

SCHOOL OF ADVANCED SCIENCES
CONTINUOUS ASSESSMENT TEST - I
FALL SEMESTER 2025-2026

Programme Name & Branch : PG Freshers
Course Code and Course Name : PAMAT501 and Probability and Statistics
Faculty Name(s) : Kuvar Satya Singh and Shayathri L
Class Number(s) : VL2025260106229
Date of Examination : 17/08/2025
Exam Duration : 90 minutes **Maximum Marks: 50**

General instruction(s):

- Answer All Questions and rough work should not be done on question paper. It will be treated as malpractice.
- M - Max mark; CO - Course Outcome; BL - Blooms Taxonomy Level (1 - Remember, 2 - Understand, 3 - Apply, 4 - Analyse, 5 - Evaluate, 6 - Create)
- Course outcomes
 1. Apply probability concepts and random variable distributions to model uncertainties in real-world data.
 2. Select and apply suitable probability distributions for practical and experimental scenarios.

Q.No	Question	M	CO	BL														
1.	A factory has two machines I and II and produces 40% and 60% of the items respectively. But 5% and 6% items are defective from machine I and II respectively. An item is drawn at randomly and is defective. Find the probability that drawn item was produced by machine II.	10	1	2														
2.	A random variable X has following probability function: <table><tr><td>x</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>p(x)</td><td>0.1</td><td>k</td><td>0.2</td><td>2k</td><td>0.3</td><td>k</td></tr></table> <p>i) Find the value of k and ii) mean iii) Construct the cumulative distribution function $F(X < 2)$.</p>	x	-2	-1	0	1	2	3	p(x)	0.1	k	0.2	2k	0.3	k	10	1	2
x	-2	-1	0	1	2	3												
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3.	The life time (in hours) of a certain part of radio tube is a continuous random variable X with p.d.f. is given by $f(x) = \frac{100}{x^2}$ when $x \geq 100$ and $f(x) = 0$ elsewhere, find the following i) $P(X \leq 150)$; ii) $P(X > 150)$; and ii) What is probability that a tube will last less than 200 hours if it is know that the tube is still functioning after 150 hours of service?	10	1	2														
4.	If $X \sim B(500, 0.002)$, use the <u>binomial</u> and Poisson distribution to find: i) $P(X=0)$; ii) $(X=1)$; and iii) $P(X < 3)$.	10	2	3														
5.	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 with parameter 0.08. (a) Find the probability that the interval between the next two signals is: i) $(10 \leq X \leq 20)$; ii) $(X < 2)$; and iii) $(X > 50)$. (b) Evaluate mean and standard deviation of the intervals between successive signals.	10	2	3														
