CLASS: IMSc   SEMESTER : I
BRANCH: QEDS   SESSION : MO/2023

SUBJECT: ED107 PROBABILITY - I

TIME: 02 Hours   **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. **Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

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Q.1(a)	Two newspapers X and Y are published in a certain city. It is estimated from a survey that 16% read X, 14% read Y and 5% read both the newspapers. Find the probability that a randomly selected person does not read any newspaper.	[2]	1
Q.1(b)	If the events $E_1, E_2, \dots, E_n$ are independent and such that $P(E_i^c) = \frac{i}{i+1}$, i = 1(1)n, the find the probability that at least one of the n events occurs.	[3]	1
Q.2(a)	A and B alternatively toss a fair coin. The first one to throw a head win. If A starts, find the probability of him winning.	[2]	1
Q.2(b)	There are three boxes numbered 1 to 3 that contain 3 red and 1 blue, 3 blue and 1 red, and 2 red and 2 blue balls respectively. One box is chosen at random, and one ball is drawn from it. If it is given that the ball drawn is red, what is the probability that it came from box 1?	[3]	1
Q.3	If t is a positive real number and the probability mass function of a discrete random variable X is given by $P_X(x) = e^{-t}(1 - e^{-t})^{x-1}$ for x = 1,2,3,…. Find the MGF of the above distribution.	[5]	2
Q.4	Using the MGF obtained for the distribution defined in question 3, find the mean and variance of the distribution.	[5]	2
Q.5	If a random variable X follows Poisson distribution satisfying 2P[X=0] = P[X=1], Determine P[X>0] and E(X). Given $e^2 = 0.1353$.	[5]	2

:::::18/10/2023:::::