E 4040

M.B.A. DEGREE EXAMINATION, MAY/JUNE 2007.

First Semester

BA 100 — STATISTICS FOR MANAGEMENT

(Regulation 2002)

Time : Three hours Maximum : 100 marks

Use of calculator and Statistical tables is permitted.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write any two properties of binomial distribution. unit 1

2. Specify any two assumptions of normal distribution. unit 1

3. Explain the two types of errors in testing hypothesis. unit 3

4. Mention the steps in hypothesis testing. unit 3

5. State the properties of good estimator. unit 2

6. What are the conditions for the validity of chi-square test? unit 4

7. Compare chi-square test, *t*-test and ANOVA. unit 3

8. Write a note on sign test. unit-4

9. Write about correlation. unit 5

10. Explain seasonal variation with example. unit-5

PART B — (5 × 16 = 80 marks)

11. (a) (i) A research organisation claims that the monthly wages of industrial workers in district X exceeds that of those in district Y by more than Rs. 150. Two different samples drawn independently from the two districts yielded the following results :

District X	$\overline{X}_1 = 648$;	$S_1^2 = 120$	and	$n_1 = 100$
District Y	$\overline{X}_2 = 495$;	$S_2^2 = 140$	and	$n_2 = 90$

Verify at 0.05 level of significance whether the sample results support the claim of the organisation. (8)

(ii) A random sample of 400 married working women was selected to know whether they prefer brand A detergent or brand B. Brand A was favoured by 180 of them while the remaining preferred brand B. Do the sample results provide sufficient evident to indicate a significant difference in preference for the two brands of detergent? Use $\alpha = 0.05$ level of significance. (8)

Or

(b) Mention any four statistical tool and explain its application with examples. (16)

12. (a) (i) State the characteristics of normal distribution. (4)

(ii) Suppose a fruit processing unit produces canned fruit juice with a mean weight of one kg and variance of 0.02 kg. The cans are packed in boxes each containing 100 cans. Assuming that the weights of individual cans are statistically independent, the weights of boxes, denoted as S, will follow an approximately normal distribution as each box represents the sum of weights of 100 cans. The mean weight of each box = 100 kg; S.D. is 1.41 kg. Find

(1) the probability that a box has a weight of less than 102 kg

(2) the probability that the box has a weight more than 101.5 kg and

(3) The probability that the weight of a box is between 99 and 101.5 kg. (12)

Or

(b) A set of 8 symmetrical coins were tossed 256 times. The frequencies of head occurred were observed as

No. of heads :	0	1	2	3	4	5	6	7	8
Frequencies :	2	6	24	63	64	50	36	10	1

Fit a binomial distribution and find mean and standard deviation also. (16)

13. (a) Three different promotion techniques are compared for profit. It was tried at different locations and the results are shown below :

	Promotions		
Location	A	B	C
1	18	13	12
2	20	23	21
3	14	12	9
4	11	17	10

Test the hypothesis there is no difference in the profit based on promotion techniques. (16)

Or

(b) (i) Write about the applications of Chi–square test.

(ii) The theory predicts the proportion of beans in the four groups A, B, C and D should be 9 : 3 : 3 : 1. In an experiment among 1600 beans, the numbers in the four groups were 882, 313, 287 and 118. Does the experimental results support the theory. (16)

14. (a) Given are three members relating to their job to work together. The HR manager wants to select only two out of the three. Suggest which two get along well. (16)

X	3	4	5	6	7	8	9	9
Y	2	5	6	4	3	2	4	4
Z	5	6	4	5	6	5	8	8

Or

(b) In a partially destroyed laboratory record of an analysis of correlation data, the following results only are legible :

Variance of $x = 9$

Regression equations $8x - 10y + 66 = 0$

$$40x - 18y = 214 .$$

(i) Find mean of x, y, S.D. of y, coefficient of correlation between x and y?

(ii) The age of husbands and wives in a community were found to have a correlation coefficient of 0.8, the average age of husbands was 25 years and wives 22 with S.D's 5 and 4 respectively. Draw regression lines and also estimate age of husband when wife's age is 22 and age of wife when husband's age is 28. (16)

15. (a) Total profit in lakh are given for eight years. Fit a straight line and also find the trend values. Forecast the rainfall for the year 2010. (16)

Year :	1999	2000	2001	2002	2003	2004	2005	2006
Profit :	11	13	15	10	14	17	15	20

Or

(b) The prices of a commodity during 1983–88 are given below. Fit a second degree polynomial trend equation and find the trend values.

Year :	1983	1984	1985	1986	1987	1988
Prices :	100	107	128	140	181	192