#147 - M21_Quiz1_Probability and Statistics_7th September 2021_01:00 PM

Instructions

Read the instructions provided for every question properly before attempting the answer.

1. Please submit your scans 5 minutes before the end. Don't wait until the end!
2. Answers sent by email wont be accepted.
3. Please consult invigilator immediately, if you have any difficulty uploading answers.
4. All questions are compulsory.
5. You can use the calculator in code tantra.

1. Objective

1 marks per question | 4 display questions | 4 maximum answerable

Q1 (414) MCQ - Single Answer | 1 marks | Easy

Suppose we have a set of n symbols. How many different sequences of length k we can form out of these symbols?

◉	n^k
○	$n!$
○	2^n
○	2^{n+1}

Q2 (415) MCQ - Single Answer | 1 marks | Easy

Suppose we have a set of n symbols. How many different sequences of length k we can form out of these symbols if we are not allowed to use the same symbol twice?

◉	$\frac{n!}{(n-k)!}$
○	$\frac{(n-k)!}{n!}$
○	$(n-k)!$

Q3 (416) MCQ - Single Answer | 1 marks | Easy

What is the number of 5-card hands with three hearts and three spades?

○	$\binom{12}{3}\binom{12}{3}$
◉	$\binom{13}{3}\binom{13}{3}$
○	$\binom{13}{2}\binom{13}{2}$

Q4 (417) MCQ - Single Answer | 1 marks | Easy

Ten fair coins are tossed simultaneously. What is the probability of getting atleast one tail?

○	$\frac{(2^{10}+1)}{2^{10}}$
○	$\frac{(2^9+1)}{2^9}$
◉	$\frac{(2^{10}-1)}{(2^{10})}$

pawan.kumar@iiit.ac.in

2. Descriptive

3 marks per question | 5 display questions | 5 maximum answerable

Q1 (418) | Scan and/or Upload | 3 marks | Medium

Long ago a prisoner was to be executed. In response to his supplications, he was promised that he would be released if he drew a white ball from one of two similar urns. The provisions were that he had to distribute 100 white and 100 black balls between the two urns, in any way he liked, after which he had to draw a ball at random from one of these urns. How should the prisoner put the balls such that the probability of his release is maximized? Explain your answer.

Q2 (419) | Scan and/or Upload | 3 marks | Medium

State and prove law of total probability.

Q3 (420) | Scan and/or Upload | 3 marks | Medium

A fair coin is flipped. If it turns out head, then roll a four sided die, else roll a six sided die. You win if you roll 4. What is your probability of winning? Show the probability tree, and explain your answer.

Q4 (421) | Scan and/or Upload | 3 marks | Medium

It is known that 50% of all email in 2021 is spam, 20% of spam has the word "dear", and 2% of non-spam has the word "dear". You get an email with the word “dear” in it. What is the probability that the email is spam? Show detailed answer.

Q5 (422) | Scan and/or Upload | 3 marks | Medium

Describe Monty-Hall problem (discussed in class)? Discuss solution to this problem. What if Monty opens the door randomly?

pawan.kumar@iiit.ac.in