

MID TERM EXAMINATIONS - July 2024

	Cont.	B.Tech.		Semester	1:	Fall Semester 2024-2025
ourse Title	1:	Probability Statistics and Reliability		Course Code	:	MAT3003
ate/Session	1:	16 July 2024/ Session II	1		+	A11+ D11+ A12+ D12+ A13
ime	1:	1 ½ hours		Max. Marks	1:	50

Answer all the Questions

Sub.

Question Description

Marks

A person gets a construction job and agrees to undertake it. The completion of the job in time depends on whether there happens to be strike or not in the company. There are 40% chances that there will be a strike. Probability that job is completed in time is 30% if the strike takes place and is 70% if the strike does not take place. What is the probability that the job will be completed in time?

By examining the chest X-ray, the probability that T.B is detected when a person is actually suffering from T.B. is 0.99. The probability that the doctor diagnoses incorrectly that a person has T.B. on the basis of X-ray is 0.002. In a certain city, one in 1000 persons suffers from T.B. A person is selected at random and is diagnosed to have T.B., what is the chance that he actually has T.B.?

10

A random variable. X assumes the values -2, -1, 0, 1, 2 such that P[X = -2] = P[X = -1] = P[X = 1] = P[X = 2], P[X < 0] = P[X = 0].

-angello

Obtain the probability mass function of X. The p.d.f. of the different weights of a "1 litre pure ghee pack" of a company is given by:

 $f(x) = \begin{cases} 200(x-1) & for \ 1 \le x \le 1.1 \\ 0, & otherwise \end{cases}$

Examine whether the given p.d.f. is a valid one. If yes, find the probability that the weight of any pack will lie between 1.01 and 1.02.

In a certain factory turning out fountain pens, there is a small chance of 1/500, for any pen to be defective. The pens are supplied in packets of 10. In a consignment of 20000 packets calculate the approximate number of packets containing

(i) One defective (ii) I wo defective (iii) Five defective pens

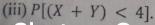
The following table represents the joint probability distribution of the discrete random variable

(X,Y):

\	Y 1	2.		
X		-		
1	0.1	0.2		
2	0.1	0.3		
3	0.2	0.1		

Find:

- (i) The marginal distributions.
- (ii) The conditional distribution of X given Y = 1.



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