Code No. 11224/O/BL

FACULTY OF INFORMATICS

M.C.A. I-Semester (CBCS) (Main & Backlog) (Old) Examination, August 2021

Subject : Probability and Statistics

Time : 2 Hours **Max. Marks: 70**

Note: Missing data, if any, may be suitably assumed.

Answer any four questions. **(4x17½=70 Marks)**

1 a) What is secondary data? Explain the precaution to be taken in the use of secondary data.
b) Explain the concepts of data validation and information abstraction.

2 a) What are the characteristics that are to be satisfied by a measure to become an ideal measure of central tendency?
b) Find the variance for the following data:

x	1	2	3	4	5	6	7	8
f	4	9	16	25	22	15	7	3

3 a) State and prove Baye's theorem.
b) A bag contains 5 white and 3 black balls. Two balls are drawn one after the other without replacement. Find the probability that second ball drawn is black given that first ball drawn is white.

4 a) If the random variable X takes the values 1, 2, 3 and 4 such that $2P(X=1) = 3(X=2) = P(X=3) = 5P(X=4)$, derive the probability distribution function and cumulative distribution function of X.
b) Explain Binomial distribution. Derive its moment generating function and hence find its mean and variance.

5 Define moment generating function of Normal distribution and hence find its mean and variance.

6 a) Define gamma distribution.
b) The daily consumption of milk in a city, in excess of 20,000 gallons, is approximately distributed as a Gamma variate with the parameters v = 2 and $\lambda=\frac{1}{10000}$. The city has a daily stock of 30,000 gallons. What is the probability that the stock is insufficient on a particular day?

7 a) Define moments. What is the effect of change of origin and scale on moments?
b) State and prove addition theorem of mathematical expectation.

8 a) Express the moments about mean in terms of moments about any point.
b) What do you understand by skewness and Kurtosis of a distribution? Write in detail about different measures for skewness.

9 a) State and prove the properties of Correlation coefficients.
b) Let the number X be chosen at random from among the integers 1, 2, 3, 4 and the number Y be chosen from among those at least as large as X. Prove that Cov (X, Y) = 5/8. Find also the regression line of Y on X.

1st Sem

Code No. D0343/N

FACULTY OF INFORMATICS

MCA II Semester (CBCS) (Backlog) (New) Examination, November 2021

Subject: Probability and Statistics

Time: 2 Hours **Max. Marks: 70**

(Missing data, if any, may be suitably assumed)

Note: Answer any four questions. **(4 x 17 ½ = 70 M)**

1 (a) Define Mode, Median. Explain how they are determined from a Frequency Distribution.
(b) From the following data calculate the Arithmetic Mean.

Earing (Rs)	200-300	300-400	400-500	500-600	600-700	700-800
No. of Persons	6	5	10	15	9	7

2 (a) Define standard deviation, coefficient of variance, standard score.
(b) Fine population coefficient of variation with standard deviation 12, mean 48.

3 (a) State and prove multiplication theorem of Probability. Discuss the case when the two events A and B are independent.
(b) When a card is drawn from a pack of 52 cards, find the probability of getting
(i) A heart card (ii) A red card (iii) A face card.

4 (a) Define binomial distribution and give its characteristics.
(b) It is known that an item produced by a certain machine will be defective is 0.01. In a random sample of 100 items, find the probability that there are
(i) no defectives (ii) atleast one defective (iii) not more than one defective.

5 (a) Distinguish between point and interval estimate.
(b) From a population having standard deviation of 1.4, a sample of 60 individuals are taken. The mean is 6.2. Find standard error of mean and find interval estimate of sample mean.

6 (a) Define (i) null and alternate hypothesis (ii) Type I and Type II errors.
(b) Given a sample mean of 94.3, a sample standard deviation of 8.4 and a sample size of 6, test the hypothesis that the value of the population mean is 100 against the alternative hypothesis that it is less than 100. Use the 0.05 significance level.

7 (a) Describe the large sample procedure for testing the difference between two means.
(b) Write about "testing hypothesis – two sample tests".

8 (a) A brand manager is concerned that their brand's share may be evenly distributed throughout the country. In a survey in which the country was divided into 4 regions, a random sampling of 100 consumers in each region was surveyed with the following. (table value of X^2=7.815) Test whether the brand share is same across the 4 regions at 5% level of significance.

	NE	NW	SE	SW
Purchased brand	40	55	45	50
Do not purchase brand	60	45	55	50

Code No. D0343/N

(b) Explain the Chi-square as independence of attributes.

9 (a) Define Correlation and regression.
(b) State regression properties.

10 (a) Develop a regression equation for the following observations.

X	191	170	272	155	280	173	234
Y	40	42	53	35	56	39	48

(b) Predict Y when x=250.

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Code No. 3381/CBCS/M

FACULTY OF INFORMATICS

M.C.A. II-Semester (CBCS) (Main) (New) Examination, November 2020

Subject : Probability and Statistics

Time : 2 Hours **Max. Marks: 70**

Note: Answer any four questions ***(4 x 17 ½ = 70 Marks)***

1 What are the measures of Central tendency? Give the advantages and disadvantages of them.

2 (a) Define standard deviation and coefficient of variance. How these are useful in data analysis?
(b) Find population coefficient of variation, with standard deviation 12, mean 48.

3 State and prove Bayes theorem. How this theorem is applicable in computer science to justify.

4 (a) Define binomial distribution. sate its characteristics and find mode.
(b) It is known that an item produced by a certain machine will be defective is 0.01. In a random sample of 100 items, find the probability that there are (i) no defectives (ii) atleast one defective (iii) not more than one defective

5 (a) Explain one tail, and two tail test in testing of hypothesis.
(b) Define normal distribution. Find its MD, SD and QD and state your conclusion.

6 If a sample of 25 observations reveals a sample mean of 52 and a sample variance of 4.2, test the hypothesis that the population mean is 65 against the alternative hypothesis that it is some other value use 0.01 significance level.

7 Describe the procedure for test for differences between proportions of large sample.

8 A certain drug was administered to 456 males out of a total 720 in a certain locality to test its efficacy against typhoid. The incidence of typhoid is shown below. Find out the effectiveness of the drug against the disease at 0.05 level of significance.

	Infection	No infection	Total
Administering drug	144	312	456
Without administering drug	192	72	264
Total	336	384	720

9 (i) Define correlation and regression. State its properties.
(ii) What are the utilities of these in computer science explain with an example.

10 Develop a regression equations for the following observations.

X	191	170	272	155	280	173	234
Y	40	42	53	35	56	39	48

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Code No. 11001/BL/Non-BCS

FACULTY OF INFORMATICS

MCA I Year I Semester (Backlog) (Non-CBCS) Examination, July 2021

Subject: Probability and Statistics

Time: 2 Hours **Max. Marks: 80**

(Missing data, if any, may be suitably assumed)

Note: Answer any four questions. **(4 x 20 = 80 Marks)**

1 (a) How to represent the Tabulation in data collection and it's types.
(b) Draw up a blank table showing the distribution of population in a district A, according to the five age groups from 0 to 100 years, Sex, Literacy and civil conditions.

2 (a) Explain the various sources of secondary data.
(b) Discuss the differences between the Schedule and Questionaries.

3 (a) Explain the concept of conditional probability.
(b) State and prove Multiplication Theorem of Probability.

4 (a) Four coins are tossed simultaneously what is the probability of getting 2 heads.
(b) Obtain the formula for the most likely outcome of a Poisson distribution and hence find most likely outcome when the parameter of Poisson distribution is four.

5 (a) Let $X_1, X_2, \ldots X_n$ be independent $N(\mu, \sigma^2)$. Prove that $X_1+X_2+\ldots.+X_n$ has the distribution $(n\mu, n\sigma^2)$.
(b) Find mean and variance of beta distribution of Second kind.

6 (a) Explain the Rectangular distribution and find its mean and variance using C.F.
(b) Define gamma distribution and derive its MGF. Hence find mean and variance.

7 (a) Define central and non central moments.
(b) In a certain distribution the first four moments about the point 4 are -1.5, 17, -30 and 108 respectively. Find the Kurtosis of the frequency curve and comments on its shape.

8 (a) Define mathematical expectation of a random variables, state raw and central moments using mathematical expectation.
(b) Find $E(X)$, $E(X^2)$ and $V(X)$ from the data given below

X:	1	2	3	4	5	6
Pi:	0.10	0.15	0.20	0.25	0.18	0.12.

9 (a) Distinguish between partial and multiple correlation coefficients. Give one example in each case.
(b) Explain what are regression lines. Why are there two such lines? Derive the equations of the regression line of Y on X.

10 (a) Explain the procedure for hypothesis. The means of two single large samples of 1000 and 2000 members are 67.5 cms and 68.0 cms respectively. Can the sample be regarded as drawn from the same population of the standard deviation 2.5cms (test at 5% level of significance) (table values: Z at 5% = 1.96 and Z at 5% = 1.645).
(b) Explain Chi-square test of goodness of fit.

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Code No.3251/CBCS/O/BL

FACULTY OF INFORMATICS

M.C.A. I-Semester (CBCS) (Old)(Backlog) Examination, November 2020

Subject : Probability and Statistics

Time : 2 Hours **Max. Marks: 70**

Note: Answer any four questions. *($4 \times 17^{1/2}$=70 Marks)*

1 a) Distinguish between a questionnaire and a schedule.
b) Find the coefficient of variation for the following data:

x	1	2	3	4	5	6	7	8
f	4	9	16	25	22	15	7	3

2 a) What is Histogram? Explain the steps in construction of Ogive curves.
b) Explain various methods of collecting primary data.

3 a) State and prove additive law of probability of two events A and B.
b) Six cards are drawn from a pack of 52 cards. Find the probability that: At least three are diamonds (ii) 4 are diamonds.

4 a) A random variable X has the following probability function:

X	1	2	3	4
P(x)	0.1	0.3	0.4	0.2

Determine (i) Mean, (ii) Variance and (iii) Standard deviation.

b) Define Binomial distribution. Show that mean is greater than variance in binomial distribution.

5 Define Rectangular distribution and find its characteristic function, hence, find its mean and variance.

6 Define Normal distribution. Find mean and variance of normal distribution.

7 a) State and prove theorem multiplication of mathematical expectation.
b) Define moments. In calculating the moments of a distribution of a frequency distribution based on 100 observations, the following results are obtained:

Mean = 9, Variance = 19, , $\beta_1 = 0.7$ (μ_3 is positive), $\beta_2 = 4$. But latter on it was found that one observation 12 was read as 21, obtain the correct value of the 1st four central moments.

8 a) Define Skewness. Explain Skewness based on moments.

b) An urn contains balls numbered 1, 2 and 3. First a ball is drawn from the urn and then a fair coin 'is tossed the number of times as the number shown on the drawn ball. Find the expected number of heads.

9 a) Calculate the correlation coefficient for the following heights (in inches) of fathers (X) and their sons (Y) :

X:	65	66	67	67	68	69	70	72
Y:	61	68	65	68	12	12	69	71

b) State and prove the properties of regression coefficients.

10 a) Define (i) Population (ii) Sample (iii) Parameter (iv) Statistic (v) Standard error.

b) A survey of 320 families with 5 children each revealed the following distribution:

No. of boys:	5	4	3	2	1	0
No. of girls:	0	1	2	3	4	5
No. of families:	14	56	110	88	40	12

Is this result consistent with the hypothesis that male and female births are equally probable?

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Code No.12152/CBCS/S

FACULTY OF INFORMATICS

MCA I-Semester (CBCS) (Supple.) Examination, July 2019

Subject: Probability & Statistics

Time : 3 hours

Max Mark: 70

UNIT – I

1. a. Distinguish between a questionnaire and a schedule.

   b. Construct an exclusive frequency distribution of the following Raw data.

Marks in Statistics obtained by 105 students of a college.

40,	37,	61,	67,	56,	70,	39,	46,	68,	41,	60,	38,	39,	40,	51.
37,	40,	72,	39,	50,	43,	41,	25,	42,	38,	40,	50,	60,	33,	54.
58,	14,	71,	55,	33,	65,	55,	66,	40,	62,	54,	39,	48,	55,	38.
40,	20,	69,	14,	43,	49,	59,	73,	28,	47,	59,	33,	38,	52,	68.
38,	48,	45,	71,	44,	52,	45,	56,	64,	51,	59,	47,	46,	57,	65.
39,	73,	28,	30,	46,	54,	56,	44,	44,	62,	47,	52,	50,	50,	50.
23,	41,	74,	58,	47,	52,	61,	42,	28,	40,	56,	63,	56,	66,	30.

OR

2. a. What is pie diagram? Explain the steps in its construction.

   b. Find the Mode of the following data.

X	1	2	3	4	5	6	7	8
F	4	9	16	25	22	15	7	3

UNIT – II

3. a. If 5% of the electric bulbs manufactured by a company are defective, use Poisson distribution to find the probability that in a sample of 100 bulbs.

   (i) 5 bulbs will be defective.

   (ii) None is defective.

   b. What is the Probability that four S's come consecutively in the word MISSISSIPPI.

OR

4. a. The Joint p. d. f. of X and Y is given by

   $F(x, y) = Kxy, 1 \leq x \leq y \leq 2$

   Find i) k ii) Marginal iii) Conditional

   b. Define binomial distribution. Find the mgf of binomial distribution and hence its mean and variance.

UNIT – III

5. For normal distribution show that Q.D:M.D::2/3 s : 4/5 s : s

OR

6. Find the mean and variance of Normal distribution.

UNIT – IV

7. a. If X and Y are independent random variables, then $E(XY) = E(X) \cdot E(Y)$

   b. State and prove Multiplication theorem of mathematical expectation.

OR

8. a. Define Raw moments and Central moments. What are Sheppard's Corrections? Explain them.

   b. Let X be a random variable with probability mass function.

.....2

X	0	1	2	3
P(x)	1/3	1/2	1/24	1/8

Find the expected value of $Y = (X-l)^2$

UNIT – V

9. a. Define Rank correlation coefficient and derive limits their limits.
   b. Given below Information about advertisement and sales.

	Adv. Exp.(x) (Rs.crores)	Sales(y) (Rs. crores)
Mean	20	120
Standard Deviation	5	25

Correlation coefficient is 0.08.
(i) Find regression line on Y on x
(ii) Find the likely sales when advertisement expenditure is Rs.25 crores.

OR

10 The following mistakes per pages were observed in a book.

No. Of mistakes Per page	0	1	2	3	4	Total
No. Of pages	211	90	19	5	0	325

Fit a Poisson distribution and test for the goodness of fit
(c^2 for 1 d. f. at 5% l.o.s. is 3.841)

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Code No. 11370/N

FACULTY OF INFORMATICS

M.C.A. (2Year Course) I-Semester (CBCS) (Main & Backlog (New) Examination, August 2021

Subject : Probability and Statistics

Time : 2 Hours **Max. Marks: 70**

Missing data, if any, may be suitably assumed

Note: Answer any Four questions : **($4 \times 17^{1/2} = 70$ Marks)**

1. a) Define sub space and Column space.
   b) Determine the set $\{v_1, v_2, v_3\}$ is linearly independent or linearly dependent, where

$$v_1 = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}, v_2 = \begin{bmatrix} 4 \\ 5 \\ 6 \end{bmatrix} and \quad v_3 = \begin{bmatrix} 2 \\ 1 \\ 0 \end{bmatrix}$$

2. a) Define Linear Transformation and Basis.

   b) For what values of h will y be in the subspace of R^3 spanned by v_1, v_2, v_3 if

$$v_1 = \begin{bmatrix} 1 \\ -1 \\ -2 \end{bmatrix}, v_2 = \begin{bmatrix} 5 \\ -4 \\ -7 \end{bmatrix}, v_3 = \begin{bmatrix} -3 \\ 1 \\ 0 \end{bmatrix}, y = \begin{bmatrix} -4 \\ 3 \\ h \end{bmatrix}$$

3. In a single throw with two dice find the probability of throwing a sum i) 10 ii) which is a perfect square.

4. If X is a normal variate with mean 30 and standard deviation 5. Find the probabilities that $i)\ 26 \le X \le 40$ and $ii)\ X \ge 45$.

5. A population consists of six numbers 4,8,12,16,20,24. Consider all samples of size two which can be drawn without replacement from this population. Find a) the population mean and ii) the population standard deviation.

6. a) The mean height of students in a college is 155 cms and standard deviation is 1.5. What is the probability that the mean height of 36 students is less than 157 cms ?
   b) A random sample of size 100 has a standard deviation of 5. What can you say about the maximum error with 95% confidence?

7. A sample of 400 items is taken from a population whose standard deviation is 10. The mean of the sample is 40. Test whether the sample has come from a population with mean 38. Also calculate 96% confidence in interval for the population

Code No: 12152/CBCS/S

FACULTY OF INFORMATICS

MCA I-Semester (CBCS) (Main) Examination, Dec 2018/ Jan 2019

Subject : Probability and Statistics

Time: 3 Hours

Max. Marks: 70

Note: Answer one question from each Unit. All questions carry marks.

UNIT-I

1 a) What is tabulation? State the objectives of tabulation.
b) Construct a blank table showing the distribution of population in a district A, according to the five age groups from 0 to 100 years, Sex, Literacy and civil conditions.

OR

2 a) Distinguish between a questionnaire and a schedule.
b) Find the Median of the following distribution.

C.I	0-8	8-16	16-24	24-32	32-40	40-48
f	8	7	16	24	15	7

UNIT-II

3 a) Define i) Sample space ii) Exhaustive Events ii) Mutually Exclusive Events iv) Independent Events and explain with suitable examples.
b) There are ten urns of which each of three contains I white and 9 black balls, each of the other three contains 9 white and 1 black ball and of the remaining four each contains 5 white and 5 black balls. One of the urns is selected at random and a ball taken at random. It turns out to be white. What is the probability that an urn containing 1 white and 9 black balls was selected.

OR

4 a) State and prove Addition theorem of probability for n events.
b) Obtain the Moment generating function of Binomial Distribution. Hence, show that sum of two binomial variates is a binomial variate, if the variates are independent and have the same probability of success.

UNIT-III

5 a) Derive the Characteristics function of normal distribution and calculate Mean and variance using Moment generating function.
b) Derive the moment generating function of normal distribution

OR

6 a) Define Gamma distribution – Second Kind and derive mean and variance about Origin.
b) In a transaction line, there is a fault in the insulation for every 2.5 miles on the average. What is the probability of having 2 faults in less than 6 miles?

UNIT-IV

7 a) If X and Y are any two random variables then prove that
$(E(X+Y) = E(X) + E(Y)$

b) From a lot of 10 items containing 3 defective items. A sample of 4 items is drawn at random. Let the random variable X denote the number of defective items in the sample. Answer the following when sample is drawn without replacement
i) Find the probability distribution of X
ii) Find $P(X \leq 1), P(X < 1)$ and $P(0 < X < 2)$

OR

8 a) If continuous Random Variable X has the p.d.f

$$f(x)=\begin{cases} \frac{1}{2} & ;-1<x<0 \\ \frac{1}{4}(2-x) & ;0<x<2 \\ 0 & ;\text{ else where} \end{cases}$$

Obtain the distribution function of 'X'.

b) Define Moments. Obtain the expression to express non central moments in terms of central moments.

UNIT-V

9 a) Define Karl Pearson correlation coefficient. Show that Correlation Coefficient is independent of change of origin and scale.

b) The mean and standard deviations of prices in Bombay and calcutta based on a samples of sizes 40 are given below.

	Calcutta	Bombay
Average	65	67
Standard deviation	2.5	3.5

Test whether the mean scores of the two cities is same and also test the equality of variances. Test at 5% level.

OR

10 a) Explain x^2-test procedure for independence of attributes.

b) In a sample of 8 observations the sum of the squares of deviation of the sample values from the sample mean was 84.4 and in the other sample of 10 observations it was 102.6 Test whether this difference is significance at 5 percent level (The 5 percent points of F for n_1=7 n_2=9 degrees of freedom is 3.29).

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O18

Code No. 879/CBCS

FACULTY OF INFORMATICS

M.C.A. I-Semester (CBCS) (Main & Backlog) Examination, January / February 2018

Subject : Probability and Statistics

Time : 3 Hours Max. Marks: 70

Note: Answer one question from each unit. All questions carry equal marks.

Unit-I

1 (a) What do you understand by data charting? How you can gather information from data charting illustrate with suitable examples?

(b) Define Tabulation of data. State rules for Tabulation of data. Illustrate with suitable example.

OR

2 (a) Explain the methods used for collecting secondary data. Discuss their merits and demerits.

(b) Compute Mode for the following data using Histogram.

Class Interval	Frequency
0 – 10	12
10 – 20	20
20 – 30	32
30 – 40	22
40 – 50	10

Unit-II

3 (a) Give the mathematical definition of probability and state its merits and demerits.

(b) State and prove the Bayes theorem and give at least three real life applications.

OR

4 (a) State the physical conditions for the occurrence of Binomial distribution and obtain its probability mass function.

(b) Derive the Mean and Variance of Poisson distribution.

Unit-III

5 (a) Derive the MGF of the uniform distribution. Find Mean and Variance using MGF.

(b) A person has to wait at a bus stop for a bus. The waiting time is uniformly distributed in the interval [5, 20]. What is the probability that he has to wait for more than 10 minutes? What is the average waiting time?

OR

6 (a) Define Beta 1st kind distribution. Obtain its Mean and Variance.

(b) Show that Mean, Median and Mode are equal for a Normal distribution.

Unit-IV

7 (a) Define Mathematical expectation of a random variable. Obtain E(X) for the following pdf by finding K value.

$$f(x) = K.\, x^8(1-x)^7 \quad 0 < x < 1$$
$$= 0 \quad \text{otherwise}$$

(b) Establish the relationship between central and non central moments. Hence write first four central moments.

OR

8 (a) If the mean, variance, μ_3 and μ_4 are :12, 12, 220, 650 find the first four noncentral moments about A = 12, if exists.

(b) If $f(x, y) = 8\,xy \quad 0 < x < y < 1$ find the marginal densities for the random variables X and Y.

Unit-V

9 (a) Explain the test procedure for testing the equality means of two populations when the size of the sample is small (paired & unpaired).

(b) Explain the test procedure for testing variance of the population based on a single sample with specified variance.

OR

10 (a) Define Karl Pearson's coefficient correlation. Explain the same with suitable example.

(b) Obtain the Regression line Y on X and X on Y to the following data

X	5	15	20	22	32	40
Y	17	15	24	20	35	38

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