



B.E.DEGREE END SEMESTER EXAMINATIONS, MAY 2012
INDUSTRIAL ENGINEERING BRANCH

2

IE501 - INDUSTRIAL SCHEDULING

Duration: 3 hours

Max. marks = 100

PART A (10x2=20 marks)

Answer all questions.

1. What are the characteristics of a flow shop?
2. State the limitations of Muntz-Coffman algorithm.
3. Distinguish between scheduling and sequencing.
4. Data on a single machine sequencing problem is given below. Prepare an EDD sequence and compute the mean tardiness for EDD sequence.

Job	1	2	3	4	5
Duration	5	7	4	3	5
Due date	7	10	7	8	6

5. Define a feasible schedule in job shop scheduling problem.
6. Give the steps in H_1 algorithm used to minimize weighted mean flow time in parallel machine model.
7. State any one basic theorem used in building a single machine schedule.
8. State Smith's rule. When do you apply this rule?
9. Obtain an optimum sequence to minimize the makespan for the data given below:

Job Order	1	2	3	4
Process time (m/c A)	23	7	18	12
Process time (m/c B)	11	20	28	8

10. State the significance of lap phasing structure in flow shop model.

PART B (5x16= marks)

Answer all questions.

11. Indicate the steps involved in the generation of a non delay schedule. Illustrate the application with the sample data of your choice. Assume 3 machines and 4 jobs in the job shop.
- 12.A. Apply Dynamic programming technique to determine a schedule for the following single machine problem to minimize the average tardiness.

Job #	Process time	Due date
A	5	8
B	3	6
C	7	9
D	3	5

[OR]

- 12.B. Solve the set up cost dependent job problem to get the near optimal sequence which minimizes total set up cost.

i\j	1	2	3	4
1	-	9	3	5
2	7	-	9	3
3	4	6	-	5
4	7	3	6	-

- 13.A. Eight independent jobs are to be scheduled on 4 parallel machines. The process times of these jobs are given below;

Job i	1	2	3	4	5	6	7	8
t_i	6	6	5	2	7	3	5	4

- i) Design a schedule to minimize makespan assuming that pre-emption is not permitted.
- ii) Determine the schedule that minimizes mean flow time.

[OR]

- 13.B. Apply H_m algorithm to obtain an optimal schedule for five similar machines. Objective is to minimize mean weighted flow time. Show the schedule on a Gantt chart.

j	1	2	3	4	5	6	7	8	9	10
t_j	12	8	20	32	14	7	28	38	36	11
W_j	3	3	6	6	4	1	2	5	4	2

- 14.A. There are six jobs to be scheduled in a flow shop. The jobs after being processed on machine P require machine Q.

Job	Lot size	Operation time/item		Set up time in m/c P
		m/c P	m/c Q	
1	45	1	7	25
2	30	4	4	30
3	30	5	3	28
4	70	4	2	26
5	60	4	2	50
6	45	2	5	20

Determine the schedule to minimize the makespan using Mitten's method.

[OR]

- 14.B. Use CDS algorithm for the flow shop data given below:

Machine/Job	A	B	C	D	E
1	3	4	7	2	8
2	5	6	8	1	5
3	2	5	2	6	4
4	7	1	4	3	5

- 15.A. Write short notes on:

- i) Hodgson's algorithm
- ii) Ignall Schrage algorithm

[OR]

- 15.B. Apply Branch and Bound algorithm to obtain the sequence which would minimize mean tardiness. Assume the data from question no.12.A.