



## BVP's Sardar Patel Institute of Technology,

Bhavans campus, Munshi Nagar, Andheri (W), Mumbai 400 058  
(An Autonomous Institute Affiliated to Mumbai University)

### Mid Semester Examination

October 2023

Max. Marks: 30

Class: SY B.Tech.

Course Code: MA203

Name of the Course: Probability and Statistics

Duration: 1 Hour

Semester: III

Branch: COMP/AIIML/CSDS

#### Instructions:

- (1) All Questions are compulsory.
- (2) Draw neat, labelled diagrams, wherever necessary.
- (3) Assume suitable data if necessary.

Q. No.	Question	Max. Marks	CO	BL																			
1.	<p>a) Bag1 contains 5 white and 6 black balls and Bag2 contains 4 white and 3 black balls. One ball is drawn at random from one of the bags and it is found to be white. Find the probability that it was drawn from bag2.</p> <p style="text-align: center;">OR</p> <p>b) A coin is tossed three times. What is the probability of two or more heads given that there was atleast one head?</p>	05	MA203.1	3																			
2.	State and Prove Bayes' theorem.	05	MA203.1	2																			
3.	<p>Define probability mass function and probability density function. For what value of c the following function is a density function.</p> $f(x) = ce^{-x/2}, x > 0.$	05	MA203.2	4																			
4.	<p>1) The joint pmf of X is given in the following table.</p> <table border="1"><tr><th rowspan="2">X</th><th colspan="3">Y</th></tr><tr><th>1</th><th>2</th><th>3</th></tr><tr><td>1</td><td>10/66</td><td>15/66</td><td>3/66</td></tr><tr><td>2</td><td>20/66</td><td>12/66</td><td>0</td></tr><tr><td>3</td><td>6/66</td><td>0</td><td>0</td></tr></table> <p>a) Find marginal of X.</p> <p>b) Find conditional frequency of Y given X=1.</p>	X	Y			1	2	3	1	10/66	15/66	3/66	2	20/66	12/66	0	3	6/66	0	0	05	MA203.2	2
X	Y																						
	1	2	3																				
1	10/66	15/66	3/66																				
2	20/66	12/66	0																				
3	6/66	0	0																				
5.	<p>Let X and Y have joint density function</p> $f(x, y) = k(x - y), 0 \leq y \leq x \leq 1.$ <p>a) Find k.</p> <p>b) Find conditional density of Y given X.</p>	05	MA203.2	2																			
6.	If $X \sim \text{Binomial}(n, p)$ . Find $E(X)$ .	05	MA203.2	1																			

\*\*\*\*\*END\*\*\*\*\*

