

## Quantitative Methods for Business

END TERM EXAM – November, 2019

Date : 21/11/2019

Time: 3 hours

Maximum Marks: 50

Candidate should read carefully the instructions printed on the question paper and on cover of the answer book, which is provided for their use.

- a) **Question no 1 is compulsory.**
- b) From Question no 2 to 8 attempt any four questions
- c) **Overall attempt 5 questions (including question no 1)**
- d) All questions carry equal marks
- e) **All part questions should be attempted together.**
- f) Students can use simple calculators. Mobile phone calculators will not be allowed.
- g) Statistical tables will **not** be provided during exam. Where ever required table-values have been given at the end of question paper or students can assume the value.

1. (**Compulsory**) Check whether following statements are true or false. If it is true write 'A' against question no, else write 'B' against questions no. Do not rewrite statement on the answer sheet. **You will lose marks if statement is rewritten. Any scribbling or rewriting is not allowed, you will lose marks.**

- i. Sum of the deviation from mean  $\sum (X - \bar{X})$  cannot be zero
- ii. Mean of consecutive numbers from 1 to 5 is 2.5.
- iii. Data is normally distributed if its mean, median and mode are same.
- iv. Primary data can be downloaded from any Govt website.
- v. In normal distribution the percentage of values included between  $-1\sigma$  and  $+1\sigma$  is approximately 68%
- vi. If each value of a data set is increased by 5, standard deviation will increase by 5
- vii. Binomial distribution is a discrete probability distribution.
- viii. An alternate hypothesis  $H_1: \mu > 500$ , is an example of right tailed test
- ix. Type II error is the error of rejecting a true Null hypothesis.
- x. Negative correlation in two series means that as the value of one of the variables decreases the other would also decrease.

2.

- a. For the following data find mean and standard deviation (5)

5, 8, 10, 3, 4, 8, 2, 12, 7, 1

- b. There are three departments in an organisation. Department A has 20 employees with mean salary of 50000, department B has 30 employees with a mean salary of 30000, department C has mean salary of 20000 but number is not known. If the mean salary

of all employees is 29000 find the total number of employees working in the organisation. (5)

3.

a. Find median of following data (5)

Class	1-10	11-20	21-30	31-40	40-50
Frequency	8	15	40	28	9

b. The two salesmen on the same area show following results over a long period of time (5)

	Salesman A	Salesman B
Sales in Lakhs	32	28
Standard deviation	5	4.8

Which salesman appears to be more consistent in getting sales achievements?

4.

a. If two regression equations are  $3X+2Y -26 = 0$  and  $6X + Y -31 =0$ , find coefficient of correlation (r) between X and Y. (5)

b. Using following data find the likely sales when advertising expenditure is Rs 25 crores (5)

	Advertising expenditure (crores)	Sales (Crores)
mean	20	120
Standard Deviation	5	25
Coefficient of correlation (r)	0.8	

5.

a. In a small factory, machines A, B and C manufacture 35%, 25% and 40% respectively of the total output. Of their output, respectively 0.5%, 4% and 2% are defective. The production is mixed. One of them is drawn and found to be defective. What is the probability that it has been produced by machine B? (5)

b. A husband and wife appear in an interview for two vacancies for the same post. The probability of husband's selection is  $\frac{1}{7}$  and that of wife's selection is  $\frac{1}{5}$ . What is the probability that only one of them will be selected? (5)

6.

a. A departmental store keeps the record of his customers and their chance of buying any product when they enter the store. From the past records it has been observed that the probability that the customer who just enters will buy something is 0.4.

During a pre-lunch session, 7 customers enter, what is the probability that no customer will buy any product. (5)

- b. On an average 5 accidents take place on a road in a day. What is the probability that 2 accidents will take place in a given moment, given  $e^{-5} = 0.00674$  (5)

7.

- a. The average daily sale of 500 branches of a large chain of white goods is Rs 150 thousands, with Standard deviation of 15 thousands. Assuming the distribution is normal, estimate how many branches have daily sales between 120 thousand and 165 thousand. (5)

- b. A manufacturer of mobile phone batteries claims that mean charge life of his product is more than 30 hours. A company is willing to buy large quantity of batteries if the claim is true. A random sample of 36 batteries is tested and it found that sample mean is 32 with a standard deviation of 4.5 hours. Company is ready to buy if life is more than 30 hours. Will they buy? Test at 1% significance level. (5)

8.

- a. Find the values of X and Y from the following equations by using crammer's rule (5)

$$3X + 2Y = 6$$

$$2X - 3Y = 17$$

- b. Following table shows the performance of three salesman. Test at 5% significance level whether their performance is same? (5)

Area	Salesmen->	A	B	C
1		5	4	7
2		6	6	3
3		8	0	5
4		3	4	7
5		3	6	8

Statistical table values:  $t_{0.5, 3 DF} = 3.182$ ,  $t_{0.5, 5 df} = 2.57$ ,  $F_{0.5, 3, 8} = 4.0662$ ,  $F_{0.5, 2DF, 12DF} = 3.88$ ,  $Z = 1.96$  for Prob 0.475,  $Z = 1.65$  for Prob = 0.45,  $Z = 2.33$  for prob = 0.49,  $Z = 2.58$  for Prob = 0.495,  $\chi^2_{0.5, 1df} = \chi^2_{0.5, 1df} = 3.84146$ ,  $\chi^2_{0.5, 2df} = 5.991$ ,  $\chi^2_{0.5, 3df} = 7.8147$ ,  $\chi^2_{0.5, 4df} = 9.4877$ , If  $Z = 1$ , Prob = 0.3413, If  $Z = 2$ , Prob = 0.4772