Reg No [redacted] Name [redacted]

VIT UNIVERSITY
CHENNAI CAMPUS

Continuous Assessment Test - II

Programme	B. Tech	**Semester**	Winter Semester 2022-23
Course	Probability & Statistics	**Code**	BMAT202L
Faculty	Dr. Surath Ghosh, Dr. Dhivya P, Dr. Tharasi Dilleswar Rao, Dr. Avinash Kumar Mittal, Dr. Om Namha Shivay, Dr. Rajivganthi C, Dr. Poulomi De, Dr. K. K. Pradhan	**Slots**	A1 + TA1
		Class Number(s)	CH2022235000985, 86, 87, 88, 90, 91 CH2022235002613
Time	1 hour 30 minutes	**Max. Marks**	50

All five questions are mandatory.

Q. No.	Question Description	Marks
1	From the data given below, obtain i) the two regression equations, ii) the coefficient of correlation between the marks in Physics and Mathematics and iii) the most likely marks in Mathematics when marks in Physics is 30	10

Physics	23	26	33	30	29	34	27	36	32	30
Mathematics	41	44	47	39	34	30	29	28	31	37

2 A Psychologist wanted to compare two methods A and B of teaching. He selected a random sample of 11 students. The marks obtained by them are tabulated below. Find the rank correlation of the obtained marks? 5

Method A	22	27	17	12	28	17	25	28	20	28	11
Method B	35	33	16	24	23	27	19	20	16	11	21

3 i) The probability that a screw manufactured by a company is defective is 0.1. The company sells screws in packets containing 5 screws and gives a guarantee of replacement if one or more screws in the packet are found to be defective. Find the probability that a packet would have to be replaced. 5

ii) Customers arrive at a convenience store according to Poisson distribution with a mean of 10 customers per hour. The manager used to notice that no customer arrives for the first 3 minutes after the shop opens. Find the probability that customer arrives within the next 3 minutes. 5

4 i) The lifetime of a component of certain type is a random variable whose probability density function is exponentially distributed with parameter 2. For a randomly picked component of such type, what is the probability that its lifetime exceeds the expected lifetime (rounded up to 3 decimal places)? 5

ii) Let X be a normal random variable with zero mean and unit variance. Obtain $E(|X|)$ correcting up to 3 decimal places (Here $|X|$ denotes the absolute value of X). 5

5 Customer's feedback of one Delhi based manufacturing company has shown that 20% of manufactured product is of top quality. In one day's production of 480 products, only 60 are of top quality. Show that either the hypothesis of 10% was wrong or the production of the day chosen was not a representative sample. Also, find the 95% confidence limits for the percentage of top quality product based on particular day's product. 10

6 The mean and standard deviation of a sample of size 100 are 73 and 10 respectively. Those of another sample of size 60 are 75 and 8. Examine whether the difference between the means is significant or not. 5