Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**Supplementary Examination – June – 2017**

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| **Code :** | **14MA2008** | **Duration :** | **3hrs** |
| **Sub. Name :** | **PROBABILITY AND STATISTICS** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| Q. No. | Sub Div. | Questions | Course  Outcome | Marks |
| 1. | a. | Find the Mean, Media and Mode for the following data:   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Marks | 0 – 10 | 10 – 20 | 20 – 30 | 30 – 40 | 40 – 50 | 50 – 60 | | Frequency | 12 | 18 | 27 | 20 | 17 | 6 | | CO2 | 10 |
| b. | The scores of two golfers x an y in 12 rounds are given below. Who is the better player and who is the more consistent player?   |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | X | 74 | 75 | 78 | 72 | 78 | 77 | 79 | 81 | 79 | 76 | 72 | 71 | | Y | 87 | 84 | 80 | 88 | 89 | 85 | 86 | 82 | 82 | 79 | 86 | 80 | | CO2 | 10 |
| (OR) | | | | |
| 2. | a. | Find the rank correlation coefficient from the following data:   |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | X | 68 | 64 | 75 | 50 | 64 | 80 | 75 | 40 | 55 | 64 | | Y | 62 | 58 | 68 | 45 | 81 | 60 | 68 | 48 | 50 | 70 | | CO2 | 10 |
| b. | Find the lines of regression for the following data:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | X | 1 | 4 | 2 | 3 | 5 | | Y | 3 | 1 | 2 | 5 | 4 | | CO2 | 10 |
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| 3. | a. | Mr. A and Mr. B throws alternately a pair of dice. Mr. A wins the game, if he throws 6 before B throws 7. Mr. B wins the game, if he throws 7 before A throws 6. If Mr. A begins the game, what is the probability of his winning? | CO1 | 10 |
| b. | In a bolt factory machines A, B, C produce 25%, 35% and 40% of the total output respectively. Of their output 5% , 4% and 2% respectively are defective bolts. If a bolt is chosen at random from the combined output, What is the probability that it is defective? If a bolt chosen at random is found to be defective, what is the probability that it was produced by B? | CO1 | 10 |
| (OR) | | | | |
| 4. | a. | A random variable ‘X’ has the following distribution.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | x | -2 | -1 | 0 | 1 | 2 | 3 | | P(x) | 0.1 | K | 0.2 | 2k | 0.3 | 3k |   (i) Find the value of k (ii) P(-2<x<2) (iii) P(x<2) (iv) Find the cumulative distribution function of x | CO1 | 10 |
| b. | The joint probability mass function of (X,Y) is P(x,y)= K(2x+3y), x= 0,1,2, y = 1,2,3 (i) Find K (ii) Find the marginal probability distributions (iii) Find the conditional probability distributions. (iv) Find the probability distribution of (X+Y) | CO1 | 10 |
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| 5. | a. | A machine manufacturing screws is known produced 5% defectives. A random sample of 15 screws is taken for inspection. Using binomial distribution, find the probability that there are (i) exactly 3 defectives (ii) atleast 3 defectives (iii) atmost 3 defectives | CO1 | 10 |

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|  | b. | Fit a poisson distribution to the following data and find the theoretical frequencies.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | 0 | 1 | 2 | 3 | 4 | | f | 122 | 60 | 15 | 2 | 1 | | CO1 | 10 |
| (OR) | | | | |
| 6. | a. | In test of 2000 bulbs electric bulbs, it was found that the life of a particular make, was normally distributed with an average life of 2040 hours and standard deviation of 60 hrs. Estimate the number of bulbs likely to burn for (i) More than 2150 hrs (ii) Less than 1950 hrs (iii) more than 1920 but less than 2160 hrs. | CO1 | 10 |
| b. | Fit a binomial distribution to the following data and find the expected frequencies:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | 0 | 1 | 2 | 3 | 4 | | f | 5 | 29 | 36 | 25 | 5 | | CO1 | 10 |
| 7. | a. | In a random asmple of 1000 people from the city of Coimbatore, 400 are found to be consumer of wheat. In a sample of 800 from the city of Madurai, 400 are found to be consumer of wheat. Do these data, reveal a significance difference between the two cities, so far as the population of wheat consumers are concerned. | CO3 | 10 |
|  | b. | The heights of college students in a city are normally distributed with S.D 6 cms. A sample of 100 students has mean height 158cms. Test the hypothesis that the mean height of college students in the city is 160cms. | CO3 | 10 |
| (OR) | | | | |
| 8. | a. | Two independent samples of sizes 9 and 7 from a normal population have the following values of the variables:   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Sample I | 15 | 13 | 12 | 15 | 12 | 14 | 16 | 14 | 15 | | Sample II | 16 | 19 | 13 | 16 | 13 | 13 | 15 | - | - |   Do the estimates of population variance differ significantly at 5% level?. | CO3 | 10 |
|  | b. | The following table gives a classification of a smaple of 160 plants of  their flower colour and flateness of the leaf. Test whether the flower  colour is independent of flatness of the leaf.   |  |  |  | | --- | --- | --- | |  | Flat leaves | Curled leaves | | White Flower | 99 | 36 | | Red Flower | 20 | 5 | | CO3 | 10 |
|  | | | | |
|  | | **Compulsory:** |  |  |
| 9. |  | Four doctors each test four treatment for a certain disease and observed the number of days each patients takes to recover the results are as follows (Recovery time in days):   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Doctor | Treatment | | | | | 1 | 2 | 3 | 4 | | A | 10 | 14 | 19 | 20 | | B | 11 | 15 | 17 | 21 | | C | 9 | 12 | 16 | 19 | | D | 8 | 13 | 17 | 20 |   Discuss the difference between (a) doctors (b) treatments. | CO3 | 20 |

ALL THE BEST