RollNo. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, APRIL/MAYDEC 2024

INDUSTRIAL ENGINEERING – VI SEMESTER
IEM503 – OPERATIONS MANAGEMENT
(Regulation-2019)

Time:3hrs Max.Marks: 100

CO1	Appreciate the role of operations manager and exposure to Product and Process Planning
CO2	Obtain sufficient knowledge and skills to apply Work Study and Layout Design concepts to maximise Productivity
CO3	Formulate and Assess Aggregate Planning strategies and Materials Requirement Plan.
CO4	Analyse the quality and the reliability of a system and propose strategies to improvement.
CO5	Apply Scheduling, Line balancing and Lean Concepts for improving System Performance

BL – Bloom's Taxonomy Levels
(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A(10x2=20Marks)
(Answer all Questions)

Q.No.	Questions	Marks	CO	BL
1	What is difference between short term and long term capacity planning ?	2	1	L3
2	Define product life cycle?	2	1	L1
3	What are the benefits of computerized layout planning?	2	2	L2
4	Explain about micro motion and memo motion study?	2	2	L1
5	Where can use aggregate planning strategies?	2	3	L1
6	Define MRP how will you related with MPS?	2	3	L4
7	Why need for controlling quality in organization?	2	4	L1
8	What is meaning of k out of m modelling with example?	2	4	L2
9	write the procedure involved in single machine scheduling?	2	5	L2
10	Explain about JIT?	2	5	L2

PART- B(5x 13=65Marks)

Q.No.	Questions	Marks	CO	BL
11 (a)	(i)Explain about types of line balancing methods? (ii)Draw & write the product life cycle with example?	8 5	1	L2
	OR			
11 (b)	(i) What are the systematic steps in capacity planning?	5	1	L3

	(ii) Differentiate production management & Operation Management ?	8		
12 (a)	(i) Explain about various types of facility layouts along with their advantages and disadvantage.?	13	2	L4
	OR			
12 b)	(i) Write the steps involved in ALDEP computerized layout planning techniques? (ii) Write the flow process involved in the Systematic layout planning	5 8	2	L4
13 (a)	(i) Explain about aggregate planning strategies? (iii) Briefly explain the objectives of Master production scheduling ?	5 8	3	L4
	OR			
13 b)	(i) The forecast for a group of items is reproduced below	13	3	L5

Quarter	Demand	Cumulative Demand
1	270	270
2	220	490
3	470	960
4	670	1630
5	450	2080
6	270	2350
7	200	2550
8	370	2920

(a) Suppose that the firm estimates that it costs 150 per unit to increase the production rate,200 per unit to decrease the production rate, 50 per unit per quarter to carry the items on inventory and 100 per unit if subcontracted. Compare the cost incurred if pure strategies are followed.

(b) Given these costs, evaluate the following mixed strategy.

The company decides to maintain a constant production rate of 250 units per quarter and permits 20 per cent overtime when the demand exceeds the production rate. The incremental cost of overtime is 25 per unit. It plans to meet the excess demand by hiring and firing of workers.

Use different pure strategies

(i) Vary the work force size

(ii) Changing inventory levels

(iii) Subcontracting

14 (a)	Draw the framework of MRP II system with classifications?		4	L5

14 (b)	(i) Alpha electronic company manufactures cathode ray tubes on mass production basis. At some intermediate point of production line, 15 samples of size 50 each have been taken. Tubes within each sample were classified into good or bad. The related data are given in the following table. Construct a P-chart with 3 sigma limit and comment on the process. (8M)	8	4	L3
	(ii) The following table gives the number of missing rivets noted in a newly fabricated bus.Construct a C-chart	5		

Sample Number	Number of Defective Tubes	Percentage of Defective Tubes
1	10	0.20
2	10	0.20
3	9	0.18
4	10	0.20
5	4	0.08
6	6	0.12
7	2	0.04
8	3	0.06
9	9	0.18
10	4	0.08
11	8	0.16
12	11	0.22
13	8	0.16
14	10	0.20
15	9	0.18

Bus Number	1	2	3	4	5	6	7	8
Number of missing rivets (c)	14	13	26	20	9	25	15	11

15 (a)	14. (i) Explain about mura muri muda in lean manufacturing system(5M)? (ii) Consider the following single machine scheduling problem. (8M)	5 8	5	L2

Job (j)	1	2	3	4	5
Processing time (t_j)	10	8	8	7	12
Due date (d_j)	15	10	12	11	18

Determine the sequence which will minimize the maximum lateness (Lmax). Also, determine the Lmax with respect to the optimal sequence.

OR

15 (b)	(i) Consider the following two machines and six jobs flow shop scheduling problem. Using Johnson's algorithm, obtain the optimal sequence which will minimize the makespan.	5 8	5	L2

Job *i*	Machine 1	Machine 2
1	5	4
2	2	3
3	13	14
4	10	1
5	8	9
6	12	11

(ii) what are the phases involved in production activity control?

PART- C(1x 15=15Marks)

(Q.No.16 is compulsory)

Q.No.	Questions	Marks	CO	BL
16.	(i) Use graphical method to minimize the time needed to process the following jobs on the machines shown (i.e. for each machine, find the job which should be scheduled first). Also, calculate the total time elapsed to complete both jobs.	10	5	L4
	(ii) Explain about theory of constraints & its applications	5		

Job 1	Sequence	A	–	B	–	C	–	D
	Time (Hrs)	3		4		2		6
Job 2	Sequence	B	–	C	–	A	–	D
	Time (Hrs)	5		4		3		2