QP CODE: D3BST2402	**(Pages: 2)**	**Reg. No**	**: .....**
		Name	**: .....**

THIRD SEMESTER FYUGP EXAMINATION, NOVEMBER 2025

Discipline Specific Core (DSC) Course - Minor

STA3MN203 : Random variables and CART

(Credits: 4)

Time: 2 Hours **Maximum Marks: 70**

Section A

Answer the following questions. Each carries 3 marks (Ceiling: 24 marks)

1.	Give any three examples of random variable.	BL1	CO1
2.	State any three properties of distribution function.	BL1	CO1
3.	Define standard normal distribution.	BL1	CO3
4.	What are the parameters of normal distribution? How can we obtain standard normal distribution from it?	BL1	CO3
5.	Define CART.	BL1	CO4
6.	Comment on Statistical Learning and give one application.	BL2	CO4
7.	Mention one advantage and one disadvantage of decision trees.	BL1	CO4
8.	What is meant by an input variable and output variable?	BL2	CO4
9.	Write any three key difference between classification and regression.	BL1	CO4
10.	What is Bagging?	BL1	CO5

Section B

Answer the following questions. Each carries 6 marks (Ceiling: 36 Marks)

11.	What is meant by continuous random variable? Give any three examples.	BL1	CO1
12.	Find the unknown value of k of a random variable X which has the following probability function.	BL2	CO2

X = x	0	1	2	3	4	5
P(x)	K^2	K/4	5k/2	k/4	$2k^2$	K^2

(PTO)

13.	Describe the relationship between the Bernoulli and Binomial distributions.	BL1	CO3
14.	(i) Define Poisson distribution. (ii) If 3% of electric bulbs manufactured by a company are defective , find the probability that in a sample of 100 bulbs , at least three bulbs are defective.	BL2	CO3
15.	Explain the concepts of response and predictor variables using an example.	BL2	CO4
16.	Write a short note on how trees differ from linear models in handling non-linear data patterns.	BL2	CO4
17.	Compare supervised and unsupervised learning with real-life applications.	BL4	CO4
18.	What is the role of feature selection at each split in Random Forest?	BL1	CO5

Section C

Answer any one question. Each carries 10 marks (1 x 10 = 10 Marks)

19. The p.m.f of a random variable X is given as follows : BL2 CO2

x	0	1	2	3	4	5
P(x)	K^2	k/4	5k/4	k/4	$2k^2$	K^2

Find (i) k. (ii) Write down the distribution function of X.

20. (a) Define Binomial distribution. BL2 CO3
(b) The mean and variance of a binomial distribution are 2.5 and 1.875 respectively. Find
(i) Exactly two successes (ii) Less than two successes (iii) More than 8 successes.

CO : Course Outcome

BL : Bloom's Taxonomy Levels (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)