

FYCS

Paper / Subject Code: 77306 / Statistics Methods & Testing of Hypothesis. / 30

(Time: 2 ½ Hours)

[Total Marks: 75]

- N.B.
- 1) All questions are compulsory.
 - 2) Figures to the right indicate marks.
 - 3) Illustrations, in-depth answers and diagrams will be appreciated.
 - 4) Mixing of sub-questions is not allowed.

Q. 1 Attempt All the questions

(15M)

Multiple choices questions

- (a)
- 1 The mean of the binomial distribution is -----
a) npq b) np c) pq d) nq
 - 2 Cumulative distribution function is a ----- continuous function
a) Right b) Left c) Bounded d) None of above
 - 3 The critical region is region of -----
a) Rejection b) Acceptance c) positive d) Negative
 - 4 For a two sided test the Rejection region lies at ----- tails
a) One b) two c) both a & b d) None of above
 - 5 Chi square test of association is used for ----- data
a) Qualitative b) Quantitative c) Time series d) Geographic

(b) **Fill in the blanks.**

- 1 The curve of Normal distribution is -----
- 2 Number of children in a family is a ----- random variable
- 3 ANOVA is used for testing -----
- 4 Power of statistical test must always be -----
- 5 Sign test is a ----- test

(c) **Answer in one sentence**

- 1 Define discrete random variable with an example
- 2 State one property of the Normal distribution
- 3 Write the sample space when a coin is tossed two times
- 4 Describe the curve of the F distribution
- 5 Define type I error for a statistical hypothesis

Q. 2 Attempt the following (Any THREE)

(15M)

- (a) Define probability density function, cumulative distribution function and expectation for a continuous random variable X .
- (b) State the density function of the chi square distribution and any two properties of it.
- (c) Define t distribution. Write any two properties of the same
- (d) Explain briefly the Normal distribution with the help of its curve
- (e) Define a Binomial distribution? State the mean and variance of the Binomial distribution
- (f) Chances that a student of Mumbai university clears UPSC exam are 70%. If 20 students appear for the exam, what is the chance that more than 3 students and exactly 8 students will clear the exam.

Q. 3 Attempt the following (Any THREE) (15M)

- (a) Define null and alternative hypothesis. State an example of null hypothesis
- (b) Describe the paired t test with an example .
- (c) Distinguish between type I and type II error
- (d) Describe the large sample test for testing $H_0: \mu = \mu_0$ against $H_1: \mu > \mu_0$
- (e) Explain briefly ANOVA with an example of one way ANOVA
- (f) A health club advertised a weight reducing program and claimed that it will reduce the weight in 3 months. To check the claim 10 persons before and after weight was noted. Does the data support the claim at 1 % Level of significance. Table value=2.822

No	1	2	3	4	5	6	7	8	9	10
Wt before	61	65	68	72	75	73	74	66	69	82
Wt after	52	54	60	62	67	66	64	59	60	76

Q. 4 Attempt the following (Any THREE) (15)

- (a) Explain in short Non parametric tests
- (b) Write a short note on Wilcoxon's signed rank test
- (c) State the test statistics for Mann Whitney U test and Kruskal Wallis test
- (d) Explain the concept of post hoc Analysis of variance
- (e) Write a short note on Chi square test of Association
- (f) Test if there is an association between gender and acceptance of application for the following data.(Table value at 5% LOS=3.84)

	Application successful	Application not successful	TOTAL
Male	23	40	63
Female	31	39	70
TOTAL	54	79	133

Q. 5 Attempt the following (Any THREE) (15)

- (a) Define probability mass function and expectation of a discrete random variable
- (b) Define one sided and two sided hypothesis
- (c) Write a short note on sign test
- (d) Differentiate between parametric and non parametric tests
- (e) If X follows binomial (3,0.5) find the mean and variance
