

Production Management (MEL 421)

Major Exam

Duration: 2 hrs

All questions are compulsory

1. Prove that for a single machine scheduling problem, the sequence that minimizes mean flow time also minimizes
 - a. Mean lateness
 - b. Mean work-in-process inventory

(5 marks)

2. Consider the following jobs with their processing times, due dates and importance weights.

Job	1	2	3	4	5	6	7	8	9	10
Proc time	1	10	5	2	8	7	8	4	3	6
Due date	10	20	15	10	10	25	15	25	10	20
Weights	3	2	1	1	4	2	3	3	2	4

Find sequences that minimize mean flow time, maximum lateness, mean weighted flow time and number of tardy jobs. Calculate average work in process inventory for first two cases

(10 marks)

3. Consider the following jobs with their processing times, due dates and penalties.

Job	1	2	3	4	5
Proc time	15	20	30	15	30
Early due date	20	25	30	20	40
Late due date	25	30	40	25	50
Early penalty	1	0	2	2	1
Late penalty	3	3	3	2	2

Use Backward-Forward heuristic to derive a sequence that will minimize total penalty

(10 marks)

4. Reduce makespan time for the following problem with 4 jobs and 4 machines (M1 to M4) in series. Also calculate the utilization of each machine.

Job	M1	M2	M3	M4
1	4	3	5	2
2	3	3	4	2
3	2	1	6	1
4	5	3	2	3

(8 marks)

5. Develop a sequence for the following data that minimizes Make Span Time as well as Mean Flow Time. The sequence is to be developed for three identical parallel machines. Also show the job loading for each machine on a time scale and calculate the make span time and mean flow time.

Job	1	2	3	4	5	6	7	8	9	10
Proc Time	6	7	10	9	8	5	4	6	5	3

(7 marks)