

Date: 18/03/2014

Time: 1 to 2.00 p.m.

(Foundation of Statistics - II)

Note:

(i) Q.2 to 5, each sub question have 4 marks (ii) Simple/Scientific calculator is allowed.

(iii) Statistical table is allowed/provided on request.

## Q.1 Short Type Questions (Attempt Any Three)

(2 × 3)

- (1) State the equations of two regression lines. At which point two regression lines intersect?
- (2) State the conditions for applicability of Binomial distribution.
- (3) List out the Discrete probability distributions you have studied. Define any one of them. State its parameters, mean and standard deviation.
- (4) List out the various methods of studying relationship between two quantitative variables. Write in brief about any one of them.
- (5) Interviews with 185 persons engaged in a stressful occupation reveal that 76 were alcoholics, 81 were mentally depressed and 54 were both.  
(a) Present the above data in the two-way frequency table (b) State its objective(s) (c) Which statistical test would you prefer to the said objective(s).
- (6) Write down the formula for calculating Spearman's rank correlation coefficient. State its limits. How will you modify the formula if ranks are repeated?

Q.2(a) The following table gives the results of measurements of train resistance;  $X$  is the velocity in miles per hour,  $Y$  is the resistance in pounds per ton.

$X$	20	40	60	80	100	120
$Y$	5.5	9.1	14.9	22.8	33.3	46.0

If the resistance be 55 pounds per ton, what will be the velocity?

- (b) In an experiment the no. of grams of a given salt which dissolved in 100 gm of water was observed at eight different temperatures.

Temperature( $^{\circ}$ C)	0	10	20	30	40	50	60	70
Weight of salt(gm)	88.0	83.7	81.8	74.1	72.7	66.4	61.1	51.9

(i) Construct a Scatter plot (ii) Does there appear to be any evidence of a linear relationship between temperature and weight of salt? (iii) Compute  $r$ , the correlation coefficient and comment on it.

OR

Q.2(a) Juhi's parents recorded her height at various ages up to 84 months. Below is a record of the results:

Age (months)	36	48	60	72	84
Height (in inches)	35	38	41	43	45

At what age Juhi's height will be 54 inch?

- (b) Calculate Spearman's rank correlation coefficient from the data given below:

Marks in Internal Test	40	55	40	60	62	78	58	96
Marks in External test	65	45	68	65	70	75	69	88

Q.3(a) Suppose that 2% of the trees in a forest are infected with certain type of parasite. If 200 trees are selected at random, find the probability that the selected trees containing (i) More than 5 (ii) At most 4, infected trees.

- (b) It was claimed that 1 out of 4 dentists recommend sensodyne tooth paste to his patients to prevent cavities. Suppose that the claim is true. If 10 dentists are selected independently and at random, let  $X$  be the number of dentists who recommend sensodyne tooth paste to his/her patients (i) How is  $X$  distributed? (ii) Give the mean and standard deviation of  $X$  (iii) Determine  $P(X > 3)$ ,  $P(2 \leq X \leq 5)$ .

OR

Q.3(a) A test consists of 10 multiple choice questions, each with four possible answers, one of which is correct. To pass the test a student must get 70% or better on the test. If a student randomly guesses, what is the



probability that the student will pass the test?

- (b) An institute found that 4% of the registered students withdraw without completing a course on C++. If 100 students have registered in the current batch, compute the probability that (a) Two or more (b) Exactly four, will withdraw.

Q.4(a) A survey was conducted to investigate whether alcohol consumption and smoking are related. The following information was compiled for 600 individuals:

	Smoker	Non - smoker
Drinker	193	165
Non-drinker	89	153

(i) Identify the objective(s) of study (ii) Carry out an appropriate statistical test to study the said objective.

- (b) Interviews with 185 persons engaged in a stressful occupation reveal that 76 were alcoholics, 81 were mentally depressed and 54 were both.

(i) Present the above data in the two-way frequency table (ii) Is there any association between "Consumption of alcohol" and "Depression"? Test at  $\alpha = 0.01$ .

OR

Q.4(a) Write in brief on chi square test in a  $2 \times 2$  contingency table.

- (b) From the following data find out whether there is any relationship (association) between sex and preference of colour.

Colour	Sex		Total
	Male	Female	
Red	10	40	50
White	70	30	100
Green	30	20	50
Total	110	90	200

