

Continuous Assessment Test (CAT) - I – February 2024

Programme	:	B.Tech.	Semester	:	Winter 2023-2024	
Course Code & Course Title	:	BMAT202L & Probability and Statistics	Slot	:	F1+TF1	
Faculty		Dr. Vanchinathan P Dr. Balamurugan B J Dr. Lakshmanan S Dr. Revathi G K Dr. Durga Nagarajan Dr. Padmaja N Ms. Sakthidevi K	Class Number	:	CH2023240500841 CH2023240500842 CH2023240500843 CH2023240500844 CH2023240500845 CH2023240500846 CH2023240500847	
Duration	1	90 Mins	Max. Marks	:	50 Marks	

General Instructions:

- Write only your registration number on the question paper in the box provided and do not write other information.
- Only non-programmable calculator without storage is permitted

Answer all the Questions

				4	Answer	an tu	c Que	Stions				
.No.	Sub Sec.	Description										
		Consider th	e followi	ng data:								
		Class	10-15	15-20	20-25	25-	30	30-35	35-40	40-45	45-50	Total
		Frequency	24	_	90	11	2	_	56	20	33	460
1		,	uartile is and the mis	ssing fre	quencie	s (5 m	arks)					
2 A	Α	The following is the distribution of marks of 80 students in a class. Find the coefficient of variation.										
			Mark	Marks below		40	30	20	10			
			No of	Studen	ts 80	65	46	25	12			
		Calculate n	nean devi	ation ab	out med	lian fo	r the f	ollowi	ng data:			
2	В	Carculate 11	Class		0-10	10-20)-30	30-40	40-50	50-60)
			Frequ	ency	6	7		15	16	4	2	
3 A	A	A random variable X has the density function $f(x) = \frac{c}{x^2 + 1}, -\infty < x < \infty$										
		i) Find the constant C (2 marks)										
			and $P(\frac{1}{\sqrt{3}} \le$			(1 < 1)	$X \leq \chi$	$\sqrt{3}$) (3	marks)			

3 B	When a fair coin is tossed three times, let <i>X</i> denote the number of times it showed up heads											
	Out comes	ННН	ТНН	HTH	THH	THT	TTH	HTT	TTT			
	Values of	3	2	2	2	1	1	1	0			



- i) Construct the probability distribution of X. (2 marks)
- (ii) Find P(X > 2). (1 mark)

The random variable *X* and *Y* has the joint density function
$$f(x,y) = \begin{cases} K(2x+y), & 2 < x < 6, & 0 < y < 5 \\ 0, & otherwise \end{cases}$$

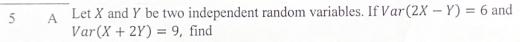


3 6

- i) Find the constant K and the marginal density function $f_Y(y)$. (5 marks)
- ii) Find P(3 < X < 4, Y > 2). (2 marks)
- The joint density function of two random variables X, Y as follows: 4

$$f(x,y) = \begin{cases} \frac{x(1+3y^2)}{4}, & 0 < x < 2, & 0 < y < 1, \\ 0, & otherwise \end{cases}$$

Find the conditional density function f(x|y) and the conditional probability $P\left(\frac{1}{4} < X < \frac{1}{2} \mid y = 3\right).$



i) Var(X) and Var(Y) (4 marks)

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- ii) Var(X + Y)
- (1 mark)

5 B Let X and Y be discrete random variables with probability function
$$f(x, y) = \frac{x+y}{21}$$
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