

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur (GIET University)



B. Tech.(Sixth Semester – Regular/Supplementary) Examinations, April 2025
21BMEPC36003/22BMEPC36003 – Production and Operations Management
(Mechanical Engineering)

Time: 3 hrs

Maximum: 70 Marks

(The figures in the right hand margin indicate marks)

PART – A**(2 x 5 = 10 Marks)**Q.1. Answer **ALL** questions

- List various symbols used in operation process chart.
- Explain the main purpose of method study in industrial engineering.
- Explain the concept of forecasting error and give an example.
- Mention the importance of Safety stock in Inventory.
- Explain the term “sequencing” in the context of operations scheduling.

CO #	Blooms Level
CO1	K1
CO1	K2
CO2	K2
CO3	K1
CO4	K2

PART – B**(15 x 4=60 Marks)**Answer **ALL** the questions

- What is multiple activity chart? Illustrate it with an example.
 - Explain about the different process technologies.
- (OR)
- An 8 hrs work measurement study in a plant reveals the following-
Unit produced= 320
Idle time= 15%
Performance rating= 120%
allowance= 12% of normal time
Determine the standard time per unit produced.
 - A work sampling study is to be made for a typist. It is felt that typist is idle 30% of the time. How many observations should be made in order to have 95% of confidence so that accuracy is within +-5%.
 - Potential locations A, B and C have the cost structure shown below for manufacturing a product expected to sell for Rs. 270 per unit. Find the most economical location for an expected volume of 2000 units per year and also determine the optimum volume range for each location.

Marks	CO #	Blooms Level
8	CO1	K1
7	CO1	K2
8	CO1	K3
7	CO1	K3
8	CO2	K3

Site	Fixed cost /year (Rs.)	Variable cost/ unit (Rs.)
A	65000	120
B	75000	56
C	55000	425

- A firm believes that its annual profit depends on its expenditures for research. The information for the preceding six years is given below. Estimate the profit when the expenditure is 6 units.

Year	1	2	3	4	5	6
Expenditure	2	3	5	4	11	5
Annual profit(Y)	20	25	34	30	40	31

7 CO2 K3

(OR)

- What are the factors influencing the plant and warehouse locations selection? Explain any one facility location selection model.

10 CO2 K1

- d. Discuss the merits and demerits of process layout and product layout. 5 CO2 K2
- 4.a. List and explain the various pure strategies and mixed strategies. 8 CO3 K2
- b. What is Material Requirement Planning. State its objective and function. 7 CO3 K1

(OR)

- c. The store of an oil engine repair shop has 10 items whose details are shown in the following table. Apply ABC analysis to the store.

Component code	Description	Price/unit	Units/year
C01	Packing thread	100	100
C02	Tower bolt	200	300
CO3	Hexagonal nut	50	700
CO4	Bush	300	400
CO5	Coupling	500	1000
CO6	Bearings (Big)	3000	30
CO7	Bearing (Small)	1000	100
CO8	FUEL PUMP	7000	500
CO9	Fixture	5000	105
CO10	Drill bit	60	1000

8 CO3 K3

- d. The demand for an item is 18000 per year. Its production rate is 1000 per month. The carrying cost is Rs. 0.15/unit/month and the set-up cost is Rs. 500 per set-up. The shortage cost is Rs. 20 per unit per year. Find the various parameters for inventory system. 7 CO3 K3
- 5.a. Consider the following two machines and six jobs flow shop scheduling problem. Using Johnson's algorithm, obtain the optimal sequence which will minimize the make span and also calculate the idle time for each machine.

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

10 CO4 K3

- b. Write short notes on ISO9000.

5 CO4 K1

(OR)

- c. A small engineering project consists of 9 activities. Three time estimates for each activity are given in table.

(i) Draw the network diagram and mark t_e on each activity.

(ii) Calculate EST and LFT and mark them on the network diagram.

(iii) Find the length of critical paths or the total project duration.

Activity	1-2	1-6	2-3	2-4	3-5	4-5	6-7	5-8	7-8
Time									
T_0	2	2	5	1	5	2	3	2	7
T_m	5	5	11	4	11	5	9	2	13
T_p	14	8	29	7	17	14	27	8	31

10 CO4 K3

- d. State the differences between PERT and CPM.

5 CO4 K2

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