PVP 23

Code: 23BS1402

II B.Tech - II Semester – Supplementary Examinations
DECEMBER 2025

PROBABILITY AND STATISTICS

(Common for ME, CSE, IT, AIML, DS)

Duration: 3 hours Max. Marks: 70

Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.
4. All parts of Question paper must be answered in one place.

PART – A

1.a)	The mean of five numbers 10, 12, 15, 18, and x is 14. Find the value of x.
1.b)	Write Baye's theorem.
1.c)	If a random variable has a Poisson distribution such that P(1)=P(2), find mean of the distribution.
1.d)	Write any two the applications of Normal distribution.
1.e)	Write the regression lines.
1.f)	Write the formula for finding the Karl Pearson's correlation coefficient.
1.g)	Define Null and Alternative hypothesis.
1.h)	Write the formula of test for difference of proportions.
1.i)	Define F-test for two samples.
1.j)	Write applications of Chi-square test.

PART – B

<table>
<tr><td></td><td></td><td></td><td>Max. Marks</td></tr>
<tr><td colspan="4">UNIT-I</td></tr>
<tr><td>2</td><td></td><td>The following table gives the daily income of 50 workers of a factory. Find mean and mode.
<table>
<tr><td>Class Interval</td><td>100-120</td><td>120-140</td><td>140-160</td><td>160-180</td><td>180-200</td></tr>
<tr><td>Frequency</td><td>12</td><td>14</td><td>8</td><td>6</td><td>10</td></tr>
</table></td><td>10 M</td></tr>
<tr><td colspan="4">OR</td></tr>
<tr><td>3</td><td>a)</td><td>A business man goes to hotels X, Y, Z, 20%,50%,30% of the time respectively. It is known that 5%,4%,8% of the rooms in X,Y,Z hotels have faulty plumbing. What is the probability that business man’s room having faulty plumbing is assigned to hotel X and hotel Z.</td><td>5 M</td></tr>
<tr><td></td><td>b)</td><td>A bag A contains 2 white and 3 red balls and a bag B contains 4 white and 5 red balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that the red drawn is from bag B.</td><td>5 M</td></tr>
<tr><td colspan="4">UNIT-II</td></tr>
<tr><td>4</td><td></td><td>A discrete random variable X has the following Probability distribution
<table>
<tr><td>X</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr>
<tr><td>P(x)</td><td>2K</td><td>4K</td><td>6K</td><td>8K</td><td>10K</td><td>12K</td><td>14K</td><td>4K</td></tr>
</table>
Find (i) K value (ii) Mean (iii) variance (iv) P ($X \geq 5$)</td><td>10 M</td></tr>
<tr><td colspan="4">OR</td></tr>
<tr><td>5</td><td>a)</td><td>In Normal distribution 31% of the items are under 45 and 8% are over 64. Find the mean and variance of the distribution.</td><td>5 M</td></tr>
</table>

	b)	The mean and variance of binomial distribution are 4 and 4/3 respectively. Find P(X≥1)	5 M
UNIT-III			
6		A sample of 12 fathers and their elder sons gave the following data about their heights. Find the coefficient of rank correlation.	10 M

Fathers Height	65	63	67	64	68	62	70	66	68	67	69	71
Sons Height	68	66	68	65	69	66	68	65	71	67	68	70

OR			
7	a)	The equations of two regression lines are 7x-16y+9=0, 5y-4x-3=0, find the coefficient of correlation and the means of x and y.	5 M
	b)	Fit a straight line to the following data.	5 M

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

UNIT-IV			
8	a)	The means of two large samples of sizes 1000 and 2000 members are 67.5 inches and 68.0 inches respectively. Can the samples be regarded as drawn from the same population of S.D 2.5 inches.	5 M
	b)	What is the effect on standard error if a sample is taken from an infinite population of sample size is increased from 400 to 900.	5 M
OR			
9	a)	In two large populations, there are 30%, and 25% respectively of fair haired people. Is this difference	5 M

		likely to be hidden in samples of 1200 and 900 respectively from the two populations.	
	b)	Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that proportions of men and women in favour of the proposal are same at 5% level.	5 M
		UNIT-V	
10		Two horses A and B were tested according to the time (in seconds) to run a particular track with the following results. Horse-A: 28, 30, 32, 33, 33, 29, 34 Horse-B: 29, 30, 30, 24, 27, 29, - Test ether the two horses have the same running capacity. (use 5% los)	10 M
		OR	
11		From the table given below, whether the colour of son's eyes is associated with that of father's eyes. Test at 5% level of significance	10 M

		Eyes colour in sons	
		Not light	Light
Eyes colour in fathers	Not light	230	148
	Light	151	471