**POORNIMA UNIVERSITY, JAIPUR**

**END SEMESTER EXAMINATION, November 2022**

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|  | **3BC2111** | Roll No. | Total Printed Pages: 2 |
| **3BC2111** |  |
| B. Tech. II Year III- Semester (Back) End Semester Examination, November 2022  **(AI / DS)** | |
| **BAI03101 / BDS03101 : Statistics & Probability** | | | |

# Time: **3** Hours. Total Marks: **60**

Min. Passing Marks: **21**

Attempt **five** questions selecting one question from each Unit. There is internal choice from Unit I to Unit V. Marks of each question or its parts are indicated against each question / parts. Draw neat sketches wherever necessary to illustrate the answer. Assume missing data suitably (if any) and clearly indicate the same in the answer.

Use of following supporting material is permitted during examination for this subject.

# **1.--------------------------Nil--------------------** **2.------------------Nil-----------------------**

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|  |  | **UNIT-I (CO1)** | **Marks** | **Bloom Level** |
| **Q.1** | **(a)** | A and B are two mutually exclusive events. If P(A) = 0.25, P(B) = 0.40 and P(AUB) = 0.50, find the values of P(AB) and P(A). | **(6)** | Evaluating |
|  |  |  |  |  |
|  | **(b)** | A bag contains 30 balls numbered 1 to 30. One ball is drawn at random. Find the probability that the number on the ball drawn will be – (i) a multiple of 5 or 7 (ii) a multiple of 3 or 7. | **(6)** | Evaluating |
|  |  | **OR** |  |  |
| **Q.2** | **(a)** | If from a lottery of 30 tickets marked 1, 2, 3,…., 30, four are drawn, find the chance that those marked 1 and 2 are among them. | **(6)** | Analyzing |
|  |  |  |  |  |
|  | **(b)** | A bag contains 4 white and 2 black balls, and a second bag contains 3 of each colour. A bag is drawn at random and a ball is then selected at random from the bag chosen. What is the probability that the ball selected is white. | **(6)** | Analyzing |
|  |  | **UNIT-II (CO2)** |  |  |
| **Q.3** | **(a)** | Calculate the coefficient of variation and mean deviation from the following data: | **(6)** | Analyzing |
|  |  | |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Marks | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | | No. of Students | 15 | 35 | 60 | 54 | 96 | 127 | 198 | 250 | |  |  |
|  |  |  |  |  |
|  | **(b)** | Calculate the mode and the median for the following frequency distribution:  Marks 1-5 6-10 11-15 16-20 21-25 26-30 31-35 36-40 41-45  No. of 7 10 16 32 24 18 10 5 1  students | **(6)** | Analyzing |
|  |  | **OR** |  |  |
| **Q.4** | **(a)** | Find the missing frequencies for the following incomplete distribution of height of 100 students.  Marks 0-10 10-20 20-30 30-40 40-50 50-60  No. of Students 5 15 20 - 20 10  The arithmetic mean is 34 marks. | **(6)** | Analyzing |
|  |  |  |  |  |
|  | **(b)** | Find the mean, median, mode for the given frequency distribution of the ages of 5000 shoplifters in a recent psychological study of these individual:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Age | 5-14 | 15-24 | 25-34 | 35-44 | 45-54 | | Frequency | 750 | 2005 | 1950 | 195 | 100 | | **(6)** | Analyzing |
|  |  | **UNIT-III (CO3)** |  |  |
| **Q.5** | **(a)** | For a random sample of 10 pigs, fed on diet A, the increase weight in pounds in a certain period were: 10, 6, 16, 17, 13, 12, 8, 14, 15, 9  For another random sample of 12 pigs, fed on diet B, the increase in the same period were: 7, 13, 22, 15, 12, 14, 18, 8, 21, 23, 10, 17. Test whether the diets A and B differ significantly as regards their effect on increase in weight? (The table value of t for v = 20 at 5% level is 2.09). | **(6)** | Analyzing |
|  |  |  |  |  |
|  | **(b)** | A sample of 900 men is found to have a mean height of 64 inch. If this has been drawn from a normal population with S.D 20 inches, find the 99% confidence limits from the mean hight of the mean in population. | **(6)** | Analyzing |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.6** | **(a)** | Two different types of drugs A and B were tried on certain patients for increasing weight. 8 persons were given drug A and 10 persons were given drug B. The increase in weight in kgm is given below:  Drug A: 2 3 6 8 10 1 2 8  Drug B: 5 6 7 1 11 4 3 8 6 9  Do the two drugs differ significantly with regard to their effect in increasing weight (the table value of t for y = 16 at 5% level is 2.120). | **(6)** | Analyzing |
|  | **(b)** | A sample of 400 individuals is found to have a means of 67.47 inch. Can it be reasonably regarded as a sample from a large population with mean 67.39 and S.D 1.3? | **(6)** | Analyzing |
|  |  | **UNIT-IV (CO4)** |  |  |
| **Q.7** |  | A firm wishes to compare four programs for training workers to perform a certain manual task. Twenty new employees are randomly assigned to the training programs, with 5 in each program. At the end of the training period, a test is conducted to see how quickly trainees can perform the task. The number of times the task is performed per minute is recorded for each trainee, with the following results:   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Observation | Program 1 | Program 2 | Program 3 | Program 4 | | 1 | 9 | 10 | 12 | 19 | | 2 | 12 | 6 | 14 | 8 | | 3 | 14 | 1 9 | 11 | 11 | | 4 | 11 | 9 | 13 | 7 | | 5 | 13 | 10 | 11 | 8 | | **(12)** | Analyzing |
|  |  | **OR** |  |  |
| **Q.8** | **(a)** | The results of a random sample of children with pain from musculoskeletal injuries treated with acetaminophen, ibuprofen, or codeine are shown in the table. At α = 0.10, is there enough evidence to conclude that the treatment and result are independent?   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | Acetaminophen | Ibuprofen | Codeine | Total | | Significant Improvement | 58 | 81 | 61 | 200 | | Slight Improvement | 42 | 19 | 39 | 100 | | Total | 100 | 100 | 100 | 300 | | **(6)** | Evaluating |
|  |  |  |  |  |
|  | **(b)** | The side effects of a new drug are being tested against a placebo. A simple random sample of 565 patients yields the results below. At a significance level of α = 0.05, is there enough evidence to conclude that the treatment is independent of the side effect of nausea?   |  |  |  |  | | --- | --- | --- | --- | | Result | Drug | Placebo | Total | | Nausea | 36 | 13 | 49 | | No nausea | 254 | 262 | 516 | | Total | 290 | 275 | 565 | | **(6)** | Evaluating |
|  |  | **UNIT V (CO5)** |  |  |
| **Q.9** | **(a)** | From the following table of bivariate frequency distribution, calculate the coefficient of correlation between heights and weights of children: | **(6)** | Evaluating |
|  |  |  |  |  |
|  | **(b)** | Calculate the rank correlation coefficient for the given data:   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | x | 48 | 33 | 40 | 9 | 16 | 16 | 65 | 24 | 16 | 57 | | y | 13 | 13 | 24 | 6 | 15 | 4 | 20 | 9 | 6 | 19 | | **(6)** | Evaluating |
|  |  | **OR** |  |  |
| **Q.10** | **(a)** | Calculate the coefficient of correlation | **(6)** | Evaluating |
|  |  | |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | x | 65 | 63 | 61 | 64 | 68 | 62 | 70 | 66 | | y | 68 | 66 | 68 | 65 | 69 | 66 | 68 | 65 | |  |  |
|  |  |  |  |  |
|  | **(b)** | In a partially destroyed laboratory record of an analysis of correlation data, the following results are legible. Variance of x=9  Regression equations: 4x - 5y + 33 = 0 and 20x - 9y = 107. What were  (a) the mean values of x and y  (b) the standard deviation of y  (c) the coeff, of correlation between x and y? | **(6)** | Evaluating |