# 2022

## M.Com.

## 2nd Semester Examination

## BASIC STATISTICS

## PAPER—COM-204 (CBCS)

*Full Marks :* 50

*Time :* 2 Hours

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words as far as practicable.*

*Illustrate the answers wherever necessary.*

### Unit – 1

**1.** Answer any *two* questions : 2×2

(a) Distinction between an attribute and a variable. Give example.

(b) Mention any four methods of collecting primary data.

(c) What do you mean by Frequency distribution ?

(d) What are the different measures of variability of observations ?

**2.** Answer any *two* questions : 2×4

(a) The mean and standard deviation of 20 items is found to be 10 and 2 respectively. At the time of checking it was found that one item 8 was incorrect. Calculate the mean and standard deviation, if the wrong item is omitted and replaced by 12.

(b) A motor car covered a distance of 50 miles four times. The first time at 50 m.p.h, the second at 20 m.p.h, the third at 40 m.p.h and the fourth at 25 m.p.h. Calculate the average speed and explain the choice of the average.

(c) The mean age of a group of 100 children was 9.35 years. The mean age of 25 of them was 8.75 years and that of another 65 was 10.51 years. What was the mean age of the remainder ?

(d) Calculate the coefficient of correlation from the following results :

$$\sum_{i=1}^{10} X = 125 ; \quad \sum_{i=1}^{10} Y = 80 ; \quad \sum_{i=10}^{10} X^2 = 1585 ;$$

$$\sum_{i=10}^{10} Y^2 = 650 ; \quad \sum_{i=1}^{10} XY = 1007 .$$

**3.** Answer any *one* question : 1×8

(a) (i) From the following data, calculate first quartile and 4th decile :

| X | 0-5 | 5-10 | 10-15 | 15-25 | 25-35 | 35-40 | 60-80 |
|---|---|---|---|---|---|---|---|
| Y | 12 | 30 | 51 | 84 | 66 | 50 | 7 |

(ii) The arithmetic mean calculated from the following distribution is known to be 67.45 inches. Find the value of $f_3$.

| Height (inches) | 60-62 | 63-65 | 66-68 | 69-71 | 72-74 |
|---|---|---|---|---|---|
| Frequency | 15 | 54 | $f_3$ | 81 | 24 |

4+4

(b) (i) State the properties of Linear Regression.

(ii) Write short notes on :

(a) Rank Correlation and

(b) Mode 4+(2+2)

## Unit – 2

**4.** Answer any *two* questions : 2×2

(a) What do you mean by conditional probability ?

(b) State two adventages of sampling.

(c) Define binomial distribution.

(d) What is 'critical region' ?

**5.** Answer any *two* questions : 2×4

(a) What do you understand by stratified random sampling ? Give example.

(b) State the limitations of 'classical probability'.

(c) State the important properties of Poisson distribution.

(d) The probability that a bomb will hit its target is 0.8. Assuming a Binomial situation, what is the probability that out of 12 bombings exactly 3 are missed ?

**6.** Answer any *one* question : 1×8

(a) Three urns contain respectively 4 white, 2 black balls; 2 white, 4 black balls; 3 white, 3 black balls. One of the urns is chosen on the result of two throws of a coin : the first urn if head appears in each throw, the the second urn if tail appears in each throw, and the third urn in case of head appears on one throw and tail on the other. Finally, a ball is drawn at random from the chosen urn. what is the probability for the ball being white ?

(b) It is hoped that a newly developed pain reliever will more quickly reduce pain to patients after minor surgeries than a standard pain reliever. the standard pain reliever is known to bring relief in an average of 3.5 minutes with standard deviation 2.1 minutes. To test whether the new pain reliever works more quickly than the standard one, 50 patients with minor surgeries were given the new pain reliever and their times to relief were recorded. The experiment yielded a sample mean of 3.1 minutes and standard deviation 1.5 minutes. Is there sufficient evidence in the sample to indicate,

at the 5% level of significance, that the newly developed pain reliever does deliver relief of pain more quickly ?

*[Internal assessment – 10]*

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