

**ANURAG Engineering College**

(An Autonomous Institution)

II B.Tech I Semester Supplementary Examinations, December – 2024

**PROBABILITY AND STATISTICS**

(COMMON TO CIVIL &amp; CSE)

**Time: 3 Hours****Max. Marks: 75****Section – A (Short Answer type questions)****(25 Marks)**

Answer All Questions

	Course Outcome	B.T Level	Marks
1. Define Conditional event with one example.	CO1	L1	2M
2. A fair coin is tossed until a head or five tails occurs. Find the expected Number of the tosses of the coin.	CO1	L1	3M
3. Illustrate the examples of Continuous Probability distribution function.	CO2	L2	2M
4. For a normal distribution variate with mean 1 and standard deviation 3, find the probabilities that $3.43 \leq x \leq 6.19$ .	CO2	L2	3M
5. Write a brief explanation about Kurtosis.	CO3	L1	2M
6. If $\theta$ is the angle between two regression lines and Standard deviation of Y is twice the Standard deviation of X and $r=0.25$ , find $\tan \theta$ .	CO3	L2	3M
7. Define Null Hypothesis and Level of Significance.	CO4	L1	2M
8. The mean and standard deviation of a population are 11795 and 14054 respectively. If $n = 50$ , find 95% confidence interval for the mean.	CO4	L2	3M
9. Write a short note on Analysis of Variance.	CO5	L1	2M
10. Explain briefly about Chi-Square test for Independence of Attributes.	CO5	L1	3M

**Section B (Essay Questions)****Answer all questions, each question carries equal marks.****(5 X 10M = 50M)**

11. A) State Baye's theorem. In a factory, Machine-A produces 40% of the output and Machine-B produces 60% on the average, 9 items in 1000 produced by A are defective and 1 item in 250 produced by B is defective. An item drawn at random from a day's output is defective. What is the probability that it was produced by A (or) B.
- OR
- B) A continuous random variable has the probability density function
- $$f(x) = \begin{cases} kxe^{-2x}, & \text{for } x \geq 0, k > 0 \\ 0, & \text{otherwise} \end{cases}$$
- Determine i) k ii) Mean iii) Variance of the distribution iv) Distribution function.
12. A) If the masses of 300 students are normally distributed with mean 68kgs and standard derivation 3 kgs, how many students have masses i) Greater that 72 kgs ii) Less than or equal to 64kgs. iii) Between 65 and 71 kgs inclusive
- OR
- B) A hospital switch board receives an average of 4 emergency calls in a 10 minute interval, What is the probability that i) there are at most 2 emergency calls in a 10 minute interval ii) there are exact 3 emergency calls in a 10 minute interval.

13. A) Ten competitors in a musical test were ranked by the three judges A,B and C in the following order, CO3 L3 10M

Ranks by A	1	6	5	10	3	2	4	9
Ranks by B	3	5	8	4	7	10	2	1
Ranks by C	6	4	9	8	1	2	3	10

Using rank correlation method, discuss which pair of judges has the nearest approach to common likings in music.

OR

- B) By the method of least squares fit a parabola of the form  $y = a + bx + cx^2$  for the following data CO3 L3 10M

x	2	4	6	8	10
y	3.07	12.85	31.47	57.38	91.29

14. A) Identify in a random sample of 1000 people in Karnataka 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat are equally popular in this state at 1% level of significance? CO4 L2 10M

OR

- B) Discuss 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 proportions significant at 0.05 level of significance? CO4 L3 10M

15. A) Scores obtained in a shooting competition by 10 soldiers before and after intensive training are given below: CO5 L2 10M

Before	67	24	57	55	63	54	56	68	33	43
After	70	38	58	58	56	67	68	75	42	38

Test whether the intensive training is useful at 0.05 level of significance.

OR

- B) Explain the procedure for ANOVA one way classification. CO5 L2 10M