[1] Progressive Education Society's

Modern college of Arts, Science & Commerce,Ganeshkhind,
Pune 16, NEP 2020 (Autonomous)
End Semester Examination Mar-Apr 2025

Total No. Of Questions:3/14 *Total No. of Pages:2*

S.Y.B.Sc.(Regular)
MAT24201 Optimization Techniques
(Semester IV)

Program: BSc(Regular) **Credits: 2**
Program(Specific): Mathematics **Time: 2 Hours**
Course Type: Minor **Max. Marks: 30**
Paper No: MAT24201 **SET: A**

Instructions To the Candidates:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Draw a well labelled diagram wherever necessary.

Q.1) Attempt any **FIVE** of the following. $[5 \times 2 = 10]$

a) Define sudden failure.

b) Two players A and B match coins. If the coins match then A wins Rs.2 , if the coins not match, then B wins Rs.2. In remaining cases no gain no loss. Construct the pay off matrix.

c) Define Idle Time of a Machine.

d) Find the saddle point of the following game.

$$\begin{bmatrix} 2 & 6 \\ -2 & 2 \end{bmatrix}$$

e) Explain the burst event .

f) Define a two person zero sum game.

g) Mention the conditions to convert a 3 machine Sequencing problem to 2 machine problem. .

Q.2) Attempt any **THREE** of the following. $[3 \times 4 = 12]$

a) The cost of a machine is Rs. 6100 and its scrap value is Rs.100. The maintainence costs are as follows:

Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Maintainence Cost(in Rs.)	100	250	400	600	900	1250	1600	2000

When should the machine be replaced ?

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b) Solve the following game using Principle of Dominance.

$$\begin{array}{c} \\ \textbf{Player A} \end{array} \begin{array}{c} \textbf{Player B} \\ \begin{bmatrix} 3 & 5 & 4 & 9 & 6 \\ 5 & 6 & 3 & 7 & 8 \\ 8 & 7 & 9 & 8 & 7 \\ 4 & 4 & 8 & 5 & 3 \end{bmatrix} \end{array}$$

c) Distinguish between PERT and CPM.

d) Construct the network diagram of following activities involved in a project.

Activity	Predecessor(s)	Duration (Days)
A	-	3
B	-	4
C	A	5
D	A	6
E	C	7
F	D	8
G	B	9
H	E, F, G	3

e) Five jobs are to be performed first on machine A and then on machine B. The time taken in hours by each job on each machine is given below:

Jobs	**I**	**II**	**III**	**IV**	**V**
Machine A	12	4	20	14	22
Machine B	6	14	16	18	10

Determine the optimal sequence of jobs that minimizes the total elapsed time to complete the jobs.

Q.3) Attempt any **ONE** of the following. $[1 \times 8 = 8]$

a) Solve the following game graphically.

Strategies A ↓ B ⟶	**B1**	**B2**	**B3**	**B4**
A1	2	2	3	-2
A2	4	3	2	6

b) Find the sequence that minimizes the total elapsed time required in performing the following jobs on three machines in the order ABC. The processing time taken in hours by each job on each machine is given below:

Jobs	**1**	**2**	**3**	**4**	5
Machine A	8	10	6	7	11
Machine B	5	6	2	3	4
Machine C	4	9	8	6	5

Determine the total elapsed time and idle time for each machine.

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