F.Y.B.Sc. (Computer Science) Semester - I
Regular Semester-End Examination
Session : Nov. 2022

Subject : Theory of Probability and Discrete Probability Distributions **Subject Code : USCSST-112**

Time : 2 Hrs. **Total Marks 35**

Instructions : (1) All questions are compulsory.
(2) Figure to the right indicate full marks.
(3) Use of statistical tables and calculator is allowed.
(4) Symbols have their usual meanings.

Q.1 Choose the correct alternative for the following. **(5*1 = 5)**

(i) If A and B are two events with $P(A) = 0.8$, $P(B) = 0.7$ and $P(A \cap B) = 0.6$ then $P(A|B)$ is
(a) 6/7 (b) 6/8 (c) 7/8 (d) 9/10

(ii) If $E(x) = 3$ then $E(2x + 3) =$
(a) 12 (b) 15 (c) 9 (d) 6

(iii) If $A \subset B$ then
(a) $P(A) \leq P(B)$ (b) $P(A \cap B) = P(A)$
(c) $P(A \cup B) = P(B)$ (d) All of the above

(iv) For the following which is the deterministic model ?
(a) A coin is tossed 10 times and the sequence of heads and tails is noted.
(b) A body is released from a fixed height and the time it takes to reach the ground is measured.
(c) Time required for a computer to respond to a command from an interactive terminal.
(d) Running time of an algorithm.

(v) In a study evaluating a new test that screens people for a disease, healthy people correctly indentified as healthy is
(a) True Postive (b) False Positive
(c) True Negative (d) False Negative

Q.2 Attempt any Two. **(5*2 = 10)**

(i) Explain the following terms with one example.
(a) Event, (b) Mutually Exclusive Events, (c) Impossible Event

(ii) A discrete random variable x has the following probability distribution.

x	0	1	2	3	4	5	6	7	8
p (x = x)	a	3a	5a	7a	9a	11a	13a	15a	17a

Find value of (a) a, (b) Distribution function of x, (c) $P(x < 3)$.

(iii) Define uniform distribution for a discrete random variable x. State its mean and variance. Give one real life situation where it is applicable.

Q.3 Attempt any Two. **(5*2 = 10)**

(i) Define independence of two events If A and B are two independent events defined on Ω show that-

(i) A and B' are independent events.

(ii) A' and B' are independent events.

(ii) Four cards are drawn at random from a pack of 52 playing cards, find the probability that

(a) Two cards are red and two cards are black

(b) They are a king, a queen, a jack and an ace.

(iii) State Axioms of probability. Hence prove the following :

Ω $O \leq P(A) \leq 1$.

Q.4 Attempt any two. **(5*2 = 10)**

(i) The population of Nicosia is 75% Greeks and 25% Turkish. 20% of the Greeks and 10% of the Turks sepak English. If a visitor visit to the town meets someone who speaks english, what is the probability that he is Greek?

(ii) Let $x \sim B(n=10, p=0.4)$ find

(a) $P(x=4)$ (b) $P(x \geq 3)$.

(iii) Define continuous random variable and Explain following terms for continuous random variable

(a) P.d.f (b) C.d.f.

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