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Question Paper Code: AHS010



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech II Semester End Examinations (Supplementary) - May, 2019

Regulation: IARE – R16

PROBABILITY AND STATISTICS

Time: 3 Hours

(Common to CSE | IT)

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

UNIT – I

- (a) Determine the mean and variance of the binomial distribution. [7M]

(b) In a distribution exactly normal, 7% of all items are under 35 and 89% are under 63. What are the mean and standard deviation of the distribution? [7M]
- (a) Prove that the Poisson distribution as a limiting case of Binomial distribution. [7M]

(b) If x follows a Poisson variate such that $2p(x=0) = p(x=2)$, find (i) $p(x \leq 3)$ (ii) $p(2 < x \leq 5)$ and (iii) $p(x \geq 3)$. [7M]

UNIT – II

- (a) What is correlation and explain types of correlation with examples. [7M]

(b) For the bivariate probability distribution function shown in Table 1 of x and y such that, find (i) $p(x \leq 2, y = 2)$, (ii) $p(x \leq 1)$ (iii) $p(y=3)$ (iv) $p(y \leq 3)$ and (v) $p(x \leq 3, y \leq 4)$. [7M]

Table 1

$x \backslash y$	1	2	3	4	5	6
0	0	0	1/32	2/32	2/32	3/32
1	1/16	1/16	1/8	1/8	1/8	1/8
2	1/32	1/32	1/64	1/64	0	2/64

- (a) Find the angle between two regression lines. [7M]

(b) Calculate the regression equation of X on Y from the data given in Table 2 [7M]

Table 2

X	10	12	13	12	16	15
Y	40	38	43	45	37	43

UNIT – III

5. (a) What are the various steps involved in testing a statistical hypothesis? Explain. [7M]
(b) If the population size is 3, 6, 9, 15, 27. [7M]
(i) List all possible samples of size 3 that can be taken without replacement from the finite population.
(ii) Calculate the mean, variance and standard deviation of population.
(iii) Calculate the mean, variance and standard deviation of sampling distribution.
6. (a) Explain population and sample with examples. [7M]
(b) Construct sampling distribution of means for the population 4, 8, 12, 16 by drawing sample of size two with replacement. Determine (i) Population mean (ii) Population variance (iii) The mean of sampling distribution of means (iv) Standard error. [7M]

UNIT – IV

7. (a) Write test statistic for test of hypothesis of single mean and difference of means. [7M]
(b) The machine puts 16 imperfect articles in a sample of 500. After machine is overhauled, it puts out 3 imperfect articles in a batch of 100. Has the machine improved? [7M]
8. (a) Write test statistic for test of hypothesis for single proportion and difference of proportions. [7M]
(b) The average number of articles produced by two machines per day is 200 and 250 with standard deviations 20 and 25 respectively on the basis of records of 25 days production. Can you regard both the machines equally efficient at 1% level of significance? [7M]

UNIT – V

9. (a) i. What is the degree of freedom for t test for difference of means? [7M]
ii. Write the formulae for sample variance and sample standard deviation.
iii. What is the test statistic for chi square test?
- (b) Prices of shares of a company on the different days in a month were found to be 66, 65, 69, 70, 69, 71, 70, 63, , 63, 64 and 68. Discuss whether the mean price of the shares in the month is Rs.65. [7M]
10. (a) Explain the procedure of ANOVA one way classification. [7M]
(b) 2 research scholars adopted different sampling techniques while investigating some group of students falling into different intelligence level are shown in Table 3. [7M]

Table 3

Researchers	Below Average	Average	Above Average	Genius	Total
X	86	60	44	10	200
Y	40	33	25	2	100
Total	126	93	69	12	300

Would you say that the sampling techniques adopted by the two researchers are significantly different?