

Reg. No. :

Question Paper Code : 40201

M.B.A. DEGREE EXAMINATION, APRIL/MAY 2015.

First Semester

BA 9201/BA 911/UBA 9101/10488 MB 102 — STATISTICS FOR MANAGEMENT

(Regulation 2009/2010)

Time : Three hours

Maximum : 100 marks

Statistical Table Book need to be provided.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the common types of variables used in statistics?
2. Name a few descriptive measures of data.
3. State central limit theorem.
4. What are the properties of an estimator?
5. What is a hypothesis?
6. What is meant by design of experiments?
7. Write the meaning of non-parametric test.
8. How do you find the degrees of freedom in case of chi-square test?
9. Define seasonal variations and cyclic variations.
10. Explain briefly about the Laspeyre's method of constructing index numbers.

PART B — (5 × 16 = 80 marks)

11. (a) The following data shows the yearly income distribution of a sample of 200 employees at MNM, Inc.

Yearly Income (In \$1,000s)	Number of Employees
20–24	2
25–29	48
30–34	60
35–39	80
40–44	10

- (i) What percentage of employees has yearly income of \$35,000 or more?
- (ii) Is the figure (percentage) that you computed in (i) an example of statistical inference? If no, what kind of statistics does it represent?
- (iii) Based on this sample, the president of the company said that "45% of all our employees' yearly income are \$35,000 or more". The president's statement represents what kind of statistics?
- (iv) With the statement made in (iii) can we assure that more than 45% of all employees' yearly income are at least \$35,000? Explain.
- (v) What percentage of employees of the sample has yearly income of \$29,000 or less?
- (vi) How many variables are presented in the above data set?
- (vii) The above data set represents the results of how many observations?

Or

- (b) An experiment consists of throwing two six-sided dice and observing the number of spots on the upper faces. Determine the probability that
 - (i) the sum of the spots is 3
 - (ii) each die shows four or more spots
 - (iii) the sum of the spots is not 3
 - (iv) neither a one nor a six appear on each die
 - (v) a pair of sixes appear
 - (vi) the sum of the spots is 7.
12. (a) (i) Find the probability that in 120 tosses of a fair coin (1) between 40% and 60% will be heads, (2) $\frac{5}{8}$ or more will be heads. (8)
- (ii) A population consists of the five numbers, 2, 3, 6, 8, 11. Consider all possible samples of size two which can be drawn with replacement from this population. Find the mean of the sampling distribution of means, the standard deviation of the sampling distribution of means. (8)

Or

- (b) (i) Suppose that the heights of 100 male students at XYZ university represent a random sample of the heights of all male students at the university. Find (1) 95% (2) 99% confidence intervals for estimating the mean height of the XYZ university students. (8)
- (ii) A sample of five measurements of the diameter of a sphere were recorded by a scientist as 6.33, 6.37, 6.36, 6.32 and 6.37 cm. Determine unbiased and efficient estimates of (1) the true mean (2) the true variance. Assume that the measured diameter is normally distributed. (8)

13. (a) The average number of defective articles in a certain factory is claimed to be less than the average for all the factories. The average for all the factories is 30.5. A random sample of 100 defective articles showed the following distribution.

Class limits:	16-20	21-25	26-30	31-35	36-40
Number:	12	22	20	30	16

Calculate the mean and the standard deviation of the sample and use it to test the claim that the average is less than the figure for all the factories at 5% level of significance. Given $Z(-1.645) = 0.95$.

Or

- (b) Three samples below have been obtained from normal populations with equal variance. Test the hypothesis that the sample means are equal.

I	II	III
8	7	12
10	5	9
7	10	13
14	9	12
11	9	14

14. (a) Independent random samples of ten day students and ten evening students at a University showed the following age distributions. We want to use the Mann-Whitney-Wilcoxon test to determine if there is a significant difference in the age distribution of the two groups.

Day	Evening
26	32
18	24
25	23
27	30
19	40
30	41
34	42
21	39
33	45
31	35

- (i) Compute the sum of the ranks (T) for the day students. (4)
- (ii) Compute the mean μ_T . (4)
- (iii) Compute σ_T . (4)
- (iv) Use $\alpha = 0.05$ and test for any significant differences in the age distribution of the two populations. (4)

Or

- (b) In a sample of 400 people 250 indicated that they prefer domestic products while 140 said they prefer foreign products, and 10 indicated no preference. We want to use the sign test to determine if there is evidence of a significant difference in the preferences for the two types of products.
- (i) Provide the hypotheses to be tested. (2)
- (ii) Compute the mean. (3)
- (iii) Compute the standard deviation. (5)
- (iv) At 95% confidence, test to determine if there is evidence of a significant difference in the preferences for the two types of products. (6)

15. (a) Estimate the Pearson correlation coefficient by using the following data:

Job:	1	2	3	4	5	6	7	8	9	10
System 1:	4.1	5.0	4.9	5.3	13.5	12.0	19.2	10.0	24.1	6.9
System 2:	3.9	5.1	5.0	4.9	13.3	13.2	21.3	9.1	23.0	8.1

Or

- (b) Compute seasonal variations from the following time series using moving average method

Year	2002	2003	2004	2005
Quarter				
Q1	75	86	90	100
Q2	60	65	72	78
Q3	54	63	66	72
Q4	59	80	85	93