Printed Page:-04 **Subject Code:- AME0603**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: III - THEORY EXAMINATION (2024 - 2025)

Subject: Industrial Engineering

Time: 3 Hours **Max. Marks: 100**

General Instructions:

IMP: *Verify that you have received the question paper with the correct course, code, branch etc.*

1. *This Question paper comprises of* ***three Sections -A, B, & C.*** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

2. *Maximum marks for each question are indicated on right -hand side of each question.*

3. *Illustrate your answers with neat sketches wherever necessary.*

4. *Assume suitable data if necessary.*

5. *Preferably, write the answers in sequential order.*

6. *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*

SECTION-A 20

1. Attempt all parts:-

1-a. Vehicle manufacturing assembly line is an example of [CO1,K1] 1

(a) Product layout

(b) Process layout

(c) Manual layout

(d) Fixed layout

1-b. Which one of the following combinations is valid for product layout? [CO1,K1] 1

(a) General purpose machine and unskilled labour

(b) Special purpose machine and semi-skilled labour

(c) General purpose machine and skilled labour

(d) Special purpose machine and skilled labour

1-c. When using a simple moving average to forecast demand, one would. [CO2,K1] 1

(a) Give equal weight to all demand data.

(b) Assign more weight to the recent demand data.

(c) Include new demand data in the average without discarding the earlier data.

(d) Include new demand data in the average after discarding some of the earlier demand data

1-d. The MRP forms a vital link between sales and production as follows: [CO2,K1] 1

(a) The MRP makes possible valid order promises.

(b) The MRP is a plan of what is to be produced and when.

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(c) The MRP is a contract between marketing and manufacturing.

(d) All of the above

1-e. Arrivals at a telephone booth are considered to be Poisson, with an average time of 10 minutes between successive arrivals. The length of a phone call is distributed exponentially with mean 3 min. The probability that an arrival does not have to wait before service is: [CO3,K2] 1

(a) 0.3

(b) 0.5

(c) 0.7

(d) 0.9

1-f. The inter-arrival times at a tool crib are exponential with an average time of 10 minutes and the length of the service time is. [CO3,K2] assumed to be exponential with mean 6 minutes. The probability that a person arriving at the booth will have to wait is equal to: 1

(a) 0.15

(b) 0.04

(c) 0.42

(d) 0.6

1-g. Work study examines. [CO4,K1] 1

(a) method

(b) duration of work

(c) both ‘a’ and ‘b’

(d) NONE of the above

1-h. The correct order of procedure in method study is. [CO4,K1] 1

(a) Select – Record – Examine – Develop – Define – Install – Maintain

(b) Select – Define – Examine – Develop – Record – Install – Maintain

(c) Select – Record – Develop – Examine – Define – Install – Maintain

(d) Select – Record – Examine – Define – Develop – Install – Maintain

1-i. A feasible solution to a linear programming problem _____. [CO5,K1] 1

(a) must satisfy all the constraints of the problem simultaneously

(b) need not satisfy all of the constraints, only some of them

(c) must be a corner point of the feasible region.

(d) must optimize the value of the objective function

1-j. _____ is a mathematical technique used to solve the problem of allocating limited resource among the competing activities. [CO5,K1] 1

(a) Linear Programming problem

(b) Assignment Problem

(c) Replacement Problem

(d) Non linear Programming Problem

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2. Attempt all parts:-

2.a. Distinguish between production and productivity. [CO1,K2] 2

2.b. Distinguish between float and slack. [CO2,K2] 2

2.c. What are the basic characteristics of a queuing system? [CO3,K2] 2

2.d. Write down the importance of Motion Economy. [CO4,K2] 2

2.e. What is linear programming? [CO5,K1] 2

SECTION-B 30

3. Answer any five of the following:-

3-a. What are the various computerized techniques used for plant layout. [CO1,K2] 6

3-b. Setting up an Industry in rural area is more advantageous. Justify [CO1,K2] 6

3-c. A project is composed of the following activities whose time estimates in days are given below. Draw the network.. [CO2,K3] 6

Activity	A	B	C	D	E	F
Immediate predecessor(s)	-	A	A	B	C	D,E
Duration in weeks	2	5	1	1	6	1

3-d. what do you understand by material requirement planning (MRP). also explain input and output of MRP. [CO2, K2] 6

3.e. What are the functions of inventory control? [CO3, K2] 6

3.f. Explain the concept of value engineering. With a neat Flow Chart Explain the phases of Value Engineering Job Plan. [CO4 K3] 6

3.g. Write the steps involved in the North-West Corner Rule for finding an initial basic feasible solution to a transportation problem. [CO5 K3] 6

SECTION-C 50

4. Answer any one of the following:-

4-a. Explain the elements of Flexible manufacturing system with help of block diagram. Write down the advantage and disadvantages of FMS. [CO1, K2] 10

4-b. What are the factors governing the plant location. Explain with any one specific industry. [CO1, K2] 10

5. Answer any one of the following:-

5-a. For a certain project the data is given below. Draw the network diagram, Compute EST,EFT,LST,LFT and slack also identify the critical path. [CO2,K3] 10

Activity	1-2	1-4	1-7	2-3	3-6	4-5	4-8	5-6	6-9	7-8	8-9
Expected time (in months)	2	2	1	4	1	3	8	4	3	3	5

5-b. The following table shows the jobs of a network along with their time estimates. 10

Draw the project network and find the probability of project completion in 40 days [CO2, K3]

JOB	1-2	1-6	2-3	2-4	3-5	4-5	6-7	5-8	7-8
to	1	2	2	2	7	5	5	3	8
tm	7	5	14	5	10	5	8	3	17
tp	13	14	26	8	19	17	29	9	32

Question Instruction

6. Answer any <u>one</u> of the following:-

6-a. The demand for an item is deterministic and constant over tme and is equal to 600 units per year. The per unit cost is Rs.50, while the cost of placing an order is Rs.5. The inventory carrying cost is 20 percent of the cost of inventory per annum and the cost of shortage is Rs.1 per unit, per month. Find the optimal quantity when tock outs are permitted. If stock outs are not permitted, what would be the loss to the company? [CO3,K3] 10

6-b. In a bank there is only on window. A solitary employee performs all the service required and the window remains continuously open from 7am to 1pm. It has discovered that an average number of clients is 54 during the day and the average service time is 5mins / person. Find
a) Average number of clients in the system .
b) Average waiting time.
c) The probability that a client has to spend more than 10mins in a system. [CO3,K3] 10

7. Answer any <u>one</u> of the following:-

7-a. Illuminate various methods or techniques of work measurement. [CO4,K2] 10

7-b. Name various types of charts available for recording the data. Explain them in detail. [CO4,K3] 10

8. Answer any <u>one</u> of the following:-

8-a. Obtain an initial basic feasible solution to the following transportation problem using the Vogel Approximation method and obtain optimal solution [CO5,K4] 10

	1	2	3	4	Warehouse Capacity
1	11	13	17	14	250
2	16	18	14	10	300
3	21	24	13	10	400
Market Demand	200	225	275	250	

8-b. Solve the following assignment problem.[CO5,K4] 10

		Jobs			
		J_1	J_2	J_3	J_4
Workers	W_1	10	15	24	30
	W_2	16	20	28	10
	W_3	12	18	30	16
	W_4	9	24	32	18

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