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Roll No. [] [] [] [] [] [] [] [] [] []

B.E. (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL 2013
INDUSTRIAL ENGINEERING
(Semester VII)
IE9403 OPERATIONS SCHEDULING
(Regulation-R2008)

Duration: 3 hours

Answer ALL questions.

Max. marks =100

PART A (10x2=20 marks)

1. What are the characteristics of a flow shop model?
2. What is the objective of employing Hodgson's algorithm? Give the steps in this algorithm.
3. Distinguish between sequencing and scheduling.
4. The following table gives the data on a single machine sequencing problem. Compute the tardiness for EDD sequence.

Job	1	2	3	4	5
Duration	5	3	9	2	4
Due date	7	8	10	3	6

5. What are the limitations of McNaughton's algorithm?
6. Prove that SPT sequence minimizes the mean lateness.
7. Define weighted shortest processing time sequence?
8. How do you minimize the makespan in a parallel machine scheduling?
9. What is meant by a pure sequencing problem?
10. Indicate the differences between active schedule and a semi-active schedule.

PART B (5x16=80 marks)

11. Demonstrate the application of single pass approach with a view to design an active schedule. Use the sample data of your choice. Assume 3 machines and four jobs in the job shop.

- 12.A. Apply Branch and Bound algorithm to develop a schedule for the following single machine problem to minimize the average tardiness.

Job #	Process time	Due date
B	4	8
S	4	6
T	7	9
H	3	5
W	5	7

[OR]

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

i\j	1	2	3	4
1	-	7	2	4
2	6	-	9	2
3	3	10	-	5
4	7	3	8	-

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	5	7	1	9	3	10	4

- Determine the schedule to minimize makespan assuming that pre-emption is not permitted.
- Prepare the schedule that minimizes mean flow time.

[OR]

13.B. Determine an optimal schedule for five similar machines. Objective is to minimize mean weighted flow time. (Apply H_m algorithm). Represent the schedule on a Gantt chart.

J	1	2	3	4	5	6	7	8	9	10
t_i	15	9	20	23	14	7	28	31	36	10
W_i	3	3	6	5	4	1	2	5	4	2

14.A. There are seven jobs to be scheduled in a flow shop. The jobs after being processed on machine A require machine B.

Job	Lot size	Operation time/item		Set up time in m/c A
		m/c A	m/c B	
1	50	2	7	37
2	25	3	4	55
3	30	1	3	34
4	70	5	2	26
5	60	4	2	55
6	45	4	5	20
7	50	3	3	15

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

[OR]

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

Machine\Job	1	2	3	4	5
1	5	4	7	2	8
2	8	6	9	3	5
3	2	5	2	6	4
4	6	2	4	3	5

15.A. Obtain the sequence to minimize mean tardiness using Dynamic programming method. Assume the data from question no.12A.

[OR]

15.B. Write short notes on:

- Ignall Schrage algorithm
- Dynamic job shop simulation