(167)

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2026

B. Tech.-III Semester (IT-Backlog)

COURSE CODE (CREDITS): 18B11MA313 (3) MAX. MARKS: 25

COURSE NAME: PROBABILITY AND STATISTICS

COURSE INSTRUCTOR: SST MAX. TIME: 1 Hour 30 Minutes

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make suitable numeric assumptions wherever required for solving problems.

(c) Use of a scientific calculator is allowed.

Q. No.	Question	CO	Marks
Q1	Let X be the random variable that denotes the life in hours of a certain electronic device. The probability density function is: $$f(x) = \begin{cases} \frac{20000}{x^3}, x > 100 \\ 0, \quad elsewhere \end{cases}$$ Find the expected life of this type of device.	2	4
Q2	The proportion of people who respond to a certain mail-order solicitation is a continuous random variable X that has the density function $$f(x) = \begin{cases} \frac{2(x+2)}{5}, 0 < x < 1 \\ 0, \quad elsewhere \end{cases}$$ Find the probability that more than $1/4$ but fewer than $1/2$ of the people contacted will respond to this type of solicitation.	2	4
Q3	A block of 100 bits is to be transmitted over a binary channel with a probability of bit error of $p = 0.001$. What is the probability that two or more bits are received in error?	3	4
Q4	The number of traffic tickets that a certain traffic officer gives out on any day has been shown to have a Poisson distribution with a mean of 7. What is the probability that on one particular day the officer gave out no ticket?	3	4
Q5	The annual rainfall in inches in a certain region has a normal distribution with a mean of 40 inches and variance of 9 $inch^2$ What is the probability that the rainfall in a given year is between 30 and 45 inches?	3	4
Q6	Determine the Karl Pearson's correlation coefficient between pressure and the corresponding scale reading for the purpose of calibration:	4	5

Pressure, x $(lb/sq\ in.)$	10	10	10	50	50
Scale Reading, y	13	16	20	86	90

Standard Normal Curve Areas:

1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998