

GUJARAT TECHNOLOGICAL UNIVERSITY
MBA - SEMESTER-I • EXAMINATION – SUMMER • 2015

Subject Code: 2810007

Date: 02-06-2015

Subject Name: Quantitative Analysis – I (QA-I)

Time: 14:30 pm – 17:30 pm

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 Choose the correct options for the following questions. **6**

(a)

1. In which of the following situation, Binomial distribution is not applicable?

- | | |
|------------------------------|-----------------------------|
| A. Gender of a new born baby | B. Result in an examination |
| C. Rating of a new movie | D. Result of a Tennis match |

When a distribution is symmetrical and has one mode, the highest point on the curve is called:

- | | |
|------------|-----------------|
| 2. A. Mean | B. Median |
| C. Mode | D. All of these |

In what case would the Poisson distribution be a good approximation of the Binomial?

- | | |
|----------------------|-------------------|
| 3. A. $N=40, p=0.32$ | B. $N=40, q=0.79$ |
| C. $N=200, q=0.98$ | D. $N=10, p=0.03$ |

The finite correction factor does not have to be used when the sampling fraction is

- | | |
|----------------|------------------|
| 4. A. > 0.05 | B. > 0.50 |
| C. < 0.5 | D. None of these |

Assume that you take a sample and calculate sample mean as 100. You then calculate the upper limit of a 90% confidence interval for μ ; its value is 112. What is the lower limit of this

5. confidence interval?

- | | |
|--------|--------|
| A. 88 | B. 92 |
| C. 100 | D. 175 |

If sample-1 has 13 elements with $S_1=17$ and sample-2 has 9 elements with $S_2=22$, then $S_{p2} =$

- | | |
|----------|---------|
| 6. A. 19 | B. 361 |
| C. 367 | D. 19.5 |

Q.1 (b) Explain the given terms in brief: **04**

1. Ogive
2. Kurtosis
3. Exponential distribution
4. Central Limit Theorem

Q.1 (c) What is hypothesis? Describe types of hypothesis. **04**

Q.2 (a) What do you understand by a continuous frequency distribution? Explain various terms that are frequently used in a frequency distribution. Also highlight the difference in inclusive and exclusive methods of classes. **07**

- (b)** Assume that the daily demand for unleaded gasoline at a service station is normally distributed with a mean of 25000 gallons and a standard deviation of 5000 gallons. **07**
- a. What are the chances that daily demand will exceed 30000 gallons?
 - b. What are the chances that the daily demand will be less than 15000 gallons?
 - c. Between what two amounts would you expect 95% of the daily demands to lie?

OR

- (b) In a bolt factory, machines A, B, C manufacture 25%, 35%, 40% bolts respectively. Out of these bolts, 5%, 4%, 12% defective ones came from machines A, B, C respectively. Find the probability that a bolt found to be defective came from machine B. **07**

- Q.3** (a) Explain the term Random variable associated with an Experiment. Thereafter distinguish between discrete and continuous probability distributions also mentioning types of discrete and continuous distributions. **07**
- (b) Find the equation of the regression line for the following data and compute the residuals. **07**

X	15	8	19	12	5
Y	47	36	56	44	21

OR

- Q.3** (a) Differentiate Type I and Type II error and Explain with examples. **07**
- (b) Nine computer-components dealers in major metropolitan areas were asked for their prices on two similar colour inkjet printers. The results of this survey are given below. At $\alpha=0.05$, is it reasonable to assert that, on average, the ABC printer is less expensive than XYZ printer? **07**

Dealer	1	2	3	4	5	6	7	8	9
ABC	250	319	285	260	305	295	289	309	275
XYZ	270	325	269	275	289	285	295	325	300

- Q.4** (a) What do you understand by probability sampling? Describe Stratified and Cluster sampling designs? What is the difference between a cluster And a strata? **07**
- (b) The following table gives the number of accounting clerks committing errors and not committing errors between trained and untrained clerks working in an organisation : **07**

Clerks	Committing errors	Not Committing errors	Total
Trained	70	530	600
Untrained	155	745	900
Total	225	1275	1500

Test the effectiveness of training in preventing errors. Use 0.05 level of significance (Given chi-square at 1 d.f and $\alpha=0.05 = 3.841$)

OR

- Q.4** (a) Write short note on chi square test of goodness of fit. **07**
- (b) The following data show the number of claims processed per day for a group of four insurance company employees observed for a number of days. Test the hypothesis that the employees' mean claims per day are all the same. Use the 0.05 level of significance. **07**

Employee 1	15	17	14	12		
Employee 2	12	10	13	17		
Employee 3	11	14	13	15	12	
Employee 4	13	12	12	14	10	9

- Q.5** **Case Study** **14**

Gayatri Machine works is in production of machine tools. It claimed that average life time is 52 days with a variation of 14 days. Life time (in days) of an engineering component was measured on a sample of 200 units during Oct 2013 to Dec – 2013. Based on the test results, company obtained frequency distribution of life time of components as shown in table – 1. Due to huge demand in the market, company received a good response and the sales of the component increased in first half of the year 2014. Suddenly, during second half of the year 2014, there were complaints about the average quality of the component. Engineering companies complained that the average quality has gone down and efficiency of the component has also changed. To verify these claims it was necessary to determine current status of production of the components. For this, a sample of 200 components was tested for average life time and

standard deviation (in days) during July – 2014 to Sept – 2014. Based on this experiment of testing outgoing quality, following frequency distribution of life time of components was obtained.

Table – 1

Life Time(Days)	20 – 30	30– 40	40–50	50– 60	60– 70	70– 80	80– 90
No. of Components (Dec – 2013)	15	30	44	60	30	14	07
No. of Components (Sept – 2014)	25	40	60	35	20	15	05

You are required to test the following claims at 1% level of significance:

(I) Average life time of the components has gone down significantly from **Dec – 2013** to **Sept – 2014**;

(II) Variance of life time of the components has changed significantly from **Dec – 2013** to **Sept – 2014**.

Prepare a summary report on average and variance of life time of components. Also write your suggestion based on this testing experiment.

OR

Q.5

Case Study

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The following is the Forbes magazine's list of India's twenty Billionaires for 2006 titled. Comment on the advisability of using appropriate measures of location and dispersion including five number summaries for the both the parameters relating to net worth and age. Any comment about the relationship of age with net worth?

Rank	Name	Net worth (\$billion)	Age
1	Lakshmi Mittal	20.00	55
2	Azim Premji	11.00	60
3	Mukesh Ambani	7.00	48
4	Anil Ambani	5.50	46
5	Kushal Pal Singh	5.00	74
6	Sunil Mittal	4.90	48
7	Kumar Birla	4.40	38
8	Tulsi Tanti	3.70	47
9	Pallonji mistry	3.30	76
10	Anurag Dikshit	3.10	-
11	Shiv Nadar	3.00	60
12	Shashi Ruia	2.70	62
13	Adi Godrej	2.30	63
14	Anil Agarwal	2.10	52
15	Dilip Shanghvi	2.00	50
16	Naresh Goyal	1.90	56
17	Indu Jain	1.70	-
18	Venugopal Dhoot	1.60	52
19	Malvinder Singh	1.55	-
20	Rahul Bajaj	1.50	67
