P P SAVANI UNIVERSITY

Third-Semester of B.Sc. (IT) Examination
December 2022
SESH2060 Statistics

23.11.2022, Wednesday   Time: 10:00 a.m. To 12:30 p.m.   **Maximum Marks: 60**

Instructions:
1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

			CO	BTL
Q - 1	**Answer the following. (Any Five)**	**[05]**		
(i)	Write the formula of simple variance.		1	1/2
(ii)	Write a difference between cross sectional data and time series data		1	1/2
(iii)	Write the definition of frequency distribution.		1	1/2
(iv)	Write definition of sample correlation.		1	1/2
(v)	The mean of 1, 2, 3, 4, 5 is _____.		1	1/2
(vi)	Write the formula of Counting rule for Permutation.		1	1/2
(vii)	Write the formula of Variance of a Discrete Random variable.		1	1/2

Q - 2 (a) Consider a sample with given data values 2, 3, 5, 21, 93, 99, 99, 102 **[05]** 1 5
      (i)   Compute the mean, median and mode
      (ii)   Compute the first quartile
      (iii)   Compute the third quartile

Q - 2 (b) Discuss the scale of measurement with example. **[05]** 1 3/4

OR

Q - 2 (a) Consider a sample with a mean of 500 and standard deviation of 100. **[05]** 1 5
What is the Z score for the following data values:
      $520, 650, 500, 450, 280$

Q - 2 (b) Show the five number summary for the following data: **[05]** 1 5
      $27, 25, 20, 15, 30, 28, 25$

Q - 3 (a) Consider a sample with a mean of 30 and a standard deviation of 5. Use **[05]** 1 3/5
chebyshevs theorem to determine the percentage of the data within each of the
following ranges:
      (i)   20 to 40   (ii)   18 to 42

Q - 3 (b) A bowler's score for six games were 182, 168, 184, 190, 170 and 174. Using **[05]** 5
these data as a population, compute the following descriptive statistic:
      (i)   Standard deviation
      (ii)   Co-efficient of Variance

OR

Q - 3 (a) Consider the following frequency distribution **[05]** 1 6

Class	10-19	20-29	30-39	40-49	50-59
Frequency	10	14	17	7	2

      (i)   Construct a cumulative frequency distribution and a cumulative relative frequency distribution.
      (ii)   Construct a histogram and an Ogive.

Q - 3 (b) Consider a sample with the given data values and compute the Interquartile **[05]** 1 5
range and standard deviation: 27,25,20,15,30,34,28 and 25.

| Q - 4 | **Attempt any one** | [05] | 1 | 3/5 |
| (a) | Suppose the data have a bell-shaped distribution with a mean of 30 and a standard deviation of 5. Use the empiricial rule to determine the percentage of data within each of the following ranges: | | | |

    (i)   15 to 45   (ii)   25 to 35

| (b) | Calculate the sample correlation of the following data: | | 1 | 5 |

x	50	60	70	90	100
y	65	51	40	26	8

SECTION – II

Q - 1	**Answer the following (Any Five)**	[05]		
(i)	Write a formula of standard normal density function.		2	1/2
(ii)	Write a definition of Random variable.		2	1/2
(iii)	The sum of the probabilities must be_____.		2	1/2
(iv)	Write a definition of Discrete Random Variable.		2	1/2
(v)	Write two observations of Normal Probability Distribution.		2	1/2
(vi)	Write a formula of Poisson Probability Function.		2	1/2
(vii)	Write a formula of Sample Correlation.		2	1/2
Q - 2 (a)	Bag I contain 4 white and 6 black balls while another Bag II contains 4 white and 3 black balls. One ball is drawn at random from one of the bags and it is found to be black. Find the probability that it was drawn from Bag I.	[05]	2	5
Q - 2 (b)	The following table provides a probability distribution for the random variable x.	[05]	2	5

x	3	6	9
$f(x)$	0.25	0.50	0.25

    (i)   Compute $E(x)$, the expected value of x.
    (ii)   Compute σ^2, the variance of x.
    (iii)   Compute,σ the standard deviation of x.

OR

| Q - 2 (a) | Suppose that we have two events, A and B, with $P(A) = 0.50$, $P(B) = 0.60$, and $P(A \cap B) = 0.40$. | [05] | 2 | 5 |

    (i)   Find $P(A|B)$
    (ii)   Find $P(B|A)$
    (iii)   Are A and B independent? Why or why not?

| Q - 2 (b) | The probability distribution for the random variable x follows: | [05] | 2 | 5 |

x	20	25	30	35
$f(x)$	0.20	0.15	0.25	0.40

    (i) Is this probability distribution valid? Explain.
    (ii) What is the probability that $x = 30$?
    (iii) What is the probability that x is less than or equal to 25?
    (iv) What is the probability that x is greater than 30?

Q - 3 (a)	The distribution of wages of a group of workers is known to be normal with mean \$500 and standard deviation \$100. If the wages of 100 workers in the group are less than \$430. What is the total numbers of workers in the group? (Hint: $P(0 < Z < 0.7) = 0.258$)	[05]	2	5
Q - 3 (b)	Consider a Poisson distribution with $\mu = 3$.	[05]	2	5

     (i) Write the appropriate Poisson probability function.
     (ii) Compute $f(2)$.
     (iii) Compute $f(1)$.
     (iv) Compute $P(x \geq 2)$.

OR

Q - 3 (a)	The random variable x is known to be uniformly distributed between 1.0 and 1.5	[05]	2	5

     (i) Show the graph of the probability density function.
     (ii) Compute $P(x = 1.25)$.
     (iii) Compute $P(1.0 \leq x \leq 1.25)$.
     (iv) Computer $E(x)$.

Q - 3 (b)	An average of 15 aircraft accidents occur each year (The World Almanac and Book of Facts, 2004). Compute the mean number of aircraft accidents per month.	[05]	2	5

     (i)   Compute the mean number of aircraft accidents per month.
     (ii)   Compute the probability of no accidents during a month.
     (iii) Compute the probability of exactly one accident during a month.
     (iv) Compute the probability of more than one accident during a month.

Q - 4	**Attempt any o1ne.**	[05]		
(i)	In 1950 in India the mean life expectancy was 50 years. If the life expectancies from a random sample of 11 persons are		2	5

$$58.2, 56.6, 54.2, 50.4, 44.2, 61.9, 57.5, 53.4, 49.7, 55.4, 57.0$$

Does it confirm the expected view? Use $t_{0.01} = 2.764$ for 4 degree of freedom.

(ii)	During the first 13 weeks of the television season, the Saturday evening 8:00 p.m. to 9:00 p.m. audience proportions were recorded as ABC 29%, CBS 28%, NBC 25%, and independents 18%. A sample of 300 homes two weeks after a Saturday night schedule revision yielded the following viewing audience data: ABC 95 homes; CBS 70 homes, NBC 89 homes, and independents 46 homes. Use $\chi^2_{0.052} = 7.81473$.		2	3/5

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    CO   : Course Outcome Number   BTL   : Blooms Taxonomy Level

Level of Bloom's Revised Taxonomy in Assessment

1: Remember	2: Understand	3: Apply
4: Analyze	5: Evaluate	6: Create