ACHARYA INSTITUTE OF TECHNOLOGY
Bangalore - 560090

USN | | | | | | | | | | |

10BT41

Fourth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Biostatistics and Biomodeling

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. What are the various methods of collection of data? **(10 Marks)**

b. Represent the following data by histogram and both the cumulative frequency curves.

No. of grains }	18 - 20	20-22	22-24	24-26	26-28	28-30	30-32	32-34	34-36
No. of plants }	8	15	18	21	26	19	12	7	4

(10 Marks)

2 a. Calculate mean deviation, variance and standard deviation for the following data : **(10 Marks)**

x	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19
f	14	19	29	38	30	19	15	10

b. Calculate Arithmetic mean, Geometric mean and Harmonic mean for the following data : **(10 Marks)**

x	0-10	10-20	20-30	30-40	40-50	50-60
f	12	18	27	20	17	6

3 a. Define Probability. Explain the theories and theorems of probability. **(10 Marks)**

b. What is gene frequency and gene pool? Explain Hardy – Weinberg law. Determine whether the given population follows Hardy – Weinberg law :
In a population of 100 people, 40 are PTC – tasters with dominant allele, 40 are tasters of heterozygous nature and 20 are non tasters. **(10 Marks)**

4 a. Determine the expected frequency values for the following data assuming binomial distribution. **(06 Marks)**

x	0	1	2	3
f	28	62	46	10

b. In a book of 100 pages the observed frequency distribution of mistakes are given below :

No. of mistakes	0	1	2	3	4	5	6
No. of pages	48	27	12	7	4	1	1

Assuming Poisson distribution, compute the expected frequency values. **(07 Marks)**

c. The life – time in hours of a certain electrical equipment has the normal distribution with mean = 80, variance = 256. What is the probability that the equipment lasts at least 100 hours? Also calculate the conditional probability that it will last another 12 hrs after it has already lasted 88 hrs. **(07 Marks)**

PART – B

5 a. In a certain experiment to assess the effect of a particular diet, the following change in the body weight after 30 days of administration of the diet on the experiment animals were observed. Test whether the diet was effective in increasing the body weight of the animals. **(10 Marks)**

Body weight (g) before the diet	49	53	51	52	47	50	52	53
Body weight (g) after the diet	52	55	52	53	50	54	54	53

b. 1200 children were classified according to intelligence and marks scored in the examination. The following table gives the necessary information. Test whether intelligence level is associated with their performance in the examination. **(10 Marks)**

Intelligence	Very good	Good	Average	Total
Dull	72	90	??	240
Intelligen	184	305	??	600
Very Intelligent	144	105	??	360
Total	???	500	300	1,200

6 a. A manufacturing company has bought 3 different machines and their performances have been recorded. Test whether the machines are significantly different in performance by analysis of variance. Use $\alpha = 0.05\%$. **(10 Marks)**

Machine A	25	30	36	38	31
Machine B	31	39	38	42	35
Machine C	24	30	28	25	28

b. Define single and double blind experiments. Explain any one with a case study. **(10 Marks)**

7 a. Explain the approach of 't' test for confirming human antibody response to therapeutic drug with a case study. **(10 Marks)**

b. What is the application of statistics for cases related to cigarette smoking? **(10 Marks)**

8 a. Write short notes on :
i) Mutualism in a chemortat ii) Predation in a chemortat. **(10 Marks)**

b. How do microbes grow in a chemortat? Derive the growth equation and comment on commensalisms. **(10 Marks)**

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