 Marks)

P.T.O.

SECTION – B

Answer **any eight** questions. **Each** carries **two** marks.

11. Define a random sample.

12. Give an example of misuse of statistics.

13. Give a situation where median is the most suitable average.

14. What is the advantage of using coefficient of variation instead of standard deviation ?

15. What is the purpose of drawing a box plot ?

16. Define kurtosis.

17. What do you mean by statistical regularity ?

18. Give axiomatic definition of probability.

19. Show that sum of squares of deviations of observations is minimum when it is taken from arithmetic mean.

20. Use the axioms of probability to show that $P(AB^c) = P(A) – P(B)$.

21. If the sample space $S = \{1, 2, ..., 10\}$ and the events $A = \{1, 3, 5, 7, 9\}$, $B = \{1, 2, 3, 4, 5, 6\}$ and $C = \{5, 6, 7, 8, 9, 10\}$ then obtain the events
    a) $A \cap (B \cup C)$ b) AB^c.

22. Using the frequency definition of probability show that $P(A^c) = 1 – P(A)$.

(2×8=16 Marks)

SECTION – C

Answer **any six** questions. **Each** carries **four** marks.

23. Discuss the main characteristics of an ideal questionnaire.

24. From the following stem and leaf chart

Stem	Leaf
5	2
6	5
8	0000222455688
9	01568
10	0

Find mode and quartile deviation.

25. State and prove algebraic properties of arithmetic mean.

26. Compute mode from the following data.

Class	0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29
Frequency	6	15	28	24	12	5

27. Price in rupees of a particular commodity in five months at two regions are as follows :

Region A	:	20	22	19	22	23
Region B	:	18	12	10	20	15

Compare the consistency of the prices in the two regions.

28. Give any two measures of skewness.

29. Three unbiased dice are thrown. What is the probability that the sum of the number thrown is 10 ?

30. State and prove addition theorem of probability.

31. When will you say that three events are mutually independent. Give an example to show that pairwise independence need not imply mutual independence.

(4×6=24 Marks)

SECTION – D

Answer **any two** questions. **Each** carries **fifteen** marks.

32. Discuss the merits and demerits of mean, median and mode.

33. Compute quartile deviation from the following data :

Income	0 – 50	50 – 100	100 – 150	150 – 200	200 – 300	300 – 400
No. of families	250	220	150	120	150	100

34. If A_1, A_2, A_3 are mutually exclusive and exhaustive events show that $B_1 = A_1$, $B_2 = A_1^c A_2$ and $B_3 = A_1^c A_2^c A_3$ are mutually exclusive and exhaustive.

35. a) State and prove Bayes' theorem.

   b) Urn – I contain 5 white, 9 black and 7 red balls, urn – II contains 7 white 8 black and 10 red balls and urn – III contains 2 white, 6 black and 9 red balls. An urn is chosen at random and a ball is drawn from it and it is found that the colour of this ball is red. What is the probability that the selected ball is from urn - II ?

(15×2=30 Marks)