



BBD-1625 Seat No. _____

B. B. A. (Sem. IV) Examination

April/ May - 2014

Business Statistics - II

(FC-405)

[Core Course]

Time : 3 Hours]

[Total Marks : 70

1 Show that variance of Poisson distribution is m . 11

2 (a) Classical, Empirical and Modern definition of Probability. 7

(b) Explain the theory of Run. 5

OR

2 (a) The probabilities of three events A, B and C occurring are $P(A)=0.35$, $P(B)=0.45$ and $P(C)=0.2$. Assuming that A, B or C has occurred, the probabilities of another event X occurring are $P(X/A)=0.8$, $P(X/B)=0.65$ and $P(X/C)=0.3$. Find $P(X/A)$, $P(X/B)$ and $P(X/C)$. 7

(b) Explain chance causes and assignable causes. 5

3 (a) In a city three news papers A, B and C are published. It is found that 20% of people read A, 16% read B and 14% read C, 8% read A and B, 5% read A and C, and 4% read B and C. While 2% of people read all the three. Find percentage of the people who read at least one of the news papers. 7

- (b) A discrete random variable can take all integer values from 1 to k each with probability $1/k$. Show that its mean and variance are $\frac{k+1}{2}$ and $\frac{k^2-1}{12}$ respectively. 3
- (c) Give the definition of Process Control. 2
- OR**
- 3 (a) Three factories A, B, C produce 25%, 35% and 40% of total production of ball bearings respectively. Out of this total production 5%, 4% and 2% is defective respectively, one ball bearing is taken at random from this and it has turned out to be defective. What is the probability that it is produced in factory B ? 7
- (b) Prove that $v(x) = E(x)^2 - \mu^2$. 3
- (c) Give the definition of Lot control. 2
- 4 Explain the Null Hypothesis, Alternative Hypothesis, Type-I and Type-II error. 11
- 5 (a) If simple random samples of size 3 are taken without replacement from a population having its observations 1,5,9,11,14. Prepare a list of all possible random samples and verify the following results : 7
- (i) $E(y) = Y$
- (ii) $V(y) = \frac{N-n}{N} \cdot \frac{S^2}{n}$
- (iii) $E(s^2) = S^2$

- (b) The mean life of 200 bulbs produced by a company is 1860 hours with a standard deviation of 500 hours. Is it likely that the sample has come from a population with a mean life of 1500 hours ? 5

OR

- 5 (a) A population is divided into three strata and the information regarding them is as follows : 7

$$N_1 = 50, N_2 = 90, N_3 = 60, S_1 = 5,$$

$$S_2 = \sqrt{30}, S_3 = \sqrt{20}$$

Simple random samples obtained from these strata are as follows :

Forst stratum : 2,6,8,3,1

Second stratum : 5,6,10,8,9,13,11,18

Third stratum : 4,2,9,11,3,7

Find (i) y_{st} and (ii) $V(y_{st})$.

- (b) A buyer of electric bulbs bought 100 bulbs each of two famous brands. Upon testing these, he found that brand A had a mean life of 1500 hours with a standard deviation of 50 hours where as brand B had a mean life of 1530 hours with a standard deviation of 60 hours. Can it be concluded at 5% level of significance that two brands differ significantly in quality ? 5

- 6 (a) 8,3,11,9,4 are the population observations. Draw all possible random samples of size 2 without replacement and verify the following results : 7

(i) $E(y) = Y$

$$(ii) \quad V(y) = \frac{N-n}{N} \cdot \frac{S^2}{n}$$

$$(iii) \quad E(s^2) = S^2$$

- (b) 200 mangoes are taken at random from a large consignment and 20 of them are found to be bad. Test the hypothesis that the proportion of bad mangoes in the consignment is 15%. Use 1% level of significance. 5

OR

- 6 (a) The observations of a population about some characteristics are 2,5,8,9. How many different simple random samples of size 2 can be taken with replacement from this population ? Preparing a list of all the samples verify the following results :

$$(i) \quad E(y) = Y$$

$$(ii) \quad V(y) = \frac{\sigma^2}{n}$$

$$(iii) \quad E(s^2) = \sigma^2$$

- (b) In a random sample of 100 persons taken from a village A, 60 are found to be consuming Tobacco. In another sample taken from village B, 100 persons are found to be consuming Tobacco. Do the data reveal significant difference between the two villages so far as the habit of taking tobacco is concerned ? 5