

APPLIED STATISTICS PAPER VII - MODEL PAPERS.pdf

OPTIMIZATION TECHNIQUES VII - B - MQP.pdf

**Model Questions Paper****III B.Sc., Degree Examination (at the end of VI Semester)****STATISTICS-Elective Paper****(With Mathematics Combination)****Paper – VII - A: Applied Statistics****(With effect from 2015-2016 admitted Batch)****Time: 3Hours****Max. Marks: 75 M****PART: A****Answer any FIVE questions****5 x 5 = 25 M**

1. Explain the models of time series.
2. What do you know about link relative method?
3. What are uses and limitations of index numbers?
4. Explain Fixed and Chain base index numbers?
5. Define Demand and Supply.
6. Calculate 4 yearly centered moving averages for the following data.

Year	1	2	3	4	5	6	7	8	9	10
Production	430	470	450	460	480	470	470	500	490	480

7. Calculate the simple aggregative index number for the following data.

Commodity	A	B	C	D	E	F
Price in 2016	3.9	11.8	7	8	5.5	5.8
Price in 2017	4.25	15	9	7.15	6	7

8. What do you know about price elasticities of supply?

**PART: B****Answer ALL the following questions****5 x 10 = 50 M**

9. (a) Explain the components of a time series.  
(Or)  
(b) Explain the method of least squares to fit a straight line trend.
10. (a) Explain ratio to trend method to find the seasonal variations.  
(Or)  
(b) Explain C.S.O and N.S.S.O functions.
11. (a) Explain the problems involved in the construction of index numbers.  
(Or)  
(b) Explain any five weighted index numbers.
12. (a) Show that Fisher index number is an ideal index number.  
(Or)  
(b) Explain the method of constructing cost of living index numbers.
13. (a) Explain Leontief's Method.  
(Or)  
(b) Explain Pigou's Method.

**###**

**Model Questions Paper**  
**III B.Sc., Degree Examination (at the end of VI Semester)**  
**STATISTICS-Cluster -A**  
**(With Mathematics Combination)**  
**Paper – VIII – A1: Demography and Vital Statistics**  
**(With effect from 2015-2016 admitted Batch)**

**Time: 3Hours**

**Max. Marks: 75 M**

**PART: A**

**Answer any FIVE questions**

**5 x 5 = 25 M**

1. What are the uses of Myer and UN indices?
2. Describe the uses of vital statistics.
3. Explain Stationary and Stable population.
4. Explain Total Fertility Rate.
5. Write Pearl's Vital Index.
6. Define Rates and Ratios.
7. Show that  $q_x = \frac{2m_x}{2+m_x}$
8. Show that  $e_x^o = \frac{1}{2}e_x$

**PART: B**

**Answer ALL the following questions**

**5 x 10 = 50 M**

9. (a) Explain use of balancing equations.

(Or)

(b) Explain population composition and dependency ratio.

10. (a) Explain measurements of Mortality.

(Or)

(b) Explain the sources of collecting data on vital statistics.

11. (a) Explain construction of Life Table.

(Or)

(b) Explain Central Mortality and Force of Mortality.

12. (a) Explain construction of abridged life tables.

(Or)

(b) Explain measurements of Fertility.

13. (a) Explain measurements of Population Growth.

(Or)

(b) Explain the relation between Gross Reproduction Rate and Net Reproduction Rate.

# # #

**Model Questions Paper**  
**III B.Sc., Degree Examination (at the end of VI Semester)**  
**STATISTICS-Cluster -A**  
**(With Mathematics Combination)**  
**Paper – VIII - A2: Advanced Experimental Designs**  
**(With effect from 2015-2016 admitted Batch)**

**Time: 3Hours****Max. Marks: 75 M****PART: A****Answer any FIVE questions****5 x 5 = 25 M**

1. Write the Analysis of C.R.D
2. Explain missing plot technique.
3. Explain the concept of Analysis of Covariance.
4. Write the analysis of  $2^2$  – Factorial experiments.
5. Explain Balanced Incomplete Block design.
6. Complete the ANOVA table.

Source	D.F	S.S	M.S.S
Blocks	5	21.55	-
Treatments	3	15.66	-
Error	-	-	-
Total	23	49.51	

7. Find the missing value in randomized block design Block Total is 68.4, Treatment Total is 50.9, Grand Total is 365.3, number of blocks is 4 and number of treatments is 6.

8. Write the Yates table in  $2^2$  – Factorial Experiment.

**PART: B**

**Answer ALL the following questions**

**5 x 10 = 50 M**

9. (a) Explain the Analysis of Latin Square Design.

(Or)

(b) Explain the Analysis of Randomized Block Design.

10. (a) Explain the Analysis of Randomized Block Design with two missing Observations.

(Or)

(b) Explain the Analysis of Latin Square Design with one missing observation.

11. (a) Explain the Analysis of covariance for a one-way classification with one concomitant variable in C.R.D.

(Or)

(b) Explain the Analysis of covariance for two-way classification with one concomitant variable in R.B.D.

12. (a) Write the Analysis of  $2^3$  – Factorial Experiment.

(Or)

(b) Write the Analysis of  $3^2$  – Factorial Experiment.

13. (a) Explain the Analysis of Balanced Incomplete Block Design.

(Or)

(b) Explain the Analysis of Partially Incomplete Block Design.

# # #

**Model Questions Paper**  
**III B.Sc., Degree Examination (at the end of VI Semester)**  
**STATISTICS-Elective Paper**  
**(With Mathematics Combination)**  
**Paper – VII – B: Optimization Techniques**  
**(With effect from 2015-2016 admitted Batch)**

**Time: 3Hours**

**Max. Marks: 75 M**

**PART: A**

**Answer any FIVE questions**

**5 x 5 = 25 M**

1. Explain origin and development of Operations Research.
2. Write the mathematical formulation of L.P.P.
3. Explain basic feasible solution and optimum basic feasible solution.
4. Explain problem of Degeneracy in L.P.P.
5. Explain general primal – dual pair.
6. Write the scientific method in Operations Research.
7. Write the standard Form of L.P.P.
8. Define slack and surplus variables.

**PART: B**

**Answer ALL the following questions**

**5 x 10 = 50 M**

9. (a) Explain General Solution Methods for O.R. Models.  
(Or)  
(b) Explain Nature and Features of O.R.
10. (a) Write the major steps in graphical solution method.  
(Or)  
(b) Solving the following L.P.P. by Graphically  
$$\text{Maximize } Z = 10x_1 + 6x_2$$

Subject to the Constraints  $5x_1 + 3x_2 \leq 30$ ,  $x_1 + 2x_2 \leq 18$ , and  $x_1, x_2 \geq 0$



11. (a) Explain Simplex Algorithm.

(Or)

(b) Solve the following L.P.P. by Simplex Method.

$$\begin{aligned} & \text{Maximize } Z = 4x_1 + 10x_2 \\ \text{Subject to the Constraints } & 2x_1 + x_2 \leq 50 \\ & 2x_1 + 5x_2 \leq 100 \\ & 2x_1 + 3x_2 \leq 90 \text{ and } x_1, x_2 \geq 0 \end{aligned}$$

12. (a) Explain procedure of Big-M Method.

(Or)

(b) Solve the following problem by Big-M Method.

$$\begin{aligned} & \text{Maximize } Z = 6x_1 + 4x_2 \\ \text{Subject to the Constraints } & 2x_1 + 3x_2 \leq 30 \\ & 3x_1 + 2x_2 \leq 24 \\ & x_1 + x_2 \geq 3 \text{ and } x_1, x_2 \geq 0 \end{aligned}$$

13. (a) Explain various steps involved in formulating a dual problem.

(Or)

(b) Use duality to solve the following L.P.P.

$$\begin{aligned} & \text{Maximize } Z = 2x_1 + x_2 \\ \text{Subject to the Constraints } & x_1 + 2x_2 \leq 10 \\ & x_1 + x_2 \leq 6 \\ & x_1 - x_2 \leq 2 \\ & x_1 - 2x_2 \leq 1 \text{ and } x_1, x_2 \geq 0 \end{aligned}$$

# # #

**Model Questions Paper**  
**III B.Sc., Degree Examination (at the end of VI Semester)**  
**STATISTICS**  
**(With Mathematics Combination)**  
**Cluster –B: Paper – VIII - B1: Operations Research – I**  
**(With effect from 2015-2016 admitted Batch)**

**Time: 3Hours****Max. Marks: 75 M****PART: A****Answer any FIVE questions****5 x 5 = 25 M**

1. Explain bounded variables.
2. Write the tabular representation of transportation problem.
3. Explain briefly degeneracy transportation problem.
4. Explain travelling salesman problem.
5. Write the assumptions of sequencing problem.
6. Determine an initial basic feasible solution to the following transportation problem using North-West Corner Method.

	D1	D2	D3	D4	Availability
O1	5	3	6	2	19
O2	4	7	9	1	37
O3	3	4	7	5	34
Demand	16	18	31	25	

7. Solve the following assignment problem.

	A	B	C	D
I	1	4	6	3
II	9	7	10	9
III	4	5	11	7
IV	8	7	8	5

8. We have five jobs, each of which must go through the two machines A and B in the order AB. Processing times in hours are given in the table below.

Job	1	2	3	4	5
Machine A	5	1	9	3	10
Machine B	2	6	7	8	4

Determine a sequence for the five jobs that will minimize the elapsed time.

**PART: B**

Answer ALL the following questions

5 x 10 = 50 M

9. (a) Explain Revised Simplex Algorithm.

(Or)

- (b) Use revised simplex method to solve the following L.P.P.

$$\begin{aligned} \text{Minimize } Z &= x_1 + 4x_2 \\ \text{Subjective Constraints } &x_1 + 2x_2 \leq 7 \\ &4x_1 + x_2 \leq 6 \text{ and } x_1, x_2 \geq 0 \end{aligned}$$

10. (a) Explain least cost method.

(Or)

- (b) Determine an initial basic feasible solution to the following transportation problem by using the VAM-Method.

	I	II	III	IV	Supply
A	13	11	15	20	2000
B	17	14	12	13	6000
C	18	18	15	12	7000
Demand	3000	3000	4000	5000	

11. (a) Explain MODI method.

(Or)

- (b) Find the optimum solution to the following problem using UV-Method.

		Destination				Supply
		I	II	III	IV	
SOURCE	O <sub>1</sub>	21	16	25	13	11
	O <sub>2</sub>	17	18	14	23	13
	O <sub>3</sub>	32	17	18	41	19
Demand		6	10	12	15	43

12. (a) Explain an algorithm to solve Assignment Problem by Hungarian method.

(Or)

(b) Solve the following assignment problem of maximization.

Employee	JOBS				
	I	II	III	IV	V
A	10	5	13	15	16
B	3	9	18	13	6
C	10	7	2	2	2
D	7	11	9	7	12
E	7	9	10	4	12

13. (a) Explain sequential procedure for solving 2 machines 'n' jobs problem.

(Or)

(b) Determine the optimal sequence of jobs that minimizes the total elapsed time based on the following information processing time on machines is given in hours and passing is not allowed.

Job	A	B	C	D	E	F	G
Machine M <sub>1</sub>	3	8	7	4	9	8	7
Machine M <sub>2</sub>	4	3	2	5	1	4	3
Machine M <sub>3</sub>	6	7	5	11	5	6	12

# # #

**Model Questions Paper****III B.Sc., Degree Examination (at the end of VI Semester)****STATISTICS****(With Mathematics Combination)****Cluster –B: Paper – VIII - B2: Operations Research – II****(With effect from 2015-2016 admitted Batch)****Time: 3Hours****Max. Marks: 75 M****PART: A****Answer any FIVE questions****5 x 5 = 25 M**

1. Describe Game and Strategy.
2. Explain Economic Order Quantity.
3. Explain EOQ Problem with one price break.
4. Write the factors affecting inventory control
5. Explain Logical Sequencing in networking.
6. Write the applications of network techniques.
7. Find the Saddle Point of the following payoff matrix.

		Player B		
		B1	B2	B3
Player A	A1	60	56	34
	A2	63	60	55
	A3	83	72	60

8. Develop a network diagram for the project specified below.

Activity	A	B	C,D	E	F	G
Immediate Predecessor Activity	-	A	B	C	D	E,F

**PART: B****Answer ALL the following questions****5 x 10 = 50 M**

9. (a) Explain the graphical method of solving 2 x n game.

(Or)

- (b) Solve the following game using the method of dominance.

		Player B			
		B1	B2	B3	B4
Player A	A1	4	2	3	6
	A2	3	4	7	5
	A3	6	3	5	4

10. (a) Describe deterministic inventory problems.

(Or)

- (b) A manufacturing company purchases 9,000 parts of a machine for its annual requirements, ordering one month usage at a time. Each part costs Rs.20. The ordering cost per order is Rs.15 and the carrying charges are 15% of the average inventory per year. You have been assigned to suggest a more economical purchasing policy for the company. What advice would you offer and how much would it save the company per year?

11. (a) Explain Probabilistic Inventory Single Period Problem without set-up cost.

(Or)

- (b) The probability distribution of monthly sales of a certain item is as follows:

Monthly sales:	0	1	2	3	4	5	6
Probability	0.02	0.05	0.30	0.27	0.20	0.10	0.06

The cost of carrying inventory is Rs.10 per unit per month. The current policy is to maintain a stock of four items at the beginning of each month. Assuming that the cost of shortage is proportional to both time and quantity short, obtain the imputed cost of a shortage of one item for one unit of time.

12. (a) Describe the rules of network construction.

(Or)

(b) The following details are available regarding a project

Activity	A	B	C	D	E	F
Predecessor Activity	-	A	A	B	C	D, E
Duration (Week)	3	5	7	10	5	4

Draw the network, determine the Critical Path and find the project completion time.

13. (a) Explain the difference between PERT and CPM.

(Or)

(b) Determination of project completion time in PERT. Find out the time required to complete the following project and the critical activities.

Activity	A	B	C	D	E	F	G	H	I
Predecessor Activity	-	A	A	B	C	D,E	D,E	F	G
Pessimistic Time	6	9	12	15	10	26	25	8	5
Optimistic Time	2	3	8	9	8	16	19	2	1
Most likely Time	4	6	10	12	9	21	22	5	3

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