DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Summer Examination – 2023

Course: SY B.Tech. **Branch : Computer Science and Allied Engineering** **Semester :IV**

Subject Code & Name: Probability and Statistics **BTBSC404**

Max Marks: 60 **Date:26/07/2023** **Duration: 3 Hrs.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**	**CO1**	**12**
A)	State and Prove *"Addition theorem of Probability"*.		6
B)	If A & B are two possible outcomes of a random experiment such that $P(\bar{A}) = 0.6$, $P(A \cup B) = 0.7$ and $P(B) = k$, then find value of " k" if (i) A & B are mutually exclusive (ii) A & B are independent		6
C)	The factory F_1 produces 1000 articles,20 of them being defective; the factory F_2 produces 4000 articles,40 of them being defective and the F_3 produces 5000 articles,50 of them being defective. If one article is chosen from all these articles put in one stockpile and is found to be defective, find the probability that it is from the factory F_1.		6
Q.2	**Solve Any Two of the following.**	**CO2**	**12**
A)	A random variable X has the following distribution: X: 1 2 3 4 5 6 P(X): 2k 4k 6k 8k 10k 12k Determine (i) k (ii) $P(X < 4)$ (iii) $P(2 \leq X < 5)$		6
B)	Fit the Binomial Distribution to the following data X: 0 1 2 3 4 F: 28 62 46 10 4		6
C)	In a sample of 1000 students, the mean and standard deviation of marks Obtained by the students in a certain test are 14 and 2.5. Assuming the distribution to be normal find the number of students getting marks (i)between 12 and 15,(ii) above 18,(iii) below 8 [Given:For a S.N.V. z area between $z = 0$ to $z = 0.4$ is 0.1554, between $z = 0$ to $z = 0.8$ is 0.2881,that between $z = 0$ to $z = 1.6$ is 0.4452, between $z = 0$ to $z = 2.4$ is 0.4918]		6
Q. 3	**Solve Any Two of the following.**	**CO3**	**12**

A)	Define "Karl Pearson's Correlation Coefficient". Also show that $-1 < r < +1$.		6
B)	For the following data, X: 6 8 12 15 18 20 24 28 31 Y: 10 12 15 15 18 25 22 26 28 Calculate (i) Karl Pearson's coefficient of correlation (ii)Standard Error (S.E) (iii)Probable Error(P.E)		6
C)	Obtain Rank Correlation Coefficient (ρ), for the following data, X 68 64 75 50 64 80 75 40 55 64 Y 62 58 68 45 81 60 68 48 50 70		6
Q.4	**Solve Any Two of the following.**	CO4	12
A)	Obtain the equation of the regression lines form the following data, X 91 97 108 121 67 124 51 73 111 57 Y 71 75 69 97 70 91 39 61 80 47		6
B)	At the time of estimation of the regression equations of the two variables x and y ,the following results were obtained : $\overline{x} = 90$; $\overline{y} = 70; n = 10; \sum x^2 = 6360; \sum y^2 = 2860, \sum xy = 3900$, where x and y are the deviations from the respective means. Obtain the equations.		6
C)	Determine which one of the following is the regression line of y on x; $4x - 5y + 30 = 0; 20x - 9y - 107 = 0$. Also, find r_{xy} and σ_y when $\sigma_x = 3$		6
Q. 5	**Solve Any Two of the following.**	CO5	12
A)	A coin was tossed 200 times and the head turned up 108 times. Test the hypothesis that the coin is unbiased at 5% level of significance.		6
B)	A sample of 100 electric bulbs produced by manufacturer A showed a mean life time of 1190 hours and a standard deviation of 90 hours. A sample of 75 bulbs produced by manufacturer B showed a mean life time of 1230 hours with the standard deviation of 120 hours. Is there a difference between the mean life time of two hands is significance i) at 5% level of significance ii) at 1% level of significance		6
C)	In a city A, 20% of a random sample of 900 school boys had a certain slight physical defect. In another city B, 18.5 of a random sample of 1600 school boys had the same defect. is the difference between the proportion significance?		6
	***** End *****		

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