AMERICAN INTERNATIONAL UNIVERSITY – BANGLADESH

Faculty of Science and Technology

Department of Mathematics

MAT 3103: Computational Statistics and Probability (All Sections)

Mid-Term Examination Summer: 2022-23

Total Marks: 40 Time: 2 hours

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**Question 1 (OBE) must be answered**

**1.** The following is the distribution of consumption of electricity (MW/locality) in different days:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Class Interval | 1-3 | 3-5 | 5-7 | 7-9 | 9-11 | Total |
| Frequency | 12 | 15 | 11 | 8 | 4 | 50 |

1. What do you understand by **central tendency**? **2**
2. Calculate the **median** of the distribution.  **4**
3. Also, calculate the **standard deviation** for the distribution.  **4**

**Answer any three from Question 2 to Question 5 (10 X 3 = 30)**

**2.** **a)** Three consecutive phone calls are monitored. The calls may be either Voice call (V) or Data call (D), if P(V) = 10% and P(D) = 90%, Find the probability that out of the three calls, there will be **(a) at least one** voice call, and **(b) at best one** voice call. **5**

**b)** Suppose there are 30 students, out of which 12 are from EEE department and 18 are from CSE department. The CGPA of 8 EEE and 12 CSE students are found to be good. One student is selected randomly. Find the probability that the selected student is **(a)** from EEE dept. **given that** his CGPA is not good, and **(b)** from CSE dept. **or** his CGPA is good. **5**

**3.** The joint probability density function of two continuous random variables *X* and *Y* is:

***f(x) =***

1. Estimate the value of ***k***. **5**
2. Calculate ***E (10X + 3)***. **5**

**4.** **a)** In a firm, 30% staffs get injured during work. Six staffs are selected randomly. Find the probability that out of the 6, **(i)** **no staff** get injured, and **(ii)** **at least 3** staffs get injured. **5**

**b)** The average number of signals sent from Dhaka railway station, not reaching properly to Chittagong railway station, is 3 per day. Find the probability that on a particular day, the number of signals not reaching properly is **(i)** **less than** 0.4, and **(ii)** **between** 0.4 to 0.6. **5**

**5.** **a)** The **mode** of the density of faded out signal is 0.5. Find the probability that the density of a randomly selected signal will be **(i)** **more than** 4, and **(ii)** **less than** 3. **5**

**b)** The **average time** needed to get service in a bank is 2 minutes. Find the probability that a random client will be served **(i)** **within** 2 to 5 minutes, and **(ii) before** 5 minutes. **5**

|  |  |
| --- | --- |
| **List of formulas** | |
|  |  |
|  |  |
| = Antilog () |  |
| Me = | Mo = |
| SK = mean – median | SK = mean – mode |
| MD | 2 = |
| CV x 100% | MD |
| 2 = |  |
|  |  |
|  | *dx* |
| *dx* |  |
|  | P(⎪E) = = |
|  |  |
|  |  |
|  | *1* |
|  | *1* |
|  |  |