

END SEMESTER EXAMINATIONS, NOVEMBER 2011
ANNA UNIVERSITY, CHENNAI 25.
B.E. Industrial Engineering
IE9403 OPERATIONS SCHEDULING

(24)

Duration: 3 hours

Max. marks = 100

PART A (10x2=20 marks)

Answer all questions.

1. How will you graphically represent a job shop schedule?
2. Prove that SPT sequence minimizes maximum waiting time.
3. When do you employ Hodgson's algorithm? Bring out the steps in this algorithm.
4. Define In process inventory, as it relates to sequencing and scheduling.
5. Which algorithm is suitable for solving dependent job single machine sequencing problem to minimize mean flow time? What is the limitation of this algorithm?
6. Give the steps in Johnson's algorithm.
7. What is meant by 'pre empt resume mode'?
8. What are the characteristics of a flow shop model?
9. Name and indicate the meaning of dispatching rules used in job shop scheduling.
10. What is the principle behind neighborhood search technique?

PART B (5x16=80 marks)

Answer all questions.

11. Generate an active schedule for the following job shop data. (Break the tie using LPT rule). Draw the Gantt chart to show the schedule constructed.

Process time				Routing			
i\j	1	2	3	i\j	1	2	3
1	3	4	7	1	1	3	2
2	6	7	1	2	3	2	1
3	1	2	5	3	2	1	3
4	5	4	6	4	1	2	3

- 12.A. i) A parallel machine scheduling problem is given below. Employ Hu's algorithm to construct a schedule which would minimize the makespan. The number of machines available = 3.

Job	1	2	3	4	5	6	7	8
Successor	-	1	1	1	3	3	4	4

- ii) Assume that there are only two machines available, apply Muntz Coffman algorithm to get optimal schedule using the data given in (i). The process times for jobs are 5,7,4,2,4,2,5 and 8 respectively.

[OR]

- 12B. Determine an optimal schedule for five similar processors. Objective is to minimize mean weighted flow time. (Apply H_1 algorithm). Represent the schedule on a Gantt chart.

J	1	2	3	4	5	6	7	8	9	10
t_j	16	9	24	30	14	7	28	41	36	10
W_j	3	3	6	5	4	1	2	5	4	2

- 13.A. Design a schedule using Branch and Bound technique for the following single machine problem to minimize the average tardiness.

Job #	Process time	Due date
A	11	17
B	14	19
C	21	27
D	8	12
E	7	10

[OR]

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

i\j	1	2	3	4
1	-	9	2	4
2	7	-	12	1
3	3	9	-	4
4	9	3	6	-

- 14.A. The flow shop data is shown in the table. The objective is to minimize the sum of inventory and penalty costs. Determine the total cost of the schedule derived from CDS algorithm.

m/c\job	1	2	3	4
1	11	3	7	9
2	4	8	10	6
3	6	7	1	5
4	2	13	5	5
5	6	3	9	12
Due date	36	38	34	40
Holding cost	5	7	2	4
Penalty cost	3	3	6	7

[OR]

- 14.B. Flow shop data is shown in the table. Use Ignall-Schrage algorithm and prepare the schedule.

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

- 15.A. There are nine jobs to be scheduled in a flow shop. The jobs after being processed on the gear cutting machine require the lapping machine.

Job	Lot size	Operation time/item		Set up time in G.C. m/c (minutes)
		G.C. m/c	L. m/c	
1	50	2	7	37
2	25	3	4	55
3	30	6	3	34
4	70	5	2	26
5	60	4	2	55
6	45	4	5	20
7	55	3	4	17
8	60	2	5	24
9	40	3	1	31

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

[OR]

- 15.B. Write short notes on:
- i) Application of Palmer's algorithm
 - iii) Dynamic job shop simulation