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R-15

Code: 5GC42

II B.Tech. II Semester Supplementary Examinations May/June 2022

Probability and Statistics

(Common to CE & ME)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

Marks

UNIT-I

1. a) Given $P(A)=1/4$, $P(B)=1/3$ and $P(A \cup B) = 1/2$, then evaluate (i) $P(A/B)$, (ii) $P(B/A)$, (iii) $P(A \cap B^c)$, (iv) $P(A^c/B^c)$ 8M
- b) A card is drawn from a pack of 52 playing cards. What is the probability of drawing black card. 6M

OR

2. a) A class consists of 6 girls and 10 boys. If a committee of 3 is chosen at random from the class, find the probability that (i) 3 boys are selected, (ii) exactly 2 girls are selected. 8M
- b) Two dice are thrown and their sum is 7. Find the probability that at least one of the dice shows up 2 6M

UNIT-II

3. a) A die is thrown 6 times. If getting an even number is a success, find the probabilities of (i) at least one success (ii) 3 successes (iii) 4 successes 7M
- b) A continuous random variable x has a probability density function
- $$f(x) = \begin{cases} \frac{(x+1)}{2}, & -1 \leq x \leq 1 \\ 0 & \text{else where} \end{cases}$$
- represents the density of a random variable x , then find $P(X \leq 0)$, mean and variance. 7M

OR

4. For the normal distribution with mean 2 and standard deviation 4, evaluate (i) $P(-6 < x < 3)$, (ii) $P(x \geq 5)$ and (iii) $P(-4 < x < 4)$ 14M

UNIT-III

5. a) The variance of population is 2. The size of the sample collected from the population is 169. What is the standard error of mean 7M
- b) A population consists of 5, 10, 14, 18, 13, 24. Consider all possible samples of size 2 which can be drawn without replacement from this population. Find the population mean and standard deviation, and mean and standard deviation of the sampling distribution of means. 7M

OR

6. a) A random sample of 100 teachers in a large metropolitan area revealed a mean weekly salary of Rs.487 with a standard deviation rs 48. With what degree of confidence can assert that the average weekly salary of all teachers in the metropolitan area is between 472 to 502? 7M
- b) What is the size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with at least 95% confidence. 7M

UNIT-IV

7. In a random sample of 60 works, the average time taken by them to get work is 33.8min with a S.D of 6.1 min can we reject the null hypothesis $\mu = 15150$ min in the favour of alternative hypothesis $\mu > 15150$ at 0.05 level of significance. 14M

OR

8. A manufacturer of electronic equipment subjects sample of two completing brands of transistors to an accelerated performance test. If 45 of 180transistors of the first kind and 34 of 120 transistors of the second kind fail the test. What he conclude at the level of significance $\alpha = 0.05$ about the difference between the corresponding sample proportions. 14M

UNIT-V

9. The following data give the number of air-craft accidents that occurred during the various days of a week

Day	Mon	Tue	Wed	Thu	Fri	sat
No.of accidents	15	29	13	12	16	15

Test whether the accidents are uniformly distributed over the week.

14M

OR

10. Two random sample drawn from two normal populations have the variable values as below

Sample1	19	17	16	28	22	23	19	24	26			
Sample2	28	32	40	37	30	35	40	28	41	45	30	36

Obtain the estimate of the variance of the population and f test whether the two population have the same variance.

14M
