



**Institute of Management
JK Lakshmipat University
Jaipur**



END TERM EXAMINATION 2015

BBA(FT) Sem-III
MM: 50 Marks

Course: Business Statistics
Time: 3 Hours
Subject code: BBA 303

Instructions: Attempt any three questions from Section A. Section B is compulsory

Section A

Q1. A. Condé Nast Traveler publishes a Gold List of the top hotels all over the world. The Broadmoor Hotel in Colorado Springs contains 700 rooms and is on the 2014 Gold List. Suppose Broadmoor's marketing group forecasts a mean demand of 670 rooms for the coming weekend. Assume that demand for the upcoming weekend is normally distributed with a standard deviation of 30.

- a. What is the probability that all the hotel's rooms will be rented?
- b. What is the probability that 50 or more rooms will not be rented?

(5 Marks)

B. The driving distance for the top 100 golfers on the PGA tour is between 284.7 and 310.6 yards. Assume that the driving distance for these golfers is uniformly distributed over this interval.

- a. What is the probability the driving distance for one of these golfers is at least 300 yards?
- b. How many of these golfers drive the ball at least 290 yards?

(5 Marks)

Q2. A. To estimate the mean age for a population of 4000 employees, a simple random sample of 40 employees is selected.

- a. Would you use the finite population correction factor in calculating the standard error of the mean? Explain.
- b. If the population standard deviation is $\sigma = 8.2$ years, compute the standard error both with and without the finite population correction factor.
- c. What is the probability that the sample mean age of the employees will be within 2 years of the population mean age?

(6 Marks)

- B. The College Board reported the following mean scores for the three parts of the Scholastic Aptitude Test (SAT)
- Critical Reading 502
 - Mathematics 515
 - Writing 494

Assume that the population standard deviation on each part of the test is $\sigma = 100$.

- a. What is the probability a random sample of 90 test takers will provide a sample mean test score within 10 points of the population mean of 515 on the Mathematics part of the test?
- b. What is the probability a random sample of 100 test takers will provide a sample mean test score within 10 of the population mean of 494 on the writing part of the test?

(4 Marks)

- Q3.A. Disney's *Hannah Montana: The Movie* opened on Easter weekend in April 2009. Over the three-day weekend, the movie became the number-one box office attraction (The Wall Street Journal, April 13, 2009). The ticket sales revenue in dollars for a sample of 25 theaters is as follows.

20,200	10,150	13,000	11,320	9700
8350	7300	14,000	9940	11,200
10,750	6240	12,700	7430	13,500
13,900	4200	6750	6700	9330
13,185	9200	21,400	11,380	10,800

- a. What is the 95% confidence interval estimate for the mean ticket sales revenue per theater Interpret this result.
- b. Using the movie ticket price of \$7.16 per ticket, what is the estimate of the mean numbers of customers per theater?
- c. The movie was shown in 3118 theaters. Estimate the total number of customers who saw *Hannah Montana: The Movie* and the total box office ticket sales for the three day weekend

(5 Marks)

- B. The average cost of a gallon of unleaded gasoline in Greater Cincinnati was reported to be \$2.41. During periods of rapidly changing prices, the newspaper samples service stations and prepares reports on gasoline prices frequently. Assume the standard deviation is \$.15 for the price of a gallon of unleaded regular gasoline, and recommend the appropriate sample size for the newspaper to use if they wish to report a margin of error at 95% confidence

- a. Suppose the desired margin of error is \$.07.
- b. Suppose the desired margin of error is \$.05.
- c. Suppose the desired margin of error is \$.03.

(5 Marks)

- Q4A.** A market research firm used a sample of individuals to rate the purchase potential of a particular product before and after the individuals saw a new television commercial about the product. The purchase potential ratings were based on a 0 to 10 scale, with higher values indicating a higher purchase potential. The null hypothesis stated that the mean rating "after" would be less than or equal to the mean rating "before." Rejection of this hypothesis would show that the commercial improved the mean purchase potential rating. Use $\alpha = .05$ and the following data to test the hypothesis and comment on the value of the commercial. (5 Marks)

Individual	Purchase rating (After)	Purchase rating (Before)
1	6	5
2	6	4
3	7	7
4	4	3
5	3	5
6	9	8
7	7	5
8	6	6

- B.** The following data are from matched samples taken from two populations.

Element	Population	
	1	2
1	11	8
2	7	8
3	9	6
4	12	7
5	13	10
6	15	15
7	15	14

- What is the point estimate of the difference between the two population means?
- Provide a 95% confidence interval for the difference between the two population means.

(5 Marks)

- Q5A.** A firm is faced with the problem of a decline in its sales turn over. To overcome this problem, it has decided to opt for any of the four strategies: heavy advertisement (S1); Increase in number of sales executives (S2); Adding new features to products (S3); and increasing the price of product S4. Out of these four acts, there may be 4 possible states of



nature or events which are 40% increase in sales (E1); a 30% increase in sales (E2); a 25% increase in sales (E3); and a 22% increase in sales (E4). The firm executives have worked out the yearly net profit (in thousand Rs.) that would result if any of the four strategies are selected. This is represented in table below:

State of nature	Acts			
	S1	S2	S3	S4
E1	100	250	850	500
E2	200	500	300	700
E3	400	600	600	200
E4	600	800	350	500

On the basis of the 5 criteria for decision making under uncertainty, suggest which act should be adopted by the decision maker. (5 Marks)

B. Use the data given in the table for determining whether the observed frequency represents a uniform distribution. Take $\alpha = .05$ (5 Marks)

Category	f_o
1	19
2	15
3	12
4	17
5	20
6	21
7	22
8	15
9	14
10	13



Section B
All compulsory

Q6 A. Use following data to perform one way ANOVA

Factor 1	Factor 2	Factor 3	Factor 4
13	17	22	18
12	15	26	17
13	18	27	16
14	16	28	15
15	17	29	16
13	18	30	17

Use $\alpha = .05$ to test the hypothesis for difference in means

(5 Marks)

- B.** A researcher wants to know the difference in saving pattern of people from 2 cities: one metro and other non-metro. The researcher randomly selected government employees after the implementation of 6 pay commission. He collected data related to the amount saved by different government employees monthly in both cities. The researcher took a random sample of size 35 from both cities. Data collected by the researcher are given below

Samples from metro city in thousand Rs.

10	11	12	12	11	12	10
8	12	12	11	9	10	9
9	11	11	10	10	11	8
10	10	10	3	11	9	7
12	12	7	5	12	8	10

Samples from non metro city in thousand Rs.

15	14	17	16	15	14	15
14	13	13	17	15	14	14
11	15	14	17	13	15	16
17	18	13	14	17	17	14
15	16	18	16	15	17	15

Using $\alpha = .05$, Determine if there is a significant difference in the saving pattern of randomly selected government employees in metro and non-metro cities after implementation of the 6 pay commission.

(8 Marks)

- C. A plant has installed 2 machines producing polythene bags. During the installation, the manufacturer of the machine has stated that capacity of the machine is to produce 20 bags in a day. Owing to various factors such as different operators working on these machines etc. there is a variation in the number of bags produced at the end of the day. The researcher has taken a random sample of bags produced in 10 days for machine 1 and 13 days for machine 2, respectively. The following data gives the number of units of an item produced on a sample day by 2 machines

Machine 1	18	19	19	18	17	19	18	19	18	19			
Machine 2	16	17	17	17	16	18	16	16	17	17	16	16	17

How can the researcher determine whether the variance is from the same population (population variances are equal) or it comes from different populations (population variances are unequal)?

Take alpha as .05 level of significance

(7 Marks)