Seat No:_____ Enrollment No:_____

PARUL UNIVERSITY

COLLEGE OF AGRICULTURE

B.Sc.(Hons.) Agriculture Winter 2022-23 Examination

Semester: 3 **Date: 18-10-2022**
Subject Code: 20111202 **Time: 10:30 am to 01:00 pm**
Subject Name: Statistical Methods **Total Marks: 50**

Instructions

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 Do as Directed.

A. Fill in the blanks. (Each of 0.5 marks) **(05)**

1. For a 3×7 contigency table, the degrees of freedom are __ .
2. If the number of observation can be counted and is definite then it is called ___ population.
3. For 5% significance level and degrees of freedom = 5, then t_{tab} =___ for one tail t-test.
4. ____ is the method of selecting samples from population.
5. The median for the data $x = \{1,3,5,7,9,11,13\}$ is _____.
6. The probability that we are living in the year of 2050 is ___
7. If sum of squares for samples is 4 and degrees of freedom is 2, then the mean sum of squares for samples is __ .
8. If two coins are tossed, then the sample space S is ____ .
9. If $\beta_1 > 0$, then the data distribution is _____ skewed.
10. For a Poisson variable, mean = 6.2 and variance = 2.3. (True/False) _____ .

B. Multiple choice type questions. (Each of 0.5 marks) **(10)**

1. The probability that we are living in the year of 2018 is ___ .
a) 0 c) 05
b) 0.7 d) 1

2 . If $\beta_2 = 3$, then the data distribution curve is _____ (type of kurtosis).
a) leptokurtic c) mesokurtic
b) platykurtic d) none of these

3. If $CV_x > CV_y$, then x is more ____ than y.
a) consistent c) reliable
b) variable d) none of these

4. ____ is less expensive, fast, less time consuming and less man-power requiring survey.
a) sampling c) complete enumeration
b) population study d) none of these

5 . If $n(A) = 6$ and $n(S) = 12$, then find $P(A) =$ ___
a) 0.1 c) 0.5
b) 0.7 d) 0.3

6 . Which of the following is the correct formula to find the coefficient of skewness?
a) $\beta_1 = \frac{(\mu_2)^2}{(\mu_3)^3}$ **c)** $\beta_1 = \frac{(\mu_3)^2}{(\mu_2)^3}$
b) $\beta_1 = \frac{(\mu_3)^3}{(\mu_2)^2}$ d) none of these

7. The class with highest frequency is called ____ class.
a) mean c) max
b) median d) modal

8. For the hypothesis, $H_0: \mu_1 = \mu_2$ and $H_1: \mu_0 \neq \mu_1$, the it is ___ - tail t-test.
a) one c) three
b) four d) two

9. Complete enumeration is more appropriate for population of ___ nature
a) homogeneous
b) option a and b both
c) heterogeneous
d) none of these

10 . If $p = 0.7$, then $q =$__ .
a) 0.2
b) 0.7
c) 0.3
d) 0

11. Which of the following is not the method of graphical representation?
a) Bar graph
b) line graph
c) pie chart
d) central tendency

12. The data distribution is positively skewed if ____
a) $\bar{x} = M = z$
b) $\bar{x} > M > z$
c) $\bar{x} < M < z$
d) none of these

13. If one coin is tossed the probability of getting one tail as outcome is __
a) 0.2
b) 0.25
c) 0.5
d) 0

14. If $n = 10$ and $p = 0.5$ for binomial distributed random variable X, then the mean = ___
a) 5
b) 1.5
c) 0.5
d) 0.02

15. For a sample 15 observations, df of mean is __
a) 15
b) 13
c) 14
d) 12

16. A statistical hypothesis which is taken for possible acceptance is called a ___ hypothesis
a) alternate
b) statistic
c) null
d) none of these

17. If $F_{cal} < F_{tab}$, then the null hypothesis for F-test is ____
a) accepted
b) no conclusion
c) rejected
d) inadequate data

18. ____ type of error occurs in sampling.
a) sampling errors
b) there are no errors in sampling
c) non-sampling errors
d) none of these

19. Which of the following properties is not true for a binomial distribution?
a) The number of trials are finite.
b) The trials are dependent on each other
c) There are only two possible outcomes: success and failure
d) The probability of success, p is constant for each trial

20. If a dice is rolled then what are the total number of outcomes?
a) 5
b) 6
c) 4
d) 8

Q.2 Do as Directed.

A. Answer the following. (Any five) **(05)**

1. What are the total number of possible samples of size 2 from the population of size 4, when sampling is done with replacement?
2. Write the formula to evaluate calculated value of statistic t in two sample t-test.
3. Define the range of the data x={15, 7, 10, 25, 14, 11, 12}.
4. If $P(A) = 0.5, P(B) = 0.2$ and $P(A \cap B) = 0.1$, find $P(A \cup B)$.
5. What is sample space?
6. Write the name of the two methods of simple random sampling.
7. Define sampling.

B. Answer the following. (Any Five) **(05)**

1. Form a sample of size 10 without replacement from a population of size 50 using the following random numbers:

   14, 02, 75, 80, 64, 10, 07, 57, 11, 62, 55, 46, 71, 69, 09
2. If A and B are two independent events and $P(A) = 0.5$ and $P(B) = 0.2$, then find $P(A \cup B)$.
3. If $n = 5, p = 0.2, q = 0.8$ for binomial distribution, find mean and variance.
4. Find the two regression coefficients b_{xy} and b_{yx} for the following data:

	x	y
SD (σ)	5	10
Correlation coefficient (r)	0.8	

5. Define the types of correlation.
6. If mean sum of squares for samples is 2 and for error is 6 then find the critical value of F.

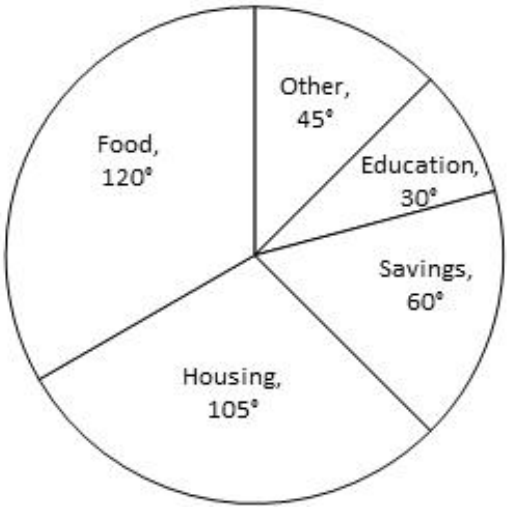
7. If $\sigma = 2$ and $\bar{x} = 6$, then find CV.

Q.3 Answer the following. (Any five) **(10)**

1. If $n = 10$ and $p = 0.3$ for a binomial distribution then find (a) mean (b) variance and (c) probability $P(X = 1)$.

2. Find the mean, median and mode of the following data: 2,4,6,2,11,10,12

3. Answer the following question for the given pie chart of the distribution of monthly salary of a person:



(a) What is the percentage amount spent on education?
(b) Where is the minimum expenditure?

If total monthly salary of the person is Rs. 6000 then how much money (in Rs.) is spent on Housing?

4. Write three points for '$Sampling\ is\ better\ than\ complete\ enumeration$'.
5. It is known that covariance between variables x and y is 20, $\sigma_x = 5$ and $\sigma_y = 8$. Then find (a) correlation coefficient r (b) regression coefficients b_{xy} and b_{yx} .
6. Write the factor affecting positively to power of test.

Q.4 Attempt any Three: **(15)**

1. In an industry for 200 workers are classified according to their performance and training received or not received as the given below table. Test the independence of performance and training performed using χ^2 test at 5% significance level.

	Performance	
	Good	Not good
Trained	100	50
Untrained	20	30

($\chi^2_{tab} = 3.84\ at\ \alpha = 5\%\ and\ df = 1$)

2. A card is selected from a pack of 52 playing cards. Find the probability that the selected card is (a) a king card (b) a red card (c) a face card (d) a spade card (e) with number between 2 and 7 (not including 2 and 7).
3. Find the mean, median and mode for the following data:

x	10	15	20	25
f	9	2	4	6

4. Find the mode of following data

xi	10-20	20-30	30-40	40-50	50-60	60-70	70-80
fi	10	11	09	08	07	15	06

t Table

cum. prob	$t_{.50}$	$t_{.75}$	$t_{.80}$	$t_{.85}$	$t_{.90}$	$t_{.95}$	$t_{.975}$
one-tail	**0.50**	**0.25**	**0.20**	**0.15**	**0.10**	**0.05**	**0.025**
two-tails	**1.00**	**0.50**	**0.40**	**0.30**	**0.20**	**0.10**	**0.05**
df							
1	0.000	1.000	1.376	1.963	3.078	6.314	12.71
2	0.000	0.816	1.061	1.386	1.886	2.920	4.303
3	0.000	0.765	0.978	1.250	1.638	2.353	3.182
4	0.000	0.741	0.941	1.190	1.533	2.132	2.776
5	0.000	0.727	0.920	1.156	1.476	2.015	2.571
6	0.000	0.718	0.906	1.134	1.440	1.943	2.447
7	0.000	0.711	0.896	1.119	1.415	1.895	2.365
8	0.000	0.706	0.889	1.108	1.397	1.860	2.306
9	0.000	0.703	0.883	1.100	1.383	1.833	2.262
10	0.000	0.700	0.879	1.093	1.372	1.812	2.228
11	0.000	0.697	0.876	1.088	1.363	1.796	2.201
12	0.000	0.695	0.873	1.083	1.356	1.782	2.179
13	0.000	0.694	0.870	1.079	1.350	1.771	2.160
14	0.000	0.692	0.868	1.076	1.345	1.761	2.145
15	0.000	0.691	0.866	1.074	1.341	1.753	2.131