

[103]

SEAT No. \_\_\_\_\_

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## Sardar Patel University

M. Sc. (Integrated) Biotechnology (IGBT) - 2<sup>nd</sup> Semester

Theory examination, March, 2019

Thursday, 28<sup>th</sup> March, 2019; Time: 10:00 a.m. to 01:00 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]

- Mean or average used to measure central tendency is called \_\_\_\_\_.  
(a) arithmetic mean (b) positive mean (c) negative mean (d) None of these
- Arithmetic mean is 12 and number of observations are 20 then sum of all values is \_\_\_\_\_.  
(a) 08 (b) 32 (c) 240 (d) 320
- The sum of the probability of an event and non event is \_\_\_\_\_.  
(a) 2 (b) 1 (c) 0 (d) None of these
- In a throw of coin what is the probability of getting head?  
(a) 0 (b) 1 (c) 2 (d)  $\frac{1}{2}$
- If  $H_0$  is true and we reject it is called:  
(a) Type - I error (b) Type - II error (c) Type - III error (d) Sampling error
- Test to be applied when numbers of observations are less than 30 and variance is not known, is said to be \_\_\_\_\_.  
(a) Z-test (b) T-test (c) F-test (d) L-test
- All data points falling along a straight line is called \_\_\_\_\_.  
(a) Linear relationship (b) Nonlinear relationship (c) Residual (d) Intercept
- In simple regression equation, the numbers of variables involved are \_\_\_\_\_.  
(a) 1 (b) 2 (c) 3 (d) Difficult to tell

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

[14]

- Give merits and demerits of mode.
- Enlist the application of Biostatistics.
- Define the terms: 1. Variable 2. Unit
- What is the probability of getting an even number in a single throw with dice?
- Define the terms: 1. Independent events 2. Dependent events
- Enlist the application of Chi-square test.
- Write about different types of errors in testing of hypothesis.
- Represent types of correlation with scatter diagram.
- Difference between correlation and regression.

(1)

[P.T.O.]

- Q.3 (A)** Given below is the data of pods per plant of a pulse. Calculate the Arithmetic mean, mode and Standard deviation. [06]

No. of pods	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
No. of plants	06	12	22	48	56	32	18	06

- Q.3 (B)** Suppose that the following represent the number of children for 10 physicians on a particular hospital staff: 3, 2, 0, 1, 4, 7, 3, 2, 4, 2. Find the following descriptive measures: (a) the arithmetic mean; (b) the geometric mean; (c) the harmonic mean [06]

OR

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

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

- Q.4 (A)** What is addition theorem for compatible events? The probability that a student passes a Biophysics test is  $(2/3)$  and the probability that he passes both Biophysics and English test is  $(14/45)$ . The probability that he passes at least one test is  $(4/5)$ . What is the probability that the student passes the English test? [06]

- Q.4 (B)** One bag contains 5 white and 4 black balls. Another bag contains 7 white and 9 black balls. A ball is transferred from first bag to second bag and then a ball is drawn from the second bag. Find the probability that it is a white ball. [06]

OR

- Q.4 (B)** What is the probability that if a card is drawn at random from an ordinary pack of cards, it is (i) a red card, (ii) a club, (iii) one of the court cards (Jack or Queen or King), (iv) a black card. [06]

- Q.5 (A)** The average number of articles produced by two machines per day is 200 and 250 with standard deviations 20 and 25 respectively on the basis of records of 25 days production. Can you regard both the machines equally efficient at 1% of significance? [06]  
[Tabulated  $t_{0.01, 48} = 2.58$ ]

- Q.5 (B)** In *Mirabilis jalapa* when plants with red flowers (RR) are crossed with plants having white flowers (rr), the F1 hybrid plants (Rr) bear pink flowers. When these F1 plants with pink flowers are self-pollinated, they develop 41 red, 84 pink and 43 white flowered plants. Determine the pattern of segregation. Do these results support the theory that the ratio of the flower colours should be 1 red : 2 pink : 1 white? [06]  
[Tabulated ' $\chi^2$ ' value 5.99 at 5% level of probability for two degree of freedom]

OR

- Q.5 (B)** Ten individuals are chosen at random from a population and their heights in inches are found to be: 63, 63, 66, 67, 68, 69, 70, 70, 71, 71. In the light of these data, mentioning the null hypothesis, discuss the suggestion that the mean height in the population is 66 inches. [Tabulated value of 't' at 5% for 9 degrees of freedom is 2.262] [06]

- Q.6 (A)** In an ecological study, data recorded on fresh and dry weights for a sample of an experimental material. Calculate the correlation coefficient ( $r$ ) between the two categories and find out its level of significance. [Tabulated 't' value at 5% (2.31) levels of probability with d.f.=8] [06]

Fresh weight(g)	6	10	12	4	15	12	14	8	7	5
Dry weight (g)	3	3	4	1	5	3	3	2	2	2

- Q.6 (B)** From the data given below, find out whether the means of the three Maize varieties yield/hectar differ significantly or not with applying ANOVA. [06]

MV 1	MV 2	MV3
20	19	13
10	13	12
17	17	10
17	12	15
16	09	05

[Tabulated F value = 3.9 at 5% level of significance]

OR

- Q.6 (B)** What is Linear Regression Lines? Derived Regression Lines and Regression Equations. [06]

\*\*\*\*X\*\*\*\*

