

14158

M. Sc. Examination, June 2023

STATISTICS

Operation Research -II

(H-4034)

Time : Three Hours]

[Maximum Marks : 50

Note : Attempt questions from all Sections as per instructions.

Section-A

(Very Short Answer Type Questions)

Attempt all the five questions. Each question carries 2 marks. Very short answer is required.

2×5=10

1. Define Wolfe's, modified simplex method.
2. What is the concept of replacement policy ?
3. Write the application of CPM/PERT techniques.

4. Define Kuhn-Tucker conditions for quadratic programming.
5. What do you mean by critical path analysis ?

Section-B

(Short Answer Type Questions)

Attempt any two questions out of the following three questions. Each question carries 5 marks. Short answer is required. 5×2=10

6. Discuss the policy of replacement of items whose maintenance cost increase with time constant and varying scrap value during the period.

7. A company has two machines  $M_1$  and  $M_2$ , on which six jobs are to be processed in the order  $M_1M_2$ . The processing time (in hours) for each job on these machines is given in the following table :

Jobs →	$J_1$	$J_2$	$J_3$	$J_4$	$J_5$	$J_6$
Machines ↓						
$M_1$	4	8	3	6	7	5
$M_2$	6	3	7	2	8	4

Find (a) the optimal job sequence and (b) total elapsed time.

8. Write the procedure for solving an LPP using revised simplex method.

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Section-C

(Detailed Answer Type Questions)

Attempt any three questions out of the following five questions. Each question carries 10 marks. Answer is required in detail. 10×3=30

9. Solve the following sequencing problem :

Jobs	A	B	C	D	E
M <sub>1</sub>	3	8	7	5	2
M <sub>2</sub>	3	4	2	1	5
M <sub>3</sub>	5	8	10	7	6

10. Solve the following problem by revised simplex method : <https://validcollege.com>

Max.:  $Z = 7x_1 + 5x_2$

Subject to  $-x_1 - 2x_2 \geq -6$

$4x_1 + 3x_2 \leq 12$

and  $x_1, x_2 \geq 0$

11. Use Branch and Bound technique to solve the following programming problem :

Max.:  $Z = 6x_1 + 8x_2$

Subject to  $4x_1 + 16x_2 \leq 32$

$14x_1 + 4x_2 \leq 28$

$x_1, x_2 \geq 0$  are integers

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12. Use Wolfe's modified simplex method to solve the following programming problem :

Max.  $Z = 6x_1 + 3x_2 - 4x_1x_2 - 2x_1^2 - 3x_2^2$

Subject to  $x_1 + x_2 \leq 1$

$2x_1 + 3x_2 \leq 4$

$x_1, x_2 \geq 0$

13. A project has the following time schedule :

Activity	Time(in days)
0-1	
-2	
-3	
-4	
-5	
-4	
-6	
-7	
5-7	
6-7	

Construct PERT network and compute :

- (a) Critical path and the project duration
- (b) Determine the total, free and independent floats.

A/6/M

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