



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.B.A. & B.COM. DEGREE EXAMINATION – BUSINESS ADMIN. & CORPO. SEC.

FOURTH SEMESTER – APRIL 2017

ST 4208- STATISTICS FOR MANAGEMENT

Date: 29-04-2017
09:00-12:00

Dept. No.

Max. : 100 Marks

SECTION A

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

1. State multiplication theorem on probability.
2. State any four properties of normal distribution
3. Distinguish between Type – I and Type –II error.
4. State one tail and two tail test.
5. What are the characteristics of an index number?
6. Mention limitations of Index Number.
7. Distinguish between the c- chart and p- chart.
8. Distinguish between process control and product control.
9. Define feasible region.
10. Describe a transportation problem.

SECTION B

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

11. State and prove Baye's theorem.
12. A bag contains four white and six black balls. Two balls are drawn at random. What is the probability that (i) both are white, (ii) both are black, (iii) one white and one black.
13. What is non-probability sampling? Explain different types of non-probability sampling.
14. A company keeps records of accidents. During a recent safety review a random sample of 60 accidents was selected and classified by the day of the week on which they occur

| Day | Mon | Tue | Wed | Thu | Fri |
|------------------|-----|-----|-----|-----|-----|
| No. Of accidents | 8 | 12 | 9 | 14 | 17 |

Test whether there is any evidence that accidents are more likely on some days than others ?

15. 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 $n=5$, $A_2=0.58$, $D_3=0$, $D_4=2.11$)

16. State the advantages and disadvantage of statistical quality control.

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

Maximize $Z = 5x + 7y$

Subject to constraints,

$x + y \leq 4$

$3x + 8y \leq 24$

$10x + 7y \leq 35$

$x, y \geq 0$

18. Find the initial basic feasible solution by using North-West Corner Rule Method for the following

Transportation problem:

| Source | Destination | | | Supply |
|--------|-------------|----|----|--------|
| | D1 | D2 | D3 | |
| S1 | 7 | 9 | 3 | 19 |
| S2 | 4 | 8 | 7 | 13 |
| S3 | 2 | 5 | 9 | 7 |
| Demand | 15 | 13 | 11 | |

SECTION C

Answer any TWO questions:

(2 X 20 = 40 Marks)

19.(a) Students of a class were given an aptitude test. Their marks were found to be normally distributed with mean 60 and standard deviation 5. What percentage of students score

(i) more than 60 marks (ii) less than 56 marks (iii) between 45 and 65 marks

(b) A factory has two machines A and B. Past records show that machine A produces 30% of the total output and machine B the remaining 70%. Machine A produces 5% defectives and machine B produces 1% defective items. An item is drawn at random and to be defective. What is the probability that it was produced (a) by machine A (b) by machine B

(12 + 8)

20. Set up two way ANOVA table for the data given below.

| Pieces of field | Treatment | | | |
|-----------------|-----------|----|----|----|
| | A | B | C | D |
| P | 45 | 40 | 38 | 37 |
| Q | 43 | 41 | 45 | 38 |
| R | 39 | 39 | 41 | 41 |

Use coding method subtracting 40 from given number. (20)

21. Calculate Laspeyre's Index number, Paasche's price index number, fisher's price index and how it satisfies time reversal test and factor reversal test.

| Commodity | 2005 | | 2006 | |
|-----------|------------------|----------------------|------------------|----------------------|
| | Price (inRs.) | Quantity (inkgs.) | Price (inRs.) | Quantity (inkgs.) |
| A | 8 | 6 | 12 | 4 |
| B | 10 | 8 | 12 | 8 |
| C | 14 | 4 | 18 | 4 |
| D | 4 | 6 | 2 | 10 |
| E | 10 | 10 | 14 | 8 |

(5+5+5+5)

22.a) A company has 5 machines to be assigned to 5 workers available for this purpose.
The time to complete the work on different machines is given below

| MACHINE | W1 | W2 | W3 | W4 | W5 |
|---------|----|----|----|----|----|
| I | 40 | 40 | 35 | 25 | 50 |
| II | 42 | 30 | 6 | 25 | 27 |
| III | 50 | 48 | 40 | 60 | 50 |
| IV | 20 | 19 | 20 | 18 | 25 |
| V | 58 | 60 | 59 | 55 | 53 |

Suggest optimal assignment of workers to machine.

22. b) Solve the following game using graphical method

Player B

Player A $\begin{pmatrix} -3 & 4 \\ 5 & -1 \\ -2 & 6 \\ 3 & -2 \end{pmatrix}$ (10+10)
