Assessment Test – II

Programme Name & Branch: B.Tech

Slot: B1+TB1

Course Name & code: Probability and Statistics [MAT1017]

Class Number (s): VL2024250106382 & 6384

Faculty Name (s): Dr. Rajendran P & Dr. Rajesh Moharana

Exam Duration: 90 Min. **Maximum Marks:**

General instruction(s): (i) Answer all questions.

(ii) Allow use of non-programmable calculator and statistical tables.

Q. No	Question	Marks	CO
1.	(i) The mean inside diameter of a sample of 200 washers produced by a machine is 0.502 cm and the standard deviation is 0.005 cm. The purpose for which these washers are intended allows a maximum tolerance in the diameter of 0.496 to 0.508 cm. Otherwise, the washers are considered to be defective washers. Assuming that the diameters are normally distributed, find the percentage of defective washers. (ii) The mean of a normal distribution is 60 and 6% of the values are greater than 70. Find the standard deviation of the distribution.	10 [7+3]	3
2.	A monitor issues a warning signal when an action is needed as part of a production process. The interval, X hours, between successive signals follows an exponential distribution $f(x) = \alpha e^{-\alpha x}; x > 0, \alpha > 0$ with parameter $\alpha = 0.08$. Find the probability that the interval between the next two signals is between 10 and 20 hours. Following a warning signal, what is the longest time the production process could be left unsupervised whilst ensuring the probability of missing the next signal is less than 0.01?	10 [5+5]	3
3.	Calculate the mean deviation from the median of the following data. Also compute the semi interquartile range.	10	3

x	1	2	3	4	5	6	7	8
f	9	26	59	72	52	29	15	10

4.	Age distribution of the life insurance policy holders is as follows: 	Age group	10-20	20-30	30-40	40-50	50-60	60-70
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Number	25	48	72	53	35	15 | Calculate the mean age and modal age.	10	3	BL4
5.	(i) Evaluate $\iint e^{2x+3y}\, dx\, dy$ over the triangle bounded by the regions $0 \leq x, y \leq 1$ and $x + y \leq 1$. (ii) Evaluate the integral $\iint xy(x+y)\, dx\, dy$ over the area between the curves $y = x^2$ and $y = x$.	10 [5+5]	7	BL5