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M.E DEGREE EXAMINATIONS: MAY/JUNE 2013

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. Define ‘schedule’.
2. List out the performance measures of single machine scheduling problems.
3. What is the meaning of weighted mean flow time?
4. Indicate the steps followed in McNaughton’s algorithm.
5. What is the application of muntz-colfman algorithm?
6. What is the objective of jackson’s algorithm?
7. Describe the procedure followed in palmer’s heuristic used to solve flow shop problem.
8. What do you mean by non delay schedule? Give an example.
9. Define a single-pass approach.
10. What is the objective of the tree search method?

PART B (5 x 16 = 80 Marks)

11. a) (i) Consider the following data of single machine scheduling problem. (8)

Job ‘j’	1	2	3	4	5	6	7	8
Processin time ‘t_j’	5	12	9	10	2	14	7	6
Due date’d_j’	10	18	10	16	6	25	15	18

Find the job sequence for minimum number of tardy jobs.

(ii) Sate the characteristics of single machine problem. (8)

(OR)

b) (i) The data on a single machine sequencing problems given below: (8)

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

Compute the mean tardiness for EDD sequence.

(ii) Consider the following single machine-scheduling problem. (8)

Job (j)	1	2	3	4	5
Processing time (t) (hrs)	15	4	5	14	8

Find the optimal sequence, (SPT RULE) which will minimize the mean flow time and also obtain the minimum mean flow time.

12. a) Determine the optimal sequence by using WILKERSON IRWIN METHOD.

Job (j)	1	2	3	4
Processing time (t)	5	7	6	4
Due date	6	8	9	10

(OR)

b) (i) Consdier the following set of jobs that are to be scheduled in 3 identical processors in parallel. (10)

Job j	1	2	3	4	5	6	7	8	9
Processing time t_j	6	5	7	3	4	8	10	2	13

Find a non pre-emptive schedule resulting from the LPT heuristic procedure.

(ii) Solve the problem given in (i) to minimize the mkespan assumbing preemption is permitted. (6)

13. a) (i) Describe the procedure followed in Milten's algorithm used to solve flow shop models (8)

(ii) Explain the structure of the Gantt chart. (8)

(OR)

b) (i) State the condition to be satisfied for the extenstion of johnson's algorithm to the 3 m/c flow shop makespan sequence (4)

(ii) Consider the following job times for a three machine problem. Assume that the jobs are processed in the sequence A-B-C (12)
Machine

Jobs	1	2	3	4	5
A	4	9	8	6	5
B	5	6	2	3	4
c	8	10	6	7	11

Find the optimal sequence for minimum makespan and draw its corresponding Gantt Chart.

14. a) (i) Explain detail about the non-delay schedule,semi active and active schedule. (8)

(ii) Describe the the various dispatching rules used in dynamic job shop problem. (8)

(OR)

b) Consider a four-job, three-machine job shop problem with the following processing times.

Find the schedule using non-delay schedule generation heuristic with following rules.
1st level-MWKR, 2nd level-SPT, 3rd level –random

Processing times operation				Routings operation			
	1	2	3		1	2	3
Job 1	4	3	2	Job 1	1	2	3
Job 2	1	4	4	Job 2	2	1	3
Job 3	3	2	3	Job 3	3	2	1
Job 4	3	3	1	Job 4	2	3	1

15. a) (i) What is COMSOAL? Explain. (8)

(ii) Explain the meaning of datum time as used in Giffler Thompson algorithm. (8)

(OR)

b) (i) Deccribe the procedure adopted in RPW and inverse RPW methods of line balancing. (8)

(ii) Solve the line balancing problem given below using RPW method. (8)

s.no	Task	Performance time (seconds)	Task that must preceed
1	A	48	-
2	B	6	A
3	C	12	B
4	D	22	-
5	E	16	C,D
6	F	21	C,E
7	G	6	F
8	H	9	G
9	I	12	-
10	J	20	G,I
11	K	35	H,J

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