[11/A-20]　　　　**Sardar Patel University**
M. Sc. Integrated Biotechnology (IGBT) - 2nd Semester
Theory examination, April, 2018
Monday, 23rd April, 2018; Time: 10:00 a.m. to 1:00 p.m.
Subject: PS02CIGB06: Biostatistics

Total Marks: 70

Notes: - (1) Figures to the right indicate marks.
　　　　　(2) Draw neat and labeled diagram, wherever necessary.

Q.1　　**Choose the Correct Answers of the Following.**　　　　　　　　　**[08]**

1. The mean is ＿＿＿＿＿＿＿＿＿＿＿.
   (a) the statistical or arithmetic average.　(b) the best representation for every set of data.
   (c) the most frequently occurring score.　(d) the middlemost score.

2. For given data set [6, 10, 4, 3, 9, 11, 22, 18], the value of median is ＿＿＿＿.
   (a) 8　　　　　(b) 9　　　　　(c) 9.5　　　　　(d) 10

3. The total number of all the possible outcomes of an experiment is known as ＿＿＿＿＿.
   (a) Mutually exclusive events　　　　(b) Favorable events
   (c) both a & b　　　　　　　　　　　(d) Exhaustive events

4. From a pack of 52 cards 1 card is drawn at random. The probability of face card drawn is
   ＿＿＿.
   (a) 2/13　　　　(b) 3/13　　　　(c) 4/13　　　　(d) 1/13

5. Conducting multiple t-tests increases the likelihood of which of the following?
   (a) Type I error　(b) Type II error　(c) Homogeneity　(d) Difficult to tell

6. What type of data do you need for a chi-square test?
   (a) Parametric　(b) Categorical　(c) Ratio　(d) Scales

7. Linear correlation coefficient can have values between＿＿＿＿＿.
   (a) 0 and 1　(b) -1 and +1　(c) -1 and 0　(d) none of these

8. Analysis of variance is a statistical method of comparing the ＿＿＿of several populations.
   (a) standard deviations　(b) variances　(c) means　(d) proportions

Q.2　　**Answer the following in short. (Attempt Any Seven)**　　　　　　　**[14]**

1. Enlist the general rules for tabulation.

2. What is Data? Give a classification of data.

3. Define the Arithmetic mean. Write the merits of arithmetic mean.

4. Write the Characteristics of Binomial Distribution.

5. Define the terms (a) Compound Events　(b) Exhaustive Events.

6. Enlist the student's t-test applications.

7. What is Chi-square test? Give formula for Chi-square test.

8. Enlist difference between regression and correlation.

9. What is ANOVA? Write the application of ANOVA.

Q.3 (A)   Write the advantages and disadvantages of graphical representation and enlist the [06] various types of graphical representation.

Q.3 (B)   In a survey of 950 families in a village, the following distribution of numbers of children [06] was obtained. Find the mean, median and mode.

No. of children	0 – 2	2 – 4	4 – 6	6 – 8	8 – 10	10 – 12
No. of families	270	328	205	120	15	10

OR

Q.3 (B)   Find the mean and standard deviation of intelligence quotient (I.Q) of 68 students of the [06] following data :

I.Q.	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
No. of days	05	12	15	20	10	04	02

Q.4 (A)   What is Multiplication Theorem? A bag contains 5 white and 3 black balls. Two balls [06] are drawn at random one after the other without replacement. Find the probability that both the balls drawn are black.

Q.4 (B)   What is Addition Theorem for compatible events? Two students A and B work [06] independently on a problem. The probability that A will solve it is (3/4) and the probability that B will solve it is (2/3). What is the probability that the problem will be solved?

OR

Q.4 (B)   (i) Four cards are drawn from a well shuffled pack of playing cards. Find the probability [03] that two are spades and two are hearts.

(ii) In a factory, there are 6 skilled workers and 4 unskilled workers. What is the [03] probability that worker selected is skilled worker.

Q.5 (A)   The pulse rate of a man due to the effect of DSP 25 mg on different days in a month [06] were found to be:

66, 65, 69, 70, 69, 71, 70, 63, 64, and 68

Discuss whether the mean pulse rate of the man in the month is 65.

[value of 't' for 9 degrees of freedom is 2.262]

Q.5 (B)   A soap manufacturing company was distributing a particular brand of soap through a [06] large number of retail shops. Before a heavy advertisement campaign, the mean sale per shop was 140 dozens. After the campaign a sample of 26 shops was taken and the mean sales figure was found to be 147 dozens with standard 16. Can you consider the advertisement effective?

[Tabulated $t_{0.05}$=2.19 for d.f. 25]

OR

Q.5 (B) From the table given below, On the basis of chi-square test for goodness of fit, can it be [06] concluded that the colour of son's eyes is associated with that of father's eyes.

		Eyes colour in sons	
		Not light	Light
Eyes colour in fathers	Not light	230	148
	Light	151	471

[Tabulated 'χ^2' value 3.84 at 5% level of probability for one degree of freedom]

Q.6 (A) What is Correlation? Explain Scatter diagram method to study correlation types and [06] write merits and demerits of method.

Q.6 (B) The height and the body weight of 10 females are given below. Calculate the correlation [06] coefficient (r), and test their level of significance. [Tabulated 't' value at 1% (3.36) levels of probability with d.f.=8]

Height (inches)	65	68	62	70	65	72	67	66	68	70
Weight (pounds)	128	140	120	152	138	160	135	130	125	165

OR

Q.6 (B) In an experiment, the mean yields of three wheat varieties grown with four nitrogen rates [06] were recorded. Analyse the data using the test of analysis of variance to determine whether here is any difference in the mean yield of three varieties with four nitrogen doses. The results are given in the following table.

Mean yield, t/ha of three varieties

Nitrogen rate kg/ha	W1	W2	W3
0	4.50	5.01	6.11
30	4.30	6.17	6.92
60	5.60	6.37	7.27
90	5.21	6.48	7.86

[Tabulated F value for between treatments F= 9.8 at 1% level of significance (d.f. = n1= 3; n2=6); F value for between nitrogen rate F = 10.9 at 1% level of significance (d.f. – n1=2; n2 = 6)]

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