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GIET MAIN CAMPUS AUTONOMOUS GUNUPUR – 765022

B. Tech Degree Examinations, November – 2021

(Seventh Semester)

BCHPE7050 – Industrial Engineering

(Chemical Engineering)

Time: 3 hrs

Maximum: 100 Marks

Answer ALL Questions**The figures in the right hand margin indicate marks.****PART – A: (Multiple Choice Questions)****(2 x 10 = 20 Marks)****Q.1. Answer ALL questions**

[CO#] [PO#]

- | | | | |
|--|---|-----|-----|
| a. Work study is also recognized as | | CO1 | PO1 |
| (i) Time study | (ii) Motion study | | |
| (iii) Both time study and motion study | (iv) None of the above | | |
| b. In process charts, the symbol used for storage is | | CO1 | PO1 |
| (i) Circle | (ii) Square | | |
| (iii) Arrow | (iv) Triangle | | |
| c. PMTS stands for _____ | | CO1 | PO1 |
| (i) Predetermined motion time system | (ii) Predetermined monitoring time system | | |
| (iii) Productive motion time system | (iv) None of these | | |
| d. The ship building industry commonly employs _____ layout. | | CO2 | PO1 |
| (i) Process | (ii) Product | | |
| (iii) GT | (iv) Fixed position | | |
| e. The range of smoothing constant in exponential smoothing method is _____ | | CO2 | PO1 |
| (i) 1 to 3 | (ii) 0.01 to 0.03 | | |
| (iii) 0.1 to 0.3 | (iv) None of these | | |
| f. Planned order release quantity is equal to _____. | | CO4 | PO1 |
| (i) Stock on hand | (ii) Projected requirement | | |
| (iii) Economic order quantity | (iv) None of these | | |
| g. In _____, an attempt will be made to reduce the project completion time earlier than the project completion time. | | CO3 | PO1 |
| (i) CPM | (ii) PERT | | |
| (iii) Project crashing | (iv) Resource allocation | | |
| h. The duration of dummy activity in a project network is _____. | | CO3 | PO1 |
| (i) Infinity | (ii) A very large value | | |
| (iii) Zero | (iv) one | | |
| i. _____ cost decreases when the order size is increased. | | CO4 | PO1 |
| (i) Carrying | (ii) Ordering | | |
| (iii) Both carrying and ordering | (iv) None of these | | |
| j. EOQ corresponds to the _____ point in the total cost curve. | | CO4 | PO1 |
| (i) Maximum | (ii) Minimum | | |
| (iii) Average | (iv) None of these | | |

PART – B: (Short Answer Questions)**(2 x 10 = 20 Marks)****Q.2. Answer ALL questions**

[CO#] [PO#]

- | | | |
|---|-----|-----|
| a. Write down the names of different process technologies. | CO1 | PO1 |
| b. Define quality and productivity. | CO1 | PO1 |
| c. Explain the concepts involved in new product design | CO1 | PO1 |
| d. What are the factors affecting plant location? | CO2 | PO2 |
| e. State the importance of forecasting error calculation and types. | CO2 | PO1 |
| f. What is multiple activity chart? Illustrate it with an example. | CO2 | PO1 |
| g. What are the relevant costs of inventory system? | CO3 | PO1 |

- | | | |
|--|-----|-----|
| h. Mention the importance of Safety stock in Inventory. | CO3 | PO1 |
| i. State the conditions for Johnson's rule to apply in m-machine and n-job problems. | CO4 | PO1 |
| j. Distinguish between PERT and CPM. | CO4 | PO1 |

PART – C: (Long Answer Questions)

(15 x 4 = 60 Marks)

Answer ALL questions

Marks [CO#] [PO#]

3. a. Suppose that there are 5 existing plants, which have a material movement relationship with a new plant. Let the existing plants have locations of (400, 200), (800, 500), (1100, 800), (200, 900) and (1300, 300). Furthermore suppose that the numbers of tons transported per year from the new plant to various existing plants are 450, 1200, 300, 800, and 1500, respectively. Then determine optimum location for new plant such that the distance moved (cost) is minimized.

15 CO1 PO2

(OR)

- c. What is time study? Explain in detail, the steps involved in time study.
- d. State the objectives of plant layout design. Classify the layouts
4. a. A job consisting of three work elements and all are performed by the same operator. An analyst conducted work sampling to determine the standard time for the job. The duration of the study is one shift with 400 min. of effective time. The details of observations are summarized in the following table. The total number of acceptable units produced during the study period is 150 units. Determine the standard time by assuming allowance of 10%.

10 CO1 PO1

5 CO1 PO1

15 CO2 PO2

Work number	element	Frequency of performance	Performance rating
1		70	80%
2		80	120%
3		50	110%

(OR)

- c. Write short notes on-i) Product life cycle ii) Concurrent engineering
5. a. A firm uses simple exponential smoothing with $\alpha=0.3$ to forecast demand. The forecast for the first week of January was 500 unit, whereas actual demand turned out to be 450.
- i. Forecast the demand for the second week of January
- ii. Assume that the actual demand during the second week of January turned out to be 550 units. Forecast the demand up to February third week, assuming the subsequent demands as 475, 450, 470, 525, and 470 units

15 CO1 PO1

15 CO2 PO2

(OR)

- c. A manufacturer purchases items in lots of 1000 units which is a requirement for one quarter. The cost per unit is Rs. 200/-. The ordering cost is Rs. 100/- per order. The quarterly inventory carrying cost rate is 5%. Find out the Economic Order Quantity and the Total Annual Cost.
6. a. Consider the following 3 machines and 5 jobs flow shop problem. Find the makespan and the idle time of each machine.

15 CO3 PO2

JOB:	1	2	3	4	5
M ₁ :	8	10	6	7	8
M ₂ :	5	6	2	3	4
M ₃ :	4	9	8	6	5

15 CO4 PO2

(OR)

- c. What is Kaizen? Explain.
- d. What are the benefits of TQM?

8 CO4 PO1

7 CO4 PO1

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