



MANAV RACHNA
॥ vidyayatariksha ॥

MANAV RACHNA
UNIVERSITY

FORMERLY MANAV RACHNA COLLEGE OF ENGINEERING
NAAC ACCREDITED A GRADE INSTITUTION

Declared as State Private University under section 2f of the UGC act, 1956

DEPARTMENT OF MATHEMATICS

ODD SEMESTER (JAN-MAY-2021)

T1 Examination, February 2021

FACULTY NAME: Ms Savitta
Saini/Ms Seema Aggarwal/Dr
Kalpana Shukla

NAME OF THE COURSE COORDINATOR:
Ms Savitta Saini

COURSE NAME: Probability and Statistics	COURSE CODE: MAH202B-T	CREDIT: 04	MAX. MARKS: 30	TIME DURATION: 90 min.	DATE OF EXAM: 09/02/2021 9:30 AM - 11:00 AM
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Note: ALL QUESTIONS ARE COMPULSORY.

Q.NO.	QUESTIONS	MAR KS	CO's ADDRESSED	BLOOM'S TAXONOMY LEVEL	PI
PART-A	Q1(A) Suppose that X is a random variable with $E[X] = 10$ and $VAR[X] = 25$. Find the positive numbers a and b such that $Y = aX + b$ has mean 0 and variance 1.	2	CO1	BT3	
	Q1(B) Find the constant k such that the following is a p.d.f. $f(x) = \begin{cases} 0, & \text{if } 0 \leq x < 2 \\ 2k, & \text{if } 2 \leq x < 4 \\ -kx + 6k, & \text{if } 4 \leq x < 6 \end{cases}$	2	CO1	BT3	
	Q1(C) Can a binomial distribution have mean 3 and variance 4? Justify your answer.	2	CO2	BT2	
	Q1(D) Let Y be the absolute difference of the upturned faces in the experiment of tossing two dice. Find $E[Y]$	2	CO1	BT3	

	Q1(E)	Prove or disprove if $P(A) = 0$, then $P(A \cap B) = 0$	2	CO1	BT3	
PART-B	Q2(A)	<p>A bombing plane flies directly above a rail road track. Assume that if a small bomb falls within 15 feet of the track, the track will be sufficiently damaged so that traffic will be disrupted. Let X denotes the perpendicular distance from the track that a bomb falls. Assume that $f_X(x) = \frac{100-x}{5000}$, $0 \leq x \leq 100$</p> <p>(i) Find the probability that a small bomb will disrupt the traffic.</p> <p>(ii) If a plane can carry 8 small bombs and uses all the eight, what is the probability that traffic will be disrupted?</p>	5	CO1	BT3	
	Q2(B)	An Urn contains balls numbered 1, 2 and 3. First a ball is drawn from the urn and then a fair coin is tossed the number of times as the number shown on the drawn ball. Find the expected number of heads.	5	CO1	BT3	
	Q3(A)	Suppose that flaws in plywood occur at random with an average of one flaw per 50 square feet. What is the probability that a 4 foot \times 8 foot sheet will have no flaws? At most one flaw? (Assume that the number of flaws per unit area is Poisson distributed).	5	CO2	BT3	
	Q3(B)	If on the average rain falls on 10 days in every 30 days, obtain the probability that	5	CO2	BT3	

		<p>(i) rain will fall on at least 3 days of a given week</p> <p>(ii) first three days of a given week will be fine and the remaining 4 days wet.</p>				
<p>*****END*****</p>						