Fast**National University of Computer & Emerging Sciences, Karachi  
Spring-2018 CS-Department  
Mid-Term II  
4th April, 2018, 1:00 pm – 2:00pm**

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| **Course Code: MT - 206** | **Course Name: Probability & Statistics** | |
| **Instructor Name :Muhammad Amjad , Osama Bin Ajaz, & Asma Masood** | | |
| **Student Roll No:** | | **Section No:** |

Instructions:

* Return the question paper.
* Read each question completely before answering it. There are **3 questions and 2 page.**
* In case of any ambiguity, you may make assumption. But your assumption should not contradict any statement in the question paper.
* All the answers must be solved according to the sequence given in the question paper.
* Write down all answer in the Answer sheet.

**Time**: 60 minutes. **Max Marks:** 30 points

**Proposed time: 15 minutes [Marks: 10]**

**Question # 01 (a):** Tick the appropriate answer.

1. A variable that can assume any possible value between two points is called
2. Discrete random variable (b) Continuous random variable (c) sample space (d) Random variable
3. The probability function of a random variable X is defined as:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | -1 | -2 | 0 | 1 | 2 |
| f(x) | K | 2K | 3K | 4K | 5K |

then what should be the value of K?

1. Zero (b) 1/4 (c) 1/15 (d) One
2. If a student randomly guesses a 5 multiple choice questions consists of five possible choices, then the probability that the student gets exactly three correct is:
3. 0.2 (b) 0.05 (c) 0.6 (d) 0.03
4. Which of the following is not a characteristic of the normal distribution?

(i)It is a symmetrical distribution (ii) The mean is always zero (iii) The mean, median and mode are equal (iv) It is a bell-shaped distribution (v) The area under the curve equals one

1. All of the above (b) a, c, d only (c) b only (d) None of the above
2. Which of the following in normal distribution is a measure of spread of the normal curve?  
   a) Mean (b) Standard deviation (c) Mode (d) All of the above
3. A box containing 3 blue and 2 black balls, 3 balls are drawn in succession with replacement. Let f(y) represents probability distribution for number of blue balls then f (y = 0)?
4. 0.266 (b) 0.216 (c) 0.064 (d) none of these
5. The \_\_\_\_\_\_\_ distribution can be used to approximate the binomial distribution when the number of trails is large and probability of success is small.
6. Hypergeometric (b)Poisson (c)discrete (d) uniform
7. “X” is a binomial variate with parameters n and p, if n = 1, the distribution X reduces to:
8. Poisson (b) Binomial itself (c) Bernoulli (d) discrete uniform

**Question # 01 (b)**

1. A normal random variable *x* has mean 22.5 and standard deviation 2.5. Determine *z* -value for *X* **=** 25.0, 26.3 16.96, 26.96 and 60.0. [2]

1. A normal random variable *z* has mean 22.5 and standard deviation 2.5. Determine *x* -value for *Z* **=** 0, 1.2, - 1.75, 2.0 and -2.33. [2]
2. An electrical firm manufactures light bulbs that have a life, before burn-out, that is normally distributed with mean equal to 800 hours and a standard deviation of 40 hours. Find the probability that a bulb burns between 778 and 834 hours. [Corresponding probabilities: z(-0.55)= 0.2912, z(0.85)= 0.8023 z(0.86)= 0.8051 ,z (0.10) =0.539] [2]

**Proposed time: 25 minutes [Marks: 10]**

**Question # 02**

1. Suppose that for a very large shipment of integrated-circuit chips, the probability of failure for any one chip is 0.10. Find the probability that at most 3 chips fail in a random sample of 20. [1.5]

1. A typist makes 3 errors per page on the average. What is the probability that he makes 5 errors on the next page he types. [1.5]
2. The probabilities are 0.4, 0.2, 0.3, and 0.1, respectively, that a delegate to a certain convention arrived by air, bus, automobile, or train. What is the probability that among 9 delegates randomly selected at this convention, 3 arrived by air, 3 arrived by bus, 1 arrived by automobile, and 2 arrived by train? [2]
3. From a lot of 10 missiles, 4 are selected at random and fired. If the lot contains 3 defective missiles that will not fire, what is the probability that: **(a)** all 4 will fire? **(b)** at most 2 will not fire? [2]
4. A sales manager receives 6 telephone calls on average between 9:30 am and 10: 30 am on a weekday. During a normal five day working week, find the probability that there will be exactly 3 days on which he will receive no calls between 9:30 and 9:40. [3]

**Proposed time: 20 minutes [Marks: 10]**

**Question # 03**

1. The random variable X has the following distribution.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *x* | *0* | *1* | *2* | *3* | *4* |
| *p(X=x)* | *0.20* | *0.20* | *0.20* | *0.20* | *0.20* |

1. Write down the name of the distribution of X. [1]
2. Find P(0 ≤ x <2) [2]
3. Find variance V(X). [2]
4. Let X denote the total number of heads obtained in three tosses of a coin. Find:
5. Sample space for tossing a coin three times. [1]
6. Probability distribution of X. [2]
7. P (X = 2) [1]
8. P (X ≤ 2) [1]