BACHELOR OF ENGINEERING IN
FOOD TECHNOLOGY AND BIO-CHEMICAL ENGINEERING EXAMINATION, 2022

(4th Year, 2nd Semester)

INDUSTRIAL MANAGEMENT

Time : Four hours   Full Marks : 70

Answer any *five* questions

Industrial Management

Answer any five questions.

1. (a) The company XYZ has an annual demand of 4000 units of an item. The cost of each item is Rs. 90. The cost of placing an order is Rs. 25 and the inventory carrying cost is Rs. 9. Assume 250 working days per year. Determine (i) EOQ, (ii) Optimal number of orders per year, (iii) The optimal order cycle time, (iv) total cost comprising total annual ordering cost and the carrying cost if the EOQ is used.

(b) Derive the formula of the EOQ you use in (a).

(c) What is the purpose of the ABC classification system?   [14]

2. (a) Determine the optimum sequence for processing the jobs shown below through two work centres in flow shop scheduling. Times at each centres are in hours.

Job	1	2	3	4	5	6	7
Work Centre 1	6	8	18	15	16	6	10
Work centre 2	12	7	9	10	8	8	5

Compute the throughput time for the optimum sequence of jobs obtained and the corresponding idle time at the two work centres.

(b) What is the difference between flow shop scheduling and job shop scheduling?   [14]

3. for a company, following data is available.

Fixed cost = Rs. 2×10^5; variable cost/unit product = Rs. 200; price/unit product = Rs. 300; actual quantity of production produced by the company = 5000 units. Determine the break-even quantity, the angle of incidence, and the margin of safety. Derive the formula of the break-even quantity.   [14]

4. The manager of an oil refinery must decide on the optimal mix of two possible blending processes of which the inputs and outputs run are as follows.

Process (units)	Input (units)		Output (units0	
	Grade A	Grade B	Gasoline X	Gasoline Y
1	5	3	5	8
2	4	5	4	4

The maximum amounts available of crudes A and B are 200 units and 150 units respectively. Market requirements show that at least 100 units of gasoline X and 80 units of gasoline y must be produced. The profits per production run for process a and process 2 are Rs. 300 and Rs. 400 respectively. Formulate the LP model and solve using graphical method.   [14]

5. Determine the initial basic feasible solution of the following transportation problem by using North-West Corner rule and VAM.

Source		D1	D2	D3	D4	Supply
			Destination			

[Turn over

6. Develop the network based on AOA and determine the critical path with the corresponding project duration.

Activity	A	B	C	D	E	F	G	H	I	J	K
Immediate predecessor(s)	----	A	A	B	D	C	E, F	G	G	H,I	J
Normal time (days)	4	6	3	6	14	5	2	2	3	4	2

[14]

7. A department has six employees with six jobs to be performed. The time (in hours) each person will take to perform each job is given in the following matrix.

		Employees					
		1	2	3	4	5	6
	A	21	5	21	15	15	38
Jobs	B	30	11	16	8	16	4
	C	28	10	11	11	15	11
	D	19	16	17	15	19	8
	E	26	21	22	28	29	14
	F	3	21	21	11	26	11

How should the jobs be allocated, one per employee, so as to minimize the total time?   [14]

8. (a) What are the probability distributions used in PERT analysis?

(b) What is linear programming? Define optimal solution and basic feasible solution?

(c) What are the differences between PERT and CPM?   [14]

END