LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **STATISTICS**

FOURTH SEMESTER – **APRIL 2014**

ST 4208/4203 - STATISTICS FOR MANAGEMENT

Date : 01/04/2014   Dept. No.   Max. : 100 Marks
Time : 01:00-04:00

SECTION A

Answer ALL questions.   **(10 X 2 = 20 marks)**

1. State addition theorem on probability.

2. Four cards are drawn from a full pack of cards. Find the probability that two are spades and two are hearts.

3. Define Poisson distribution.

4. State the various methods of sampling.

5. Define Type – I and Type –II error

6. Mention the uses of index number.

7. What are the characteristics of index number?

8. State the tolerance limits in control charts.

9. What is balanced and unbalanced assignment problem?

10. Explain the terms of transportation problem.

SECTION B

Answer any FIVE questions   **(5 X 8 = 40 Marks)**

11. State and prove Boole's inequality .

12. In a factory there are 6 skilled workers and 4 un skilled workers. What is the probability that
    (a) a worker selected is skilled worker. (b) the two worker selected are skilled.

13. Two cards are drawn successively, with replacement, from a well shuffled pack of 52 cards. Find the probability distribution of the number of kings.

14. A machine produced 20 imperfect items in a sample of 500. After the machine was overhauling it produced 5 imperfect items in a batch of 150 . Has the machine being improved after overhauling?

15. In an industry, 200 workers, employed for a specific job, were classified according to their performance and training received /not received to test independence of a specific training and performance. The data is summarized as follows:

	Performance		Total
	Good	Not Good	
Trained	100	50	150
Untrained	20	30	50
Total	120	80	20

16. Construct the cost of living index number from the following group data:

Group	Weights	Index number
Food	10	60
Fuel and light	13	75
Clothing	12	65
House rent	15	80
Miscellaneous	14	68

17. Explain the various types of control charts? Discuss its aspects and advantages.

18. Solve the following L.P. problem by graphical method.

$$\text{Maximize } Z = 3x + 2y$$
Subject to constraints,
$$2x + y \le 40$$
$$x + y \le 24$$
$$2x + 3y \le 60$$
$$x, y \ge 0$$

SECTION C

Answer any TWO questions   **(2 X 20 = 40 Marks)**

19.(a) There are 4 boys and 2 girls in a class room A and 5 boy and 3 girls in a class room B. A girl from one of the two class rooms laughed loudly. What is the probability that the girl who laughed was from class room B.   (10)

19.(b)The marks obtained in a certain examination follow normal distribution with mean 45 and standard deviation 10.If 1000 students appeared at the examination , calculate the number of students scoring
(i) less than 40 marks and (ii) more than 60 marks.   (10)

20. A former applied three types of fertilizer on 4 separate plots. The figure on yield per acre is tabulated below:

Fertilizers plots	yield			
	A	B	C	D
Nitrogen	6	4	8	6
Potash	7	6	6	9
Phosphates	8	5	10	9

    Find out the plots are materially different in fertility, and also if three fertilizers make any material difference in yield test 5% level.   (20)

21.(a) The following data gives readings for 10 samples of size 6 each in the production of a certain components.

    Sample   : 1   2   3   4   5   6   7   8   9   10
    Sample Mean   :383   508   505   582   557   337   514   614   707   753
    Sample Range : 95   128   100   91   68   65   148   28   37   80

Draw control chart for mean . can one assume that all the samples are from homogeneous lot.
(Given for n = 5, A2 = 0.58, D3 = 0 , D4 = 2.11)   (10)

21(b) Calculate Laspeyre's Index number, Paasche's price index number and verify whether it satisfies time reversal test .
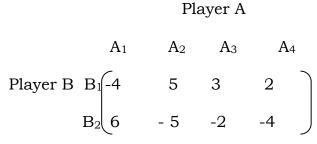
Commodity	2005		2006	
	Price (in Rs.)	Quantity (in kgs.)	Price (in Rs.)	Quantity (in kgs.)
A	10	80	20	100
B	11	140	24	130
C	14	90	25	120
D	12	60	15	70
E	15	70	22	100

                                                                                          (10)

22.(a) Obtain the initial basic feasible solution of the transportation problem by using North West Corner method(NWCM).

	A	B	C	D	Availability
X	9	8	10	11	85
Y	12	15	9	13	95
Z	10	12	14	16	120
Demand	95	90	50	65	

                                                                                          (10)

22(b) solve the following game using graphical method

                        Player A

            A_1 A_2 A_3 A_4

Player B B_1 $\begin{pmatrix} -4 & 5 & 3 & 2 \\ 6 & -5 & -2 & -4 \end{pmatrix}$
          B_2

                                                                                          (10)

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