

(2/A4)

SARDAR PATEL UNIVERSITY

M.Sc. Examination

M. Sc. Integrated Biotechnology (IGBT) - 2nd Semester

Saturday, 02nd May 2015

Session: Morning Time: 10:30 am to 1:30 pm

Subject / Course Code: -PS02CIGB06

Subject / Course Title:-Biostatistics

Maximum Marks: 70

Note: (1) All the Questions are compulsory. (2) Figures on the right indicate marks.

Q.1 Choose the correct option

1 x 8 = 8

- (i) _____ is a circular graph which represent the total value with its components.
(a) Ogive (b) Pie chart (c) Frequency polygon (d) Histogram
- (ii) Which of the following is a measure of dispersion?
(a) Range (b) Median (c) Mode (d) Mean
- (iii) _____ is a graph which represent the data of cumulative frequency distribution.
(a) Bar chart (b) frequency curve (c) Pie chart (d) Ogive
- (iv) A _____ variable is one for which there is a possible values between any two possible values.
(a) Continuous (b) discrete (c) Nominal (d) none of these.
- (v) _____ is a scientific process used in setting out the collected data in an understandable form.
(a) Analysis (b) Tabulation (c) Sampling (d) None of these
- (vi) Variance is the square of _____
(a) Mode (b) Standard deviation (c) Standard error (d) regression
- (vii) A sample space whose elements are finite or infinite but countable is called _____
(a) discrete sample space (b) Continuous sample space
(c) Null event (d) Simple event
- (viii) Linear correlation coefficient can have values between _____.
(a) 0 and 1 (b) -1 and 0 (c) -1 and +1 (d) none of these

Q.2. Attempt any seven of the following

2 x 7 = 14

1. Find the arithmetic mean of Hemoglobin present in 10 patient's blood samples in Hospital
12.5, 13.0, 12.1, 15.5, 14.7, 11.0, 11.5, 11.7, 14.5, 13.5
2. Give formulae of standard deviation for ungrouped and grouped data.
3. Write a short note on sample space
4. Write merits and demerits of Mean
5. Give formula for student's t - distribution and its application.
6. Write a short note on Histogram.
7. Give Statement of multiplicative theorem or theorem on compound probability
8. Calculate the range for the following data:
12.5, 13.0, 12.1, 15.5, 14.7, 11.0, 11.5, 11.7, 14.5, 13.5
9. Define median and mode

Q. 3. a). Write the definition & characteristics of Measures of central tendency. [6]

b). Daily high blood pressure of a patient on 100 days are given below: [6]

B.P. (mmHg)	102	106	110	114	118	122	126
No. of days	3	9	25	35	17	10	1

Calculate the mean blood pressure of patient and the standard deviation of the above data

OR

Q. 3. b). Following is data of weights of VI class students. Prepare frequency distribution table using Sturge's formula and calculate mean weight of students. [6]

20 22 26 29 30 30 21 22 23 23 26 25
24 28 28 30 29 25 26 22 33 22 32 31
25 30 21 31 22 34 22 29 25 28 28 27
22 23 29 28 25 21 25 26 38 27 22 28
25 29 21 25 32 30 21 22 28 37 25 33

Q. 4. a). Write in detail the conditions under which Poisson distribution is used and characteristics of Poisson distribution. [6]

b). A man and his wife appear for an interview for two posts. The probability of the husband's selection is $\frac{1}{7}$ and that of wife's selection is $\frac{1}{5}$. What is the probability that only one of them will be selected? [6]

OR

Q. 4. b). The probability that a student passes a Physics test is $\frac{2}{3}$ and the probability that he passes both Physics and English test is $\frac{14}{45}$. The probability he passes at least one test is $\frac{4}{5}$. What is the probability that the student passes the English test? [6]

Q. 5. a). The research unit in an organization wishes to determine scores on the scholastic aptitude test are different for male and female applicants. Random samples of applicant's file are taken and summarized below: [6]

	Applicants	
	Female	Male
\bar{x}	502.1	510.5
s	86.2	90.4
n	399	204

Using the above sample data, test the null hypothesis that the average score is same for the population male and female applicants. Use 5% significance level and assume that the scores are normally distributed in each case.

[The value of Z_α (at $\alpha = 0.05$ from the table) = 1.96]

b). A group of five patients treated with medicine 'A' weigh : 42, 39, 48, 60, and 41 kgs. A second group of 7 patients from the same hospital treated with medicine 'B' weigh : 38, 42, 56, 64, 68, 69, and 62 kgs. Do you agree with the claim the medicine 'B' increases the weight significantly? (The value of 't' at 5% level of significance for 10 degree of freedom is 2.228) [6]

OR

- Q. 5. b). A certain drug was administered to 500 people out of total 800 included in the sample to test its efficacy against typhoid. The results are given below: [6]

	Typhoid	No typhoid	Total
Drug	200	300	500
No Drug	280	20	300
Total	480	320	800

On the basis of these data can it be concluded that the drug is effective in preventing the typhoid [Given for 1 d.f., the value of chi square $(\chi^2)_{0.005} = 3.84$]

- Q. 6. a). Find the coefficient of correlation between x and y for the following data and identify the type of correlation. [6]

X = Sugar (mg)	10	20	30	40	50
Y = Absorbance at 540nm	0.102	0.198	0.296	0.420	0.514

Also calculate the regression coefficient of y on x.

- b). The following data present the yields in quintal of Tomatoes on ten subdivision of two agricultural Plots. [6]

Plot-I	6.2	5.7	6.5	6.0	6.3	5.8	5.7	6.0	6.0	5.8
Plot-II	5.6	5.9	5.6	5.7	5.8	5.7	6.0	5.5	5.7	5.5

Test whether two samples taken from two random populations have the same variance (5% point of F for $V_1 = 9$ and $V_2 = 9$ is 3.18)

OR

- Q. 6. b). Perform one way ANOVA for the following data to determine whether the four plant varieties are from the same population. [6]

Plant A	Plant B	Plant C	Plant D
3.17	2.06	2.27	4.17
2.91	3.21	3.78	4.01
4.11	2.57	3.59	3.92
3.82	2.31	4.01	4.29
4.02	2.71	3.15	3.72

$F_t [\alpha; c-1, c(r-1)]$ at $\alpha = 0.05$ is 3.24
