

CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

BCS/BAD/BAI/BDS301

Third Semester B.E./B.Tech. Degree Examination, June/July 2026

Mathematics for Computer Science

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.

2. M : Marks, L: Bloom's level, C: Course outcomes.

3. VTU Mathematics Formula Hand Book is permitted.

Module – 1

Module – 1								M	L	C											
Q.1	a.	Find the value of K such that the following distribution represent a finite probability distribution. Hence find $P(x \leq 1)$, $P(x > 1)$ and $P(-1 < x \leq 2)$.						06	L2	CO1											
	<table><tr><td>x</td><td>-3</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>P(x)</td><td>k</td><td>2k</td><td>3k</td><td>4k</td><td>3k</td><td>2k</td><td>k</td></tr></table>						x				-3	-2	-1	0	1	2	3	P(x)	k	2k	3k
x	-3	-2	-1	0	1	2	3														
P(x)	k	2k	3k	4k	3k	2k	k														
	b.	Find the mean and variance of Binomial Distribution.						07	L2	CO2											
	c.	The marks of 1000 students in an examination follows a normal distribution with mean 70 and standard deviation 5. Find the number of students whose marks will be (i) less than 65 (ii) more than 75 (iii) between 65 and 75. [$\phi(1) = 0.3413$].						07	L3	CO2											

OR

Q.2	a.	Find the constant k such that $f(x) = \begin{cases} kx^2 & 0 < x < 3 \\ 0 & \text{otherwise} \end{cases}$ is a P.d.f. Also find (i) $P(1 < x < 2)$ (ii) $P(x \leq 1)$ (iii) $P(x > 1)$	06	L2	CO1
	b.	The probability that a pen manufactured by a factory be defective is 1/10. If 12 such pens are manufactured what is the probability that (i) exactly 2 defective. (ii) atleast 2 are defective (iii) none of them are defective.	07	L3	CO2
	c.	If the probability of a bad reaction from a certain injection is 0.001. Determine the chance that out of 2000 individuals, more than two will get a bad reaction.	07	L3	CO2

Module – 2

Q.3	a.	The joint probability distribution of two random variables X and Y is	06	L2	CO2							
		<table><tr><td>X/Y</td><td>- 4</td><td>2</td><td>7</td></tr><tr><td>1</td><td>1/8</td><td>1/4</td><td>1/8</td></tr><tr><td>5</td><td>1/4</td><td>1/8</td><td>1/8</td></tr></table> Find the marginal distribution and covariance of X and Y.				X/Y	- 4	2	7	1	1/8	1/4
X/Y	- 4	2	7									
1	1/8	1/4	1/8									
5	1/4	1/8	1/8									
	b.	Find the unique probability vector for the regular stochastic matrix $\begin{bmatrix} 0 & 3/4 & 1/4 \\ 1/2 & 1/2 & 0 \\ 0 & 1 & 0 \end{bmatrix}$	07	L2	CO3							

BCS/BAD/BAI/BDS301																				
	c.	Three boys A, B, C are throwing ball to each other. A always throws the ball to B and B always throws the ball to C. C is just or likely to throw the ball to B or to A. If C was the first person to throw the ball find the probabilities that after three throws, A has the ball.	07	L3	CO3															
OR																				
Q.4	a.	The joint probability distribution table for 2 random variables X and Y as follows: <table><tr><td>x \ y</td><td>-2</td><td>-1</td><td>4</td><td>5</td></tr><tr><td>1</td><td>0.1</td><td>0.2</td><td>0</td><td>0.3</td></tr><tr><td>2</td><td>0.2</td><td>0.1</td><td>0.1</td><td>0</td></tr></table> Find covariance of X and Y.	x \ y	-2	-1	4	5	1	0.1	0.2	0	0.3	2	0.2	0.1	0.1	0	06	L2	CO2
x \ y	-2	-1	4	5																
1	0.1	0.2	0	0.3																
2	0.2	0.1	0.1	0																
	b.	Find the unique fixed probability vector for the regular stochastic matrix $A = \begin{bmatrix} 0 & 1 & 0 \\ 1/6 & 1/2 & 1/3 \\ 0 & 2/3 & 1/3 \end{bmatrix}$	07	L2	CO3															
	c.	A gambler's luck follows a pattern. If he wins a game, the probability of winning the next game is 0.6. However if he losses a game, the probability of losing the next game is 0.7. There is an even chance of gambler winning the first game. i) What is the probability of he winning the second game? ii) In the long run, how often he will win?	07	L3	CO3															
Module – 3																				
Q.5	a.	Define Null Hypothesis, Type I and Type II Error in a statistical test.	06	L1	CO4															
	b.	A coin was tossed 400 time and head turned up 216 times. Test the hypothesis that the coin is unbiased at 5% level of significance.	07	L3	CO4															
	c.	A survey was conducted in a slum locality of 2000 families by selecting a sample of size 800. It was revealed that 180 families were illiterates. Find the probable limit of the illiterate families in the population of 2000 at 10% level of significance.	07	L3	CO5															
OR																				
Q.6	a.	A coin is tossed 1000 times and head turns up 540 times. Decide on the hypothesis that the coin is unbiased at 10% level of significance.	06	L2	CO4															
	b.	In a sample of 500 men, its was found that 60% of them had over weight. What can we infer about the proportion of people having over weight in the population (For $Z_{0.1} = 2.58$)	07	L2	CO4															
	c.	One type of aircraft is found to develop engine trouble in 5 flights out of a total of 100 and another type in 7 flights out of a total of 200 flights. Is there a significance difference in the two types of aircrafts so far as engine defects are concerned at 5% LOS?	07	L3	CO4															
2 of 4																				