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

G:\logo and QP Template\logo 3 Feb 2018 final.tif

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

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| **Code :** | **17MA2008** | **Duration :** | **3hrs** |
| **Sub. Name :** | **PROBABILITY AND STATISTICS** | **Max. marks :** | **100** |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Protein intake of 400 families are given in the form frequency table is given below.   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Protein Intake/day(g) | 10  –  15 | 15  –  20 | 20  –  25 | 25  –  30 | 30  –  35 | 35  – 40 | 40  –  45 | 45  –  50 | | No. of families | 2 | 28 | 125 | 270 | 303 | 197 | 65 | 10 |   Compute arithmetic mean, median and mode for the above data | CO2 | 10 |
| b. | Find the standard deviation and variance of the following distribution:   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Age | 20-25 | 25-30 | 30-35 | 35-40 | 40-45 | 45-50 | | No. of persons | 120 | 110 | 80 | 40 | 10 | 3 | | CO2 | 10 |
| (OR) | | | | |
| 2. | a. | Find the correlation coefficient for the following data.   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | x | 55 | 56 | 58 | 59 | 60 | 61 | 62 | | y | 35 | 38 | 37 | 39 | 44 | 43 | 40 | | CO2 | 10 |
| b. | In partially destroyed laboratory record of an analysis of correlation  data, the following results only are legible and the following regression equations are given below:  .  Find the mean values of  andif the variance of  = 9, and also find the standard deviation of  from the data given above. | 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. B begins the game, what is the probability of his winning? | CO1 | 10 |
| b. | In a bolt factory machines A, B, C produce 20%, 30% and 50% of the total output respectively of their output 4% , 3% 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 A. | 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. | The joint probability mass function of (X,Y) is P(x,y)= K(2x+3y), x= 0,1,2, and y = 1,2,3 (i) Find K (ii) Find the marginal probability distribution (iii) Find the conditional probability distribution. | CO1 | 10 |
|  |  |  |  |  |
| 5. | a. | A machine manufacturing screws is known to produce 5% defective. In a random sample of 15 screws, using Binomial distribution, Find the probability that there are (i) Exactly three defectives (ii) No defectives (iii) At least three defectives. | CO1 | 10 |
| b. | Fit a poisson distribution to the following data and find the theoretical frequencies.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | x | 0 | 1 | 2 | 3 | 4 | | f | 19 | 18 | 8 | 4 | 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 | | f | 2 | 14 | 20 | 34 | 22 | 8 | | CO1 | 10 |
|  |  |  |  |  |
| 7. | a. | Random samples of 400 men and 600 women were asked whether they would like to have a school near their residence. 200 men and 325 women were in favour of the project. Test the hypothesis that the proportion of men and women in favour of the project are the same 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 | 100 | 61 | 4 | | Sample II | 200 | 63 | 6 |   Find out whether the two mean wages differs significantly. | CO3 | 10 |
| (OR) | | | | |
| 8. | a. | The following data are obtained from two samples. Can it be said that the two samples come from normal populations having the same mean.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Sample I | 24 | 27 | 26 | 21 | 25 |  | | Sample II | 27 | 30 | 28 | 31 | 22 | 36 | | CO3 | 10 |
| b. | The following table gives a classification of a sample 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 | 83 | 57 | | Red Flower | 45 | 68 | | CO3 | 10 |
|  | | **Compulsory**: |  |  |
| 9. |  | Set up the analysis of variance for the following results of a Latin Square Design.   |  |  |  |  | | --- | --- | --- | --- | | A(12) | B(19) | B(10) | D(8) | | C(18) | B(12) | D(6) | A(7) | | B(22) | D(10) | A(5) | C(21) | | D(12) | A(7) | C(27) | B(17) | | CO3 | 20 |