

GANPAT UNIVERSITY
B. Tech. Semester: III (BMI/CE/CL/EC/EE/IT/MC/ME) (Open Elective)
CBCS Regular Examination December 2013
Subject: 20S301 Research Methods & Statistical Applications
Total Marks: 70

Time: 3 Hours

Instruction:

1. All questions are compulsory.
2. Write answer of each section in separate answer books.
3. Figures to the right indicate marks of questions.

Section I

- Q-1 (A)** In an anti malaria campaign in a certain area, quinine was administered to 812 persons out of a total population of 3248. The number of fever cases is shown in table. [07]

Treatment	Fever	No fever	Total
Quinine	20	792	812
Non-quinine	220	2216	2436
Total	240	3008	3248

Discuss the usefulness of quinine in checking of malaria. ($\chi^2_{tab} = 3.84$)

- (B)** The following data represents yields in quintals of common ten sub-divisions of equal area of two agriculture plots: [05]

Plot 1	6.2	5.7	6.5	6.0	6.3	5.8	5.7	6.0	6.0	5.8
Plot 2	5.6	5.9	5.6	5.7	5.8	5.7	6.0	5.5	5.7	5.5

Test whether the two samples taken from the two random populations have the same variance ($F_{tab} = 3.18$)

OR

- Q-1 (A)** The nicotine content (in mg) of two samples of tobacco were found to be as follows [07]

Sample A	24	27	26	21	25	-
Sample B	27	30	28	31	22	36

Using F-test can it be said that the two samples came from the same normal population and critical value is equal to 6.26

- (B)** A sample size 13 gave an estimated population variance of 3.0 while another sample of size 15 gave an estimate of 2.5. Could both samples be from the population with the same variance? Take $F_{tab} = 2.53$ also calculate degree of freedom. [05]

- Q-2 (A)** In experiment on immunization of cattle from tuberculosis, the following results were obtained: [07]

	Affected	Not affected
Inoculated	12	26
Non inoculated	16	6

Calculate χ^2_{cal} and discuss effect of vaccine susceptibility to tuberculosis. ($\chi^2_{tab} = 3.84$)

- (B)** The observations of a population are 10, 20, 12, 22 and 26. How many samples of size 2 without replacement can be taken from it? Make a list of all the samples and verify the following results: [04]

1. $E(\bar{x}) = \bar{y} = \mu$
2. $E(s^2) = s^2$

OR

- Q-2 (A)** Explain: α error & β error, level of significance and two-tailed & one-tailed test. [07]

- (B)** Explain central limit theorem. [04]

- Q-3 (A) Draw and explain flow diagram of hypothesis testing. [06]
(B) Give the differences between population study and sample study. [06]

Section II

- Q-4 (A) Write the types of research and explain any two. [06]
(B) What kind of techniques is involved for defining a problem? [06]

OR

- Q-4 (A) Give the explanation about criteria of good research. [06]
(B) Explain any two steps of research process. [06]

- Q-5 (A) What are the important concepts relating to research design and explain any two. [06]
(B) Give details for selecting a sampling procedure. [05]

OR

- Q-5 (A) Explain measurement scales. [06]
(B) Explain source of error in measurements. [05]

- Q-6 (A) Explain observation method. [06]
(B) Give explanation for selecting of appropriate methods for data collection. [06]

END OF PAPER