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

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**End Semester Examination – Nov/Dec – 2018**

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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. | Calculate the Mean, Median and Mode for the following data:   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Class Interval | 0 -10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | | Frequency | 6 | 20 | 44 | 26 | 3 | 1 | | CO2 | 10 |
| b. | Find the quartile deviation for the following data:   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Marks | 0 -5 | 5-10 | 10-15 | 15-20 | 20-25 | 25-30 | | No of Students | 4 | 6 | 8 | 12 | 7 | 2 | | CO2 | 10 |
| (OR) | | | | |
| 2. | a. | Find the correlation coefficient from the following data:   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | X | 65 | 66 | 67 | 60 | 68 | 69 | 70 | 72 | | Y | 67 | 63 | 65 | 68 | 72 | 70 | 69 | 71 | | 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 |
| 3. | a. | Mr. A and Mr. B throws alternatively 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 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 continuous random variable X has the probability density function ;. Find (i) the value of (ii) mean and variance (iii) P(x<4) | CO1 | 10 |
| b. | For the bivariate probability distribution of given below: (i) find (ii) (iii) P (iv) P(v)   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | |  | Y | | | | | | | X | 1 | 2 | 3 | 4 | 5 | 6 | | 0 | 0 | 0 |  |  |  |  | | 1 |  |  |  |  |  |  | | 2 |  |  |  |  | 0 |  | | CO1 | 10 |
| 5. | a. | The large consignment of electric bulbs 10% are defective. A random sample of 20 is taken for inspection. Using binomial distribution, Find the probability that (i) all are good lamps (ii) at most there are 3 defectives (iii) atleast 3 defectives | CO1 | 10 |
| 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. | The weekly wages of 1000 workmen are normally distributed around a mean of Rs.70 with a standard deviation of Rs.5. Estimate the number of workers whose weekly wages will be (i) More than Rs.72 (ii) Less than Rs.69 (iii) Between Rs.69 and Rs.72 | CO1 | 10 |
| b. | Fit a binomial distribution to the following data and find the expected frequencies:   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | | f | 5 | 18 | 28 | 12 | 7 | 6 | 4 | | CO1 | 10 |
|  |  |  |  |  |
| 7. | a. | In a city a sample of 1000 were taken and out of them 540 are vegetarian and the rest are non – vegetarian. Can we say that both habbit of eating are equally popular in the city at 5% level of significance. | CO3 | 10 |
| b. | The following data are taken from investigations:   |  |  |  |  | | --- | --- | --- | --- | |  | Sample Size | Mean Wages | S.D of wages | | Sample I | 400 | 47.4 | 3.1 | | Sample II | 950 | 50.3 | 3.3 |   Find out whether the two mean wages differs significantly. | 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 sample of 160 plants of their flower colour and flatness 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 |   Using randomized block design ,discuss the difference between the doctor and treatment. | CO3 | 20 |