TDC Odd Semester Exam., 2020
held in July, 2021

STATISTICS

(Pass)

(3rd Semester)

Course No. : STSP–301

(Statistical Methods)

Full Marks : 35
Pass Marks : 12

Time : 2 hours

The figures in the margin indicate full marks for the questions

Answer **five** questions, taking **one** from each Unit

UNIT—I

1. *(a)* What is standard error of a statistic? Mention its role in large sample theory. 1+2=3

(b) Find standard error of sample proportion in both simple random sampling with replacement and simple random sampling without replacement from a finite population. 4

2. *(a)* Derive sampling distribution of mean of a random sample drawn from a normal population. 3

(b) Let $x_1, x_2, ..., x_n$ be a random sample of size n drawn with replacement from a population having variance ^{2}. Show that the standard error of the sample mean ($\bar{x}$) is given by $\frac{}{\sqrt{n}}$. 4

UNIT—II

3. *(a)* Define chi-squared statistic. Mention some applications of chi-squared distribution. 1+2=3

(b) Explain *t*-test for testing the significance of the difference between two population means stating clearly the underlying assumptions. 4

4. *(a)* Define *F*-statistic and write two applications of *F*-test. 1+2=3

(b) In a random sample of 8 observations, $(x \ \bar{x})^2$ 94 5. In another random sample of 10 observations, $(x \ \bar{x})^2$ 101 7. Test whether the difference between the two sums of

squares is significant at 5% level. Given—

$F_{0\ 05}$ for (8, 10) = 3·07

$F_{0\ 05}$ for (7, 9) = 3·29 4

UNIT—III

5. *(a)* Show how to test the significance of the difference between means of two samples when the samples are large. 3

(b) In a large city *A*, 20% of a random sample of 900 children had defective eyesight. In another large city *B*, 15% of random sample of 1600 children had defective eyesight. Is the difference between the two proportions significant? Obtain 95% confidence limits for the difference in population proportions. 3+1=4

6. *(a)* Write a note on large sample test. 3

(b) Describe the method of testing for an assumed population mean on the basis of information supplied by a random sample of large size when the population variance is known. 4

UNIT—IV

7. *(a)* Describe Pearsonian chi-squared test for goodness of fit between theory and experiment stating clearly the conditions of its validity. 4

(b) A die is tossed 120 times and each outcome is recorded as under :

Faces	:	1	2	3	4	5	6
Frequency	:	20	22	17	18	19	24

Is the distribution of outcomes uniform? [Given $^{2}_{0\ 05}(5)$ 11 1] 3

8. What is a contingency table? Show that in 2×2 contingency table, where the frequencies are

a	b
c	d

^{2} calculated from the independent frequencies is

$$\frac{(a\ \ b\ \ c\ \ d)(ad\ \ \ bc)^{2}}{(a\ \ b)(c\ \ d)(a\ \ c)(b\ \ d)}$$ 2+5=7

UNIT—V

9. *(a)* Distinguish between census and sample survey. Explain with specific reasoning the actual need of sampling. 1+3=4

(b) Describe briefly the three basic principles of sample survey. 3

10. *(a)* Describe briefly the ways to control non-sampling errors. 4

(b) Describe briefly the planning stages of a large-scale sample survey. 3

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