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Question Paper Code : 15032

M.B.A. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

First Semester

BA 7102 — STATISTICS FOR MANAGEMENT

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State Baye's theorem.
2. Comment on the possibility of the following statement : The mean of a binomial distribution is 3 and variance is 4.
3. If the random samples comes from a normal population, what can be said about the sampling distribution of the mean?
4. State central-limit theorem.
5. Define student's t-test for difference of means of two samples.
6. What is null hypothesis? Explain.
7. Write the contingency 2×2 table for χ^2 - test.
8. Define rank correlation coefficient.
9. Write the components of time series.
10. What is positive correlation and negative correlation?

PART B — (5 × 13 = 65 marks)

11. (a) (i) In a distribution exactly normal, 7% of the items are under 35 and 89% are under 63. What are the mean and standard deviation of the distribution. (6½)
- (ii) The probability that a student passes in statistics examination is $\frac{2}{3}$ and the probability that he will not pass in mathematics examination is $\frac{5}{9}$. The probability that he will pass in atleast one of the examination is $\frac{4}{5}$. Find the probability that he will pass in both the examination. (6½)

Or

- (b) (i) A random variable 'X' has a uniform distribution over $(-3,3)$ compute

(1) $P[X < 2], P[|X| < 2], P[|X - 2| < 2]$

(2) Find k for which $P[X > K] = 1/3$. (6½)

- (ii) Fit a Poisson distribution to the following data which gives the number of doddens in a sample of clover seeds. (6½)

No. of doddens : 0 1 2 3 4 5 6 7 8

Observed frequency : 56 156 132 92 37 22 4 0 1

12. (a) (i) The lifetime of certain brand of an electric bulb may be considered as a RV with mean 1200 h and standard deviation 250h. Find the probability, using central limit theorem, that the average life time of 60 bulbs exceeds 1250 h.
- (ii) Let x_1, x_2, \dots, x_n be a random sample from a uniform population on $[0, \theta]$. Find a sufficient estimator for θ . (6½)

Or

- (b) (i) A research worker wants to determine the average time it takes a mechanic to rotate the trees of a car and she wants to be able to assert with 95% confidence that the mean of her sample is off by at most 0.50 minute. If she can presume from past experience that $\sigma = 1.6$ min. How large a sample will she have to take? (6½)
- (ii) Let Y_1, Y_2, Y_3, Y_4 be uncorrelated observations with common variance σ^2 and expectations as under $E[Y_1] = \theta_1 + \theta_2 + \theta_3 = E[Y_2]$; $E[Y_3] = \theta_1 - \theta_2 = E[Y_4]$ show that $\theta_1 + \theta_2 + \theta_3$ is estimable. Hence obtain the best linear unbiased estimator of this parametric function and its variance. (6½)

13. (a) For a random sample of 10 pigs and 12 pigs fed diet A and diet B respectively.

Diet A 10 6 16 17 13 12 8 14 15 9
(Weight):

Diet B 7 13 22 15 12 14 18 8 21 23 10 17
(Weight):

Test whether diets A and B differs, significantly in the mean increases in weight at 5% level of significance. (13)

Or

- (b) (i) A normal population has a mean 6.48 and s.d. 1.5. In a sample of 400 members mean is 6.75. Is the difference significant? $(6\frac{1}{2})$
- (ii) In one sample of 8 observations the sum of the squares of deviations of the sample values from the sample mean was 84.4 and in the other sample of 10 observations. It was 102.6 Test whether this difference is significant at 5% level, given that the 5% point of F for $n_1 = 7$ and $n_2 = 9$ degrees of freedom is 3.29. $(6\frac{1}{2})$

14. (a) 4 coins were tossed 160 times and the following results were obtained.

No of heads : 0 1 2 3 4

Observed frequency : 17 52 54 31 6

Test the goodness of fit. (13)

Or

- (b) (i) Test whether the following numbers 0.44, 0.81, 0.14, 0.05, 0.93 are uniformly distributed using Kolmogorov – smirnov test. $(6\frac{1}{2})$
- (ii) The following are the no of misprints counted on pages selected at random from a newspaper.

Day 1: 4 10 2 6 4 12

Day 2: 8 5 13 8 8 10

Day 3: 7 9 11 2 14 7

Use H-test to test whether the samples come from same population. (6 $\frac{1}{2}$)

15. (a) Calculate the coefficient of correlation between x and y . (13)

x : 10 12 13 16 17 20 25

y : 19 22 26 27 29 33 37

Or

- (b) From the following data calculate the four – year moving average and determine the trend values. Find the short term fluctuations plot the original values and the trend on a graph. (13)

Year: 1958 1959 1960 1961 1962 1963 1964 1965 1966 1967

Value: 50 36.5 43 44.5 38.9 38.1 32.6 41.7 41.1 33.8

PART C — (1 × 15 = 15 marks)

16. (a) Describe and derive the main properties point and interval estimates for population parameters of large samples.

Or

- (b) Analyse whether (i) the Men differ in productivity (ii) the machine differ in its efficiency, from the following data.

		Machine type			
		A	B	C	D
	1	44	38	47	36
	2	46	40	52	43
Workers	3	34	36	44	32
	4	43	38	46	33
	5	38	42	49	39
