Reg. No.: [redacted]

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MID TERM EXAMINATIONS – July 2024					
Programme	:	B.Tech.	Semester	:	Fall 2024-25
Course Title	:	Probability, Statistics and Reliability	Course Code	:	MAT3003
Date/Session	:	19 July 2024/ Session II	Slot	:	B21+B22+B23+E21+E22
Time	:	1 ½ hours	Max. Marks	:	50

Answer all the Questions

Q.No.	Sub. Sec.	Question Description	Marks
1		Box A contains 6 red and 4 blue balls, box B contains 3 red and 7 blue balls. Two balls are drawn at random from box A and placed in box B. Now, a ball is drawn at random from the box B. Find the probability that it is a blue ball.	10
2		There are 4 candidates for the post of Incharge of constructing a flyover. The probabilities that they will be selected are 0.3, 0.25, 0.35 and 0.1. The probabilities that the above selected candidates can get the job done on time are 0.4, 0.7, 0.3 and 0.2, respectively. What is probability that the job is done on time?	10
3		From a lot of 12 items containing 3 defective items, a sample of 4 items are drawn at random without replacement. Let a random variable X denote the number of defective items in the sample. Find the probability distribution of X.	10
4		A random variable X has the following probability distribution	

X	0	1	2	3	4
$P(X)$	c	$2c$	$2c$	c^2	$5c^2$

(i) Find the value of c;
(ii) Evaluate $P(X < 3)$ and $P(0 < X < 4)$;
(iii) Find mean and variance of X.

10

5 For the following bivariate probability distribution of X and Y

X \ Y	0	1	2	3
0	$\frac{1}{32}$	$\frac{2}{32}$	$\frac{3}{32}$	$\frac{2}{32}$
1	$\frac{2}{32}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{32}$
2	$\frac{3}{32}$	$\frac{2}{16}$	0	$\frac{1}{16}$

10

Find
(i) $P(X \leq 1, Y = 3)$;
(ii) $P(Y \leq 2)$.

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