Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

Make up Examinations – December 2025

Date: 27 -12-2025 **Time:** 01:00pm – 04:00pm

School: SOE	**Program:** B.Tech	
Course Code : MAT1003	**Course Name:** Applied statistics	
Semester: MK	**Max Marks**:100	**Weightage**: 50%

CO - Levels	CO1	CO2	CO3	CO4
Marks	16	16	44	24

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks. **10Q x 2M=20M**

1	The intelligence quotients (IQs) of 10 girls in a class are given as 70, 120, 110, 101, 88, 83, 95, 98, 107, 100. Find the mean and median	**2 Marks**	**L1**	**CO1**
2	Comment on the nature of mode for the following data set: 1,1,1,1,2,2,2,2,3,3,3,3,4,4,4,4,5,5,5,5,6,6,6,6	**2 Marks**	**L1**	**CO1**
3	Two data sets A and B have variances 25 and 45 units respectively. Which set is more consistent?	**2 Marks**	**L1**	**CO1**
4	What is the probability of getting a sum of 9 when two dice are thrown?	**2 Marks**	**L1**	**CO2**
5	Write the formula for the conditional probability of A given B, and B given A.	**2 Marks**	**L1**	**CO2**
6	If a die is rolled, what is the probability that the outcome is less than 5?	**2 Marks**	**L1**	**CO2**
7	A box of candies has many different colors in it. There is a 15% chance of getting a pink candy. What is the probability that exactly 4 candies in a box are pink out of 10 using binomial distribution?	**2 Marks**	**L1**	**CO3**
8	If 5% of the electric bulbs manufactured by a company are defective, use Poisson distribution to find the probability that in a sample of 100 bulbs, none is defective.	**2 Marks**	**L1**	**CO3**
9	Define Type I error in sampling.	**2 Marks**	**L1**	**CO4**
10	Define sample with example.	**2 Marks**	**L1**	**CO4**

Part B

Answer the Questions. **Total Marks 80M**

<table>
<tr><td>11.</td><td>a.</td><td>Calculate Karl Pearson's coefficient of correlation between the marks secured by 10 students in Statistics and Accountancy (out of 25 marks) and comment on the result.
<table><tr><td>Marks in Statistics</td><td>18</td><td>17</td><td>23</td><td>22</td><td>19</td><td>19</td><td>20</td><td>21</td></tr><tr><td>Marks in Mathematics</td><td>16</td><td>12</td><td>20</td><td>15</td><td>11</td><td>14</td><td>19</td><td>16</td></tr></table></td><td>10 Marks</td><td>L3</td><td>CO1</td></tr>
<tr><td colspan="6">Or</td></tr>
<tr><td>12.</td><td>a.</td><td>Estimate the value of y when x = 37
<table><tr><td>x</td><td>45</td><td>43</td><td>46</td><td>44</td><td>42</td><td>40</td><td>41</td></tr><tr><td>y</td><td>41</td><td>39</td><td>40</td><td>36</td><td>38</td><td>35</td><td>37</td></tr></table></td><td>10 Marks</td><td>L3</td><td>CO1</td></tr>
<tr><td>13.</td><td>a.</td><td>Three coins are tossed. What is the probability of getting
(a) all heads
(b) two heads
(c) at least one head
(d) at least two heads?
(e) exactly one head or two heads</td><td>10 Marks</td><td>L3</td><td>CO1</td></tr>
<tr><td colspan="6">Or</td></tr>
<tr><td>14.</td><td>a.</td><td>In a certain factory, three machines M1, M2 and M3 make 30%, 45% and 25% of the products respectively. It is known that 2%, 3% and 2% of the products made by each machine, respectively, are defective. Suppose that a finished product is randomly selected. If the randomly selected product is found to be defective, what is the probability that it is made by machine M3?</td><td>10 Marks</td><td>L3</td><td>CO1</td></tr>
<tr><td>15.</td><td>a.</td><td>Assuming that it is true that 3 in 10 industrial accidents are due to fatigue, find the probability that:
(a) Exactly 3 of 7 industrial accidents will be due to fatigue.
(b) At least 3 of the 7 industrial accidents will be due to fatigue.
(c) At most 3 out of 7 industrial accidents will be due to fatigue
(d) none of the 7 accidents are due to fatigue
(e) all the 7 accidents are due to fatigue</td><td>10 Marks</td><td>L3</td><td>CO2</td></tr>
<tr><td colspan="6">Or</td></tr>
<tr><td>16.</td><td>a.</td><td>It has been observed that 2 out of 10 bulbs manufactured by a company are defective.
a. Construct a suitable mathematical model, which represents the number of defective bulbs manufactured by the company out of a total of bulbs.
b. If a box of 10 bulbs is selected, what is the probability that at most 3 are defective?</td><td>10 Marks</td><td>L3</td><td>CO2</td></tr>
</table>

		c. If a box containing 10 bulbs is selected, what is the probability that more than 7 are defective? d. If 50 bulbs each are picked up, what is the expected mean number of defective bulbs?			

17.	**a.**	It has been observed that 10 drops of water trickle every 5 minutes from a leaking pipe. What is the probability that in 5 minutes (a) exactly 6 drops of water trickle (b) at most 2 drops of water trickle (c) at least 2 drops of water trickle?	**10 Marks**	**L3**	**CO2**
		Or			
18.	**a.**	The probability that a person reacts to the newly manufactured vaccine against a pandemic is 0.002. If 4000 people are treated with the vaccine, find the probability that a) no one will react to the vaccine b) exactly 1 person will react to the vaccine c) at least 3 people will react to the vaccine d) at most 2 people will react to the vaccine	**10 Marks**	**L3**	**CO2**

19.	**a.**	The average monthly sales of 'Reliable Computers' are 2500 units with a standard deviation of 100 units. The sales are found to be normally distributed over months. What are the chances that the sales during a particular month will be (a) at most 2400 units (b) at least 2400 units (c) between 2450 to 2550 units (Given that P(Z≤0.5) = 0.6915, $P(Z$≤1) = 0.8413).	**10 Marks**	**L3**	**CO3**
		Or			
20.	**a.**	Salaries of employees of a certain organization are normally distributed with a mean of 7 LPA and standard deviation of 3 LPA. What is the probability that, for a randomly selected employee of this organization, the salary would be (a) at least 5 LPA (b) at most 5 LPA (c) between 6 and 8 LPA (Given that P(Z ≤0.33) =0.62930, P(Z ≤0.67) =0.74857).	**10 Marks**	**L3**	**CO3**

21.	**a.**	The time (in hours) required to repair a machine is an exponentially distributed random variable with parameters $\lambda=\frac{1}{2}$. What is (a) the probability that a repair time exceeds 2 hrs. (b) the probability that a repair time take atmost 3hrs. (c) the probability that a repair time takes between 2 to 4 hrs.	**10 Marks**	**L3**	**CO3**
		Or			
22.	**a.**	In a certain town the duration of a shower is exponentially distributed with mean 5 minutes. What is the probability that a shower will last for (i) 10 minutes or more (ii) less than 10 minutes (iii) between 10 and 12 minutes.	**10 Marks**	**L3**	**CO3**

23.	**a.**	A population consists of the five numbers 2, 3, 6, 8 and 11. Consider all possible samples of size 2 that can be drawn with replacement from this population. Find (a) the mean of the population (b) The standard deviation of the population **(c)** The mean of the sampling distribution of means.	**10 Marks**	**L3**	**CO**
		Or			
24.	**a.**	A population consist of the four numbers 3, 7, 11, 15. Consider all possible samples of size 2 that can be drawn with replacement from this population. Find **(a)** the mean of the sampling distributions of means and (b) the standard deviation of the sampling distribution of means.	**10 Marks**	**L3**	**CO**

25.	**a.**	The length of life X of certain computers is approximately normally distributed with mean $\boldsymbol{\mu}$ and standard deviation $\boldsymbol{\sigma = 40}$ **hours**. If a random sample of 30 computers has an average life of 788 hours, test the null hypothesis that $\boldsymbol{\mu = 800}$ hours against the alternative hypothesis at (a) 1% (b) 5% and (c) 10% level of significance(Use two-tailed test)	**10 Marks**	**L3**	**CO**
		Or			
26.	**a.**	An ambulance service company claims that on an average it takes 20 mins between a call for an ambulance and the patient's arrival at the hospital. If in 6 calls the time taken (between a call and arrival at hospital) are 27, 18, 26, 15, 20, 32. Can the company's claim be accepted at 0.10 LOS? (t_{table}= $t_{0.10,5}$ = 1.476)	**10 Marks**	**L3**	**CO**

Standard table values for Test:

Level of significance	Two tailed test	Right tailed test	Left tailed test
90% confident or level of significance = 10% =0.1	1.645	1.28	-1.28
95% confident or level of significance = 5% =0.05	1.96	1.645	-1.645
99% confident or level of significance = 1% =0.01	2.58	2.33	-2.33

******* BEST WISHES *******