

Indian Institute of Information Technology, Sri City, Chittoor

Name of the Exam: Mathematics-II

Duration: 1.5 hrs

Max. Marks: 15

Instructions:

1. Clearly write your **Roll Number and Name in capital letters** on the top right corner of every page of the answer sheets. It is mandatory.
2. **All questions** are mandatory.
3. Marks are indicated in [] after each question.
4. Rough Work should be done separately, not in the answer sheet.
5. **Answers should be reasoned and derived clearly, not a single word answer.**
6. You are required to write the answers in **A4** sheets.
7. Preferably use a ballpoint pen. The writing should be **readable after scanning**. (This is very important)
8. This is a proctored exam. You need to keep your video on throughout the exam.
9. After finishing the writing part, you are expected to submit the **scanned copy of the hand written answer sheets in one consolidated PDF format to the link provided**. The link will be provided to upload the pdf.
10. Copying in any form will be dealt strictly. Both "copied to" and "copied from" will be penalized.

1. You live in a 5th floor apartment and you take lifts everyday to go up. While going down you prefer stairs. There are 4 lifts to reach 5th floor. Due to technical problem Lift 1,2,3,4 stops in between the floors with 10 %, 20 %, 25 % and 15 % probability. You avail Lift 1,2,3,4 to go up with probability 0.3, 0.15, 0.2, 0.35 respectively. On a particular day, you had to go up 3 times, find the probability that your lift never stopped in between the floors that day? (Realistic assumptions can be made) [3]
2. In an Indian city, 30 % of the voters are poor; 50 % middle class; and 20 % rich. Election was conducted in the city where 65 % of the poor voted. In addition, 82 % of the middle class and 50 % of the rich voted respectively. Assume that you have selected a person randomly from the city, who says that he voted at the election. Determine the probability that he belongs to middle class. [3]
3. You have a six faced die and a coin, both are unbiased. For each die throwing, you toss the coin once. So for each die outcome you have a coin outcome. If the die lands on an odd number, you get Rs 500 if the corresponding coin toss lands on head and Rs. 1000 if the corresponding coin toss lands on tail. For example, if you get the outcome 3 in die rolling and head in the coin toss, you get Rs. 500. On the other hand, if the die rolling results in even number, you get Rs. 750 irrespective of the corresponding coin toss lands up head or tail. Let X be the random variable denoting the money you get out of this experiment. Find PMF of X . Find $E(X)$. [2+1]
4. Consider the following pdf of a random variable X :

$$f(x) = \frac{3}{2}e^{-3x/2}, x \geq 0$$

$$= 0, \text{ otherwise}$$
 Find cumulative distribution function of X and $Var(X)$. [1.5+1.5]
5. Mr. Pandey goes office by train 6 days a week (Monday to Saturday). He lives far from the station and there is a 10% chance of missing the train everyday, independent of other days.
 - i) Find the probability that Mr. Pandey will miss the train on 2 days in the next week.
 - ii) Find the probability that in the next week Mr. Pandey will miss his 3rd train on Saturday. (Saturday's train miss will be his 3rd miss) [1.5+1.5]