M.E. DEGREE EXAMINATIONS: MAY / JUNE 2010

Second Semester

INDUSTRIAL ENGINEERING

IEE505: Operations Scheduling

Time: Three Hours   **Maximum Marks: 100**

Answer All the Questions:- PART A (10 x 2 = 20 Marks)

1. Solve the flow shop problem using Johnson's rule.

Job	1	2	3	4	5
Machine 1 t_j	23	12	9	8	5
Machine 2 t_j	6	11	4	16	7

2. Define 'mean flow time' as the term related to scheduling of jobs on a single machine.

3. The data on a single machine sequencing problem is given below:

Job	A	B	C	D	E
Process time	3	5	1	6	3
Due date	16	10	8	7	9

4. What is the objective of Jackson's algorithm? Under what circumstances this algorithm can be used?

5. Describe the procedure followed in palmer's heuristic used to solve flow shop problem.

6. What is mean by active schedule?

7. List and explain the performance measures of single machine scheduling problems.

8. State the condition to be satisfied for the extension of Johnson's algorithm to the 3 machine problem.

9. State the objective of assembly line balancing.

10. In what type of production scheduling Giffler Thomson algorithm is applied?

PART B (5 x 16 = 80 Marks)

11. (a) Use Hudgson's algorithm to reduce the tardiness.

j	t_j	d_j
1	1	2
2	5	7
3	3	8
4	9	13
5	7	11

(OR)

(b) Use Neighbourhood search method and reduce the tardiness.

j	t_j	d_j
1	1	2
2	5	7
3	3	8
4	9	13
5	7	11

12. (a) Reduce the weighted mean flow time in a 5 machine problem using Hm algorithm.

j	1	2	3	4	5	6	7	8	9	10
t_j	5	21	16	6	26	19	50	41	32	32
w_j	4	5	3	1	4	2	5	4	3	2

(OR)

(b) Solve using MUNTZ- COFFMAN algorithm, when number of machine = 2.

j	1	2	3	4	5	6
t_j	2	1	2	2	2	1
s_j	5	6	4	6	6	-

13. (a) Apply palmer's method to obtain optimum schedule for the flow shop data given below, m = 2.

j	1	2	3	4
Machine A	4	6	2	4
Machine B	6	3	5	9

(OR)

(b) Apply Johnson's rule to obtain optimum schedule for the flow shop data given below.

job	M_1	M_2	M_3
1	8	5	4
2	10	6	9
3	6	2	8
4	7	3	6
5	11	4	5

14. (a) Describe the various priority rules in detail.

(OR)

(b) Find the schedule using non- delay schedule generation heuristic with following rules.

1st level – MWKR, 2nd level – SPT, 3rd level – Random

Job	Process timing			Routing (machines)		
	Operation			Operation		
	1	2	3	1	2	3
1	2	3	4	1	2	3
2	4	4	1	3	2	1
3	2	2	3	2	3	1
4	3	3	1	1	3	2

15. (a) Solve the line balancing problem given below using RPW method.

Task	Performance time (seconds)	Task that must proceed
A	48	-
B	6	A
C	12	B
D	22	-
E	16	C,D
F	21	C,E
G	6	F
H	9	G
I	12	-
J	20	G,I
K	35	H,J

(OR)

(b) The following table provides the facility (F) and the time required for completing all the processes in the facility for all the (K) operations of all jobs (C).

Jobs	operations			Processing time		
	1	2	3	F_1	F_2	F_3
C_1	F_3	F_1	F_2	4	2	7
C_2	F_2	F_3	F_1	3	5	6
C_3	F_2	F_1	F_3	2	4	3

Note:
C – Job identifier
K- Operation number
F – Facility identifier
Find an active feasible schedule using Giffer Thomson algorithm resolving the Conflicts applying SPT rule.

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