MALIBA PHARMACY COLLEGE, TARSADI
B. PHARM. SECOND SEMESTER
MID SEMESTER EXAMINATION MARCH 2009
APPLIED MATHEMATICS (BIOSTATISTICS) (220001)

DATE : 31/03/09 TIME : 12:30 p.m. to 3:30 p.m.
MAXIMUM MARKS : 100

Instructions :

(1) Attempt any five of the following questions.
(2) Each question carries 20 marks.

Q.1]

(a) Find the correlation coefficient between the diastolic blood pressure and serum cholesterol levels of 10 randomly selected data of 10 persons. Use Karl pearson's method.

Cholesterol	307	259	341	317	274	416	267	320	274	336
Diastolic B.P	80	75	90	74	75	110	70	85	88	78

(b) Explain the following terms.

(1) Positive and negative correlation.
(2) Correlation coefficient.

(c) Nine students secured the following percentage of marks in mathematics and chemistry.

Marks in maths	78	36	98	25	75	82	90	62	65
Marks in chemistry	84	51	91	60	68	62	86	58	53

Find the rank correlation coefficient.

(d) Explain the scatter diagram for regression equation.

Q.2]

(a) From the following data ,Obtain (a) the regression line Y on X and (b) the regression line X on Y using the Least squares method.

X	1	2	3	4	5
Y	9	11	5	8	7

(b) Write the difference between regression and correlation.

(c) Explain the regression equation.

(d) Find the lines of regression of y on x if $n = 9$ $\Sigma x = 30.3$ $\Sigma y = 91.1$ $\Sigma xy = 345.09$ and $\Sigma x^2 = 115.11$ Also find the values of variance y when x = 1.5 and x = 5.0 .

[PTO}

Q.3]

(a) Explain the following terms related to testing of hypothesis.
(1) Null hypothesis (2) Level of significance.

(b) A random sample of 20 tablets from a batch gives a mean ingredient content 42 mg and standard deviation of 6 mg. Test the hypothesis that the population mean is 44 mg.

(c) You are given the following data about the shelf life of the two formulation of same drug.

	Mean	S.D	Sample size
Brand X	2000 days	250	12
Brand Y	2230 days	300	15

Do you think there is significant difference in the two formulations ?

(d) The blood pressure (B.P) of 5 women before and after intake of certain drug are given below.

Before	110	120	125	132	125
After	120	118	125	136	121

Test at 1% Level of significance whether there is significant change in B.P.

Q.4]

(a) Explain the following terms.
(1) Critical region .
(2) One tail and Two tail Test.

(b) The sample correlation coefficient for 20 pairs of observations is 0.4 . Does this suggest the significant correlation in the population ?

(c) In a laboratory experiment two random sample gave the following result.

Sample	Size	Sample mean	Sum of squares of deviation from the mean
1	10	15	90
2	12	14	108

Test the equality of sample variances at 5% Level of significance.

(d) A dice is thrown 150 times and the following results are obtained.

Number turned up	1	2	3	4	5	6
Frequency	19	23	28	17	32	31

Test the hypothesis that the dice is unbiased at 5% Level of significance.

[PTO]

Q.5]

(a) A sample of size 400 was drawn and the sample mean was found to be 99. Test whether this sample could have come from a normal population with mean 100 and variance 64 at 5% Level of significance.

(b) Two random samples of size 100 each are drawn from the two large population. The following information are obtained for these two samples
Sample – 1 $\Sigma x_1 = 2500$ $\Sigma x_1^2 = 67{,}500$
Sample – 2 $\Sigma x_2 = 2400$ $\Sigma x_2^2 = 72{,}800$
Is the variance of the first population larger than that of the second ?

(c) The average marks of 80 boys is 78 with S.D of 12 and the average marks of 120 girls is 75 with S.D of 15. Can it be said that the average marks of boys is more than that of girls ?

(d) A machine produced 10% defective article in a batch of 1000 article. After overhauling it produced 4% defective articles in a sample of 100 articles. Has the machine improved?

Q.6]

(a) 200 mangoes are taken at random from a large consignment and 20 of them are found to be bad. Test the hypothesis that the proportion of bad mangoes in the consignment is 15%. Use 1% level of significance.

(b) A random sample of 18 pairs of observation from a normal population gives a correlation coefficient of 0.52. Is it likely that the variables in the population are correlated ?

(c) Explain the following terms
(1) Alternative hypothesis
(2) Type – I and type – II errors.

(d) In an experiment on immunization of cattle from tuberculosis, the following data were obtained. Examine the effect of vaccine in controlling the incidence of disease.

	Affected	Unaffected
Innoculated	12	28
Not innoculated	13	7

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