[42/A-20] SEAT No._____ No. of Printed Pages : 3

Sardar Patel University

B.Sc. Semester - III Examination

Wednesday, 28th November, 2018

Time: 2.00 to 4.00 p.m | US03ESTA04 | M.Marks: 70

(Biostatistics – I)

Note: (i) Simple/Scientific calculator is allowed (ii) Graph paper will provided on request.
(iii) Statistical table will be allowed/provided on request (iv) Q.3 to 6, each sub question is of 5 marks

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Q.1 Multiple Choice Questions (10×1)

(1) Which one of the following measurement does not divide a set of observations in to equal parts?
(a) Median (b) Deciles (c) Mean (d) Percentiles

(2) Difficulty level of question paper (Very difficult, difficult, so-so, easy, and very easy) is?
(a) Nominal (b) Ordinal (c) Discrete (d) continuous

(3) For a symmetrical distribution coefficient of skewness is
(a) > 0 (b) < 0 (c) $= 0$ (d) All of the above

(4) Consider the following probability distribution: $P(X = x) = \binom{7}{x}(0.2)^x(0.8)^{7-x}, x = 0,1,\ldots,7$
The standard deviation of random variable X is
(a) 1.06 (b) 1.12 (c) 1.4 (d) 7

(5) Mean – Mode =? (Mean – Median)
(a) 1 (b) 2 (c) 3 (d) 4

(6) Which of the following can be determined graphically with the help of histogram?
(a) Mean (b) Median (c) Mode (d) Standard Deviation

(7) The calculation of standard deviation is based on which measure of central tendency?
(a) Mean (b) Median (c) Mode (d) Harmonic Mean

(8) A statistical table must have
(a) Title (b) Body (c) Caption (d) All of the above

(9) The number of customers entering a bank per minute is a Poisson variate with a mean of 3.5 customers per minute. What is the probability that more than three customers enter the bank in minute?
(a) 0.3209 (b) 0.4633 (c) 0.5367 (d) 0.6791

(10) _____ is used to compare consistency of two or more sets of data
(a) Coefficient of Variation (b) Coefficient of Skewness (c) Partition Values (d) All of the above

Q.2 Short Type Questions (Attempt Any Ten) (10×2)

(1) Let X be a random variable with $b\left(6, \frac{1}{3}\right)$ distribution.
Determine (i) Mean and standard deviation of X (ii) $P(X < 4)$

(2) Give two examples each of nominal and ordinal data.

(3) What is diagram? State its importance.

(4) Measurements of the acidity level (pH) of rain samples were recorded at 12 sites in an industrial region.

4.3	4.2	4.5	4.9	4.7	4.8
3.5	5.1	5.0	3.6	4.8	3.6

Calculate mean and standard deviation of the acidity level of rain samples.

(5) If $P(A) = 0.4, P(B) = 0.3, P(A \cap B) = 0.2$
Calculate (i) $P(A')$ (ii) $P(B')$ (iii) $P(A' \cup B')$ (iv) $P(A' \cap B')$

(6) How will you calculate median?

(7) What is grouped frequency distribution?

(8) It is known that 10% of plants produced by a certain species of corn seed will be infertile. In a random sample of 5 such plants, what is the probability that more than 2 will be infertile?

(9) What is an average? State its uses.

(10) Define Poisson distribution. State its parameter(s), mean and standard deviation.

(11) Which diagram is used to present the following? State its objective(s), if any.

Diabetic Patients per lakh Population

State	1990	2016
Goa	475	1090
Tamilnadu	778	1628
Haryana	394	817
Uttarakhand	384	795
Punjab	652	1314
Karnataka	632	1202
Gujarat	387	729

Source: Gujarat Samachar dated 14th November, 2018.

(12) List out the various measures of dispersion. According to you which one is considered to be best? Name and define it.

Q.3(a) Write in brief on the following:

(a) Bar chart (graph) (b) Variables applicable in the field of Biosciences (Any four)

(b) Present the following data through most suitable diagram.

Year	Mobile Internet Users (in millions)		Total
	Rural	Urban	
2012 – 13	04	44	48
2013 – 14	21	70	91
2014 – 15	29	126	155
2015 – 16	68	171	239
2016 - 17	109	262	371

Source: IAMAI, Morgan Stanley Research

OR

Q.3(a) Write in brief on the following :

(*i*) Ordinal Data (*ii*) Importance of tabulation (*iii*) Types of data

(b) Tabulate the following information:

"In 2010 out of total 2000 patients in Krishna Hospital, 1550 were admitted in special ward. The number of women patients was 250, out of which 200 admitted in general ward."

"In 2015 the total patients in special ward was 1725 out of which 1600 were men. The number of patients in general ward was 380 among which 155 were women."

Q.4(a) List out the various measures of central tendency. According to you which measure do you considered to be best and why?

(b) A study is conducted to determine if dieting plus exercise is more effective in producing weight loss than dieting alone. The following scores indicate the weight loss in pounds over the 3 months period for each subject:

Dieting + Exercise	24	20	22	15	23	21	16	17	19	25	24	13
Diet alone	16	18	19	16	18	18	17	19	13	18	19	14

(*i*) Identify the objective (s) of the study. (*ii*) Calculate Mean and Standard deviation of both the data sets.

OR

Q.4(a) Write a note on Mode.

(b) A study was conducted to comparing female adolescent who suffer from bulimia to healthy females with similar

body composition and levels of physical activity. Listed below are measures of daily caloric intake, recorded in kilocalories per kg, for samples of adolescents from each group.

(i) Find the median daily caloric intake for both the bulimic adolescents and the healthy ones.

(ii) Which group has a greater amount of variability in the measurement?

Daily Caloric Intake(Kcal/Kg)			
Bulimic		Healthy	
15.9	18.9	20.7	30.6
16	19.6	22.4	33.2
16.5	21.5	23.1	33.7
17	21.6	23.8	36.6
17.6	22.9	24.5	37.1
18.1	23.6	25.3	38.4

Q.5 An experiment is conducted to determine if the use of a special chemical additive with standard fertilizer accelerates plant growth. Ten locations are included in the study. At each location, two plants growing in close proximity are treated; one is given the standard fertilizer; the other is given the standard fertilizer with the chemical additive. Plant growth after four weeks is measured in centimeters, and the following data are obtained:

	Location									
	1	2	3	4	5	6	7	8	9	10
Without additive	20	31	16	22	19	32	25	18	20	19
With additive	23	34	15	21	22	31	29	20	24	23

Compute Karl – Pearson's coefficient of skewness for both the data sets and comment on it.

OR

Q.5(a) What is skewness? State its uses. List out the various methods of studying skewness and write in brief about any one of them.

(b) Following is the frequency distribution of systolic b.p. of 100 low – birth infants.

Systolic b.p	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90
No. of infants	1	6	14	43	21	13	1	1

Calculate Bowley's coefficient of skewness and comment on the shape of the distribution.

Q.6(a) If 10% of pregnancies result in a miscarriage, what is the probability that :

(i) Exactly 5 (ii) more than 4 (iii) at least 2, out of 12 randomly chosen pregnant women have miscarriages.

(b) The probability that a patient will get reaction of a temiflu injection is 0.01. If 150 patients are given that injection, find the probabilities that (i) Exactly 3 (ii) less than 2 (iii) at least 4 (iv) none, will get reaction.

OR

Q.6(a) Let A and B are two independent events with $P(A) = 0.3$ and $P(B) = 0.4$.

Find $(i)\ P(A \cap B)$ $(ii)\ P(A \cup B)$ $(iii)\ P(A \cap B')$ $(iv)\ P(A' \cap B)$ $(v)\ P(A/B)$

(b) It is known that the failure rate of new treatment is 75%. If 5 patients receive this treatment, what is the probability that (i) at least 4 (ii) none (iii) 2 or less, will be cured?

— X —

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