

PG Odd Semester (CBCS) Exam., November—2016

BUSINESS ADMINISTRATION

( 1st Semester )

Course No. : MBACC-106

( Statistical Methods for Decision Making )

*Full Marks : 70*

*Pass Marks : 28*

*Time : 3 hours*

*The figures in the margin indicate full marks for the questions*

1. (a) There are three machines designated as A, B and C producing the same item. The output of A, B and C are 40%, 35% and 25% respectively. A produces 5% defectives, B produces 10% defectives and C produces 12% defectives. Draw the probability tree and answer the following : 3+3+3+3=12
- (i) If an item is selected from the total output at random, what is the probability that it is defective?

(ii) If an item is selected from the total output at random, what is the probability that it is non-defective (good piece)?

(iii) An item is selected and found to be defective. What is the chance that it is produced from A, produced from B and produced from C?

(b) Discuss briefly about 'normal distribution'. 2

2. Sample of light bulbs were brought from two suppliers and were subjected to destruction test in lab. The following data were collected on the life :

Life (in hours)	700-800	800-900	900-1000	1000-1100	Total
Supplier A	14	74	29	13	130
Supplier B	12	58	32	18	120

(a) Which supplier provides greater average life—supplier A or supplier B?

(b) Which supplier provides uniform quality—supplier A or supplier B?

(c) Which supplier would you prefer—supplier A or supplier B? 4+6+4=14

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3. (a) What do you mean by 'hypothesis'? Discuss the steps of hypothesis testing.
- (b) A sample of 200 persons with a particular disease was selected. Out of these, 100 were given a drug and the others were not given any drug. The results are as follows :

	Number of persons		
	Drug	No drug	Total
Cured	65	55	120
Not cured	35	45	80
Total	100	100	200

Test whether the drug is effective.  
(The table value of  $\chi^2$  at significance level 5% and degrees of freedom 1 is 3.84)  $2+2+10=14$

OR

4. (a) Write short notes on :
- (i) Business forecasting
- (ii) Correlation analysis

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- (b) After investigation it has been found the demand for automobiles in a city depends mainly, if not entirely upon the number of families residing in that city. Figures for the sales of automobiles in five cities for the year 2015 and the number of families residing in those cities are given below :

City	No. of families (in lakhs) X	Sales of automobiles (in '000) Y
A	70	25.2
B	75	28.6
C	80	30.2
D	60	22.3
E	90	35.4

Fit a linear regression equation of Y on X by the least squares method. Estimate the sales for the year 2018 for a city A which is estimated to have 100 lakh families assuming that the same relationship holds true.

$$3\frac{1}{2}+3\frac{1}{2}+7=14$$

5. Maria Rojas is considering the possibility of opening a small dress shop on F. A. Avenue, a few blocks from the University. She has located a good mall that attracts students. Her options are to open a small shop, a medium-sized shop or no shop at all.

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The market for a dress shop can be good, average or bad. The probabilities for these three possibilities are 0.2 for good market, 0.5 for average market and 0.3 for a bad market. The net profit or loss for the shops for the various market conditions are given below :

Alternative	Good market (in ₹)	Average market (in ₹)	Bad market (in ₹)
Small shop	75,000	25,000	- 40,000
Mid-size shop	1,00,000	35,000	- 60,000
No shop	0	0	0

What do you recommend? 14

**OR**

6. Consider the following linear programming problem and solve it using the simplex method : 14

$$\begin{aligned} &\text{Maximize } Z = 6x_1 + 8x_2 \\ &\text{subject to} \\ &5x_1 + 10x_2 = 60 \\ &4x_1 + 4x_2 = 40 \\ &x_1 \text{ and } x_2 \geq 0 \end{aligned}$$

7. Write short notes on : 7+7=14

- (a) Project management
- (b) Simulation

( 6 )

**OR**

8. In a railway yard goods arrive at a rate of 30 trains/day. Assuming that the inter arrival time follows an exponential distribution and the service time distribution is also exponential with an average 36 minutes. Calculate the following : 4+4+6=14

- (a) The average number of trains in the queue
- (b) The average number of trains in the system
- (c) The probability that number of trains in the system exceeds 10

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