**MARWADI UNIVERSITY**

**Faculty of Technology**

**Information and Communication Technology B.TECH**

**SEM: IV MU End Sem Practical Test April :2024 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Subject: - Probability and Statistics (01CT1401) Date:-30/04/2024**

**Total Marks:-40 Time: 90 min**

**Instructions:**

1. **All Questions are Compulsory.**

**2. Make suitable assumptions wherever necessary.**

**3**. **Figures to the right indicate full marks.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Q-1** |  | **Do as directed (CO6)** | **10** |
|  |  | Use simulator/code to plot dot plot, stem and leaf, box plot, bar chart, and other suitable different types of chart (if any) with the help of coding/scripting/online simulation.  Submit the screenshot and inference(comment) of each chart (5 marks)              The data set given is for battery specification of various mobiles (fill the blank one with your assumption). The numbers are given with unit mAH  2100, 2800, 3600, 2800, 3300,1200, 1600,1550,3200, 1980, 2350, 3600,3200,  900, 1200, 2400, 3200, 3400,2400, 2600, 2800, 3000,4200, 4400,4800, 3600,1200.  Classify the above batteries in four categories and plot the pie chart. (2marks)  Submit the classification, pie chart screenshot and comment  We can use limit grouping here here we are having smallest observation 900 and highest observation 4800 so we can make class 900-1900 , 1901-2900 , 2901 – 3900 , 3901-4900   |  |  | | --- | --- | | Class | Frequency | | 900-1900 | 6 | | 1901-2900 | 8 | | 2901 – 3900 | 10 | | 3901-4900 | 3 |   Use online calculator and find mean, median, mode. (1 mark)  Here we found 3 mean means it is multimodal distribution. And mean is less than median so it is left skewed.  Using online Z score converter/writing code convert the given battery specification in to Z value and plot the new dot plot. (submit screen shot of conversion and dot plot) (1 mark)   |  |  | | --- | --- | | Experimental Value | Z Score | | 2100 | -0.6132 | | 2800 | 0.081613 | | 3600 | 0.875681 | | 2800 | 0.081613 | | 3300 | 0.577905 | | 1200 | -1.50652 | | 1600 | -1.10949 | | 1550 | -1.15912 | | 3200 | 0.478647 | | 1980 | -0.73231 | | 2350 | -0.36505 | | 3600 | 0.875681 | | 3200 | 0.478647 | | 900 | -1.8043 | | 1200 | -1.50652 | | 2400 | -0.31542 | | 3200 | 0.478647 | | 3400 | 0.677164 | | 2400 | -0.31542 | | 2600 | -0.1169 | | 2800 | 0.081613 | | 3000 | 0.28013 | | 4200 | 1.471233 | | 4400 | 1.66975 | | 4800 | 2.066784 | | 3600 | 0.875681 | | 1200 | -1.50652 |     From the above plots and data metrics comment on the nature of distribution (1 mark)  From the above matrices we can conclude that it is a multimodal distribution having 4 modes on 1200 , 2800 , 3200 , 3600 |  |
| **Q-2** |  | **Do as directed (CO6)** |  |
|  | **(a)** | **Perform online simulator for the answer of the following case study.**  **Submit the screenshot and inference(comment)**  **(Any two)** | **8** |
|  |  | (i) If the probability is 0.85 that fully charged digital camera battery will take  150 or more pictures, find the probabilities that among 10 such batteries   1. 6 will take 150 pictures or more; 2. at least 4 will take 150 pictures or more; 3. at most 7 will take 150 pictures or more      1. 0 will take 150 pictures or more |  |
|  |  |  |  |
|  |  | (ii) If 3 of 10 new buildings in a city violate the building code, what is the  probability that a building inspector, who randomly selects 4 of the new  buildings for inspection, will catch   1. none of the new buildings that violate the building code? 2. 2 of the new buildings that violate the building code? 3. At least 3 of the new buildings that violate the building code? 4. All of the new buildings that violate the building code? |  |
|  |  |  |  |
|  |  | (iii) (a)Find the area under the standard normal curve that   1. Lies to the left side of 0      1. Lies to the left side of -4 2. Lies to the right side of -1.2      1. Lies between -1 and 1   (b) Determine the values of Z 0.90  and Z 0.06 |  |
|  |  |  |  |
|  | **(b)** | **Perform online simulator for the answer of the following case study.**  **Submit the screenshot and inference(comment)**  **(Any two)** | **6** |
|  |  | 1. In 52 randomly selected hours of production, the mean and the standard deviation of the number of acceptable piece produce by a automatic sampling machine are x̅ = 1.022 and s =138. At the 0.05 level of significance does this enable us to reject the null hypothesis µ = 1000 against the alternative hypothesis µ > 1000 ? |  |
|  |  |  |  |
|  |  | 1. A random sample of 6 steel beams has a mean compressive strength of 58,392 psi (pounds per square inch) with a standard deviation of 648 psi. Use this information and the level of significance α =0.05 to test whether the true average compressive strength of the steel from which this sample came is 58000 psi. assume normality. |  |
|  |  |  |  |
|  |  | 1. The dynamic modulus of concrete is obtained for two different concrete mixes. For the first mix n1 = 33, x̅ = 115.1 and s1 =0.47 psi. For the second mix n2 =31, x̅ = 114.6 and s2 =0.38. Test with α = 0.05 the null hypothesis of equality of mean dynamic modulus versus the two sided alternative. |  |
|  |  |  |  |
| **Q-3** |  | During continuous evaluation of Internal assessment, you have been given one assignment of statistical analysis tool exploration. Each of you has selected different tools. Using the same tool and the given data sheet in mail, prepare various statistical graphs, metrics and inference.  The data set is given in an attachment. The brief about data is give here. You should use your own understanding for what to analyze (also u can do other then recommended analysis)  **Global Electronics Retailer**  Sales data for a fictitious global electronics retailer, including tables containing information about transactions, products, customers, stores and currency exchange rates.  **Recommended Analysis**   1. What types of products does the company sell, and where are customers located?      1. Are there any seasonal patterns or trends for order volume or revenue?   There is almost same order volume and revenue is generated.   1. How long is the average delivery time in days? Has that changed over time?      1. Is there a difference in average order value (AOV) for online vs. in-store sales? | **16** |