Printed Page:- 05 **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 (2023 - 2024)

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) 1

(a) Product layout

(b) Process layout

(c) Manual layout

(d) Fixed layout

1-b. The layout suitable for the low demand and high variety product is: (CO1) 1

(a) Group layout

(b) Process layout

(c) Product layout

(d) Static layout

1-c. Which one of the following methods can be used for forecasting when a demand pattern is consistently increasing or decreasing? (CO2) 1

(a) Regression analysis.

(b) Moving average.

(c) Variance analysis.

(d) Weighted moving average

1-d. All major inputs to the MRP system include: (CO2) 1

(a) Master production schedule and bill of material.

(b) Bill of material and inventory records.

(c) Inventory records and master production schedule.

(d) Master production schedule, inventory records, and bills of material

1-e. A single-bay car wash with a Poisson arrival rate and exponential service time has cars arriving at an average rate of 10 minutes apart and an average service time of 4 minutes. What is the system utilization? (CO3) 1

(a) 1

(b) 0.67

(c) 0.4

(d) 0.24

1-f. If the arrival takes place every 10 minutes with a service times of 4 minutes per unit, then the mean arrival rate, mean service rate and the probability that one would have to wait will be respectively. (CO3) 1

(a) 10, 4 and 0.25

(b) 0.1, 0.25 and 0.4

(c) 10, 0.4 and 0.25

(d) 0.1, 0.25 and 0.1

1-g. Work study consists of (CO4) 1

(a) Effective use of plant and equipment

(b) Effective use of human effort

(c) Evaluation of human work

(d) All of the above

1-h. The following factor(s) must be considered while selecting the work for method study (CO4) 1

(a) Economic considerations

(b) Technical considerations

(c) Human reactions

(d) All of the above

1-i. In marking assignments, which of the following should be preferred? (CO5) 1

(a) Only row having single zero

(b) Only column having single zero

(c) Only row/column having single zero

(d) Column having more than one zero

1-j. A set of feasible solution to a Linear Programming Problem is _____ (CO5) 1

(a) Convex

(b) polygon

(c) triangle

(d) bold

2. Attempt all parts:-

2.a. What do you understand by productivity (CO1) 2

2.b. What is network scheduling? (CO2) 2

2.c. Explain the queue discipline and its various forms: (CO1) 2

2.d. Write down the advantages of time study (CO4) 2

2.e. What is the difference between feasible solution and basic feasible solution? (CO5) 2

SECTION B **30**

3. Answer any <u>five</u> of the following:-

3-a. What are advantages and disadvantages of urban and suburban locations for a plant? Compare rural and urban sites for the location of the plan (CO1) 6

3-b. Differentiate between process layout and product layout. (CO1) 6

3-c. Explain the shortest route problem with an example (CO2) 6

3-d. Explain the minimum spanning tree with an example. (CO2) 6

3.e. Derive the formula for determining EOQ for inventory model with uniform demand. (CO3) 6

3.f. What are the various types of allowances to be considered in the calculations of standard time (CO4) 6

3.g. How does the problem of degeneracy arise in a transportation problem? (CO5) 6

SECTION C **50**

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

4-a. Explain Group Technology. Explain in detail Production Flow Analysis method? Describe various benefits for Group Technology. (CO1) 10

4-b. Explain the principle of Unit Load. Also explain the different equipment used for Unit load formation. (CO1) 10

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

5-a. Determine the early start and late start in respect of all node points and identify critical path for the network as shown in Fig1. (CO2) 10

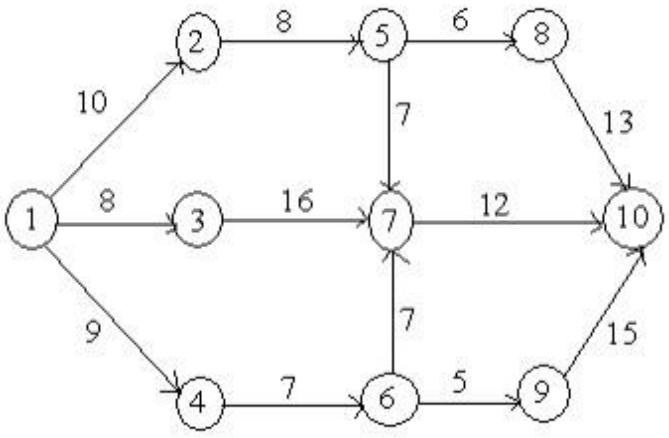

Fig1

5-b. Consider a PERT network for a project as shown in the table. Construct the network and find the expected completion time of the project and standard deviation of the critical path of the project. (CO2) 10

Activity	Most optimistic time	Most pessimistic time	Most likely time
(1 – 2)	1	5	1.5
2-3	1	3	2
2-4	1	5	3
3-5	3	5	4
4-5	2	4	3
4-6	3	7	5
5-7	4	6	5
6-7	6	8	7
7-8	2	6	4
7-9	5	8	6
8-10	1	3	2
9-10	3	7	5

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

6-a. A self service store employes one cashier at its counte. Nine customers arrive on an average every 5 minutes while the cashier can serve 10 customers in 5 minutes. Assuming poisson distribution for arrival rate and exponential distribution for service time, find (i) Average no of customers in the system. (ii) Average Que length (iii) Average time a customer spends in the system. (iv)Average time a customer wait before serve. (CO3) 10

6-b. In a self service store with one cashier, 8 customers arrive on an average of every 5 mins. and the cashier can serve 10 in 5 mins. If both arrival and service time are exponentially distributed, then determine a) Average number of customer waiting in the queue for average. b) Expected waiting time in the queue. c) What is the probability of having more than 6 customers in the system. (CO3) 10

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

7-a. Define Work Study. State its objectives. Differentiate between Method Study and Work Measurement (CO4) 10

7-b. Explain Predetermined Motion Time study(PMTS) and Method Time Measurement (MTM). (CO4) 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 (CO5) 10

	1	2	3	4	Supplies
1	20	25	28	31	200
2	32	28	32	41	180
3	18	35	24	32	110
Demands	150	40	180	170	

8-b. Solve the linear programming problem: Max Z = 3X1 + 2X2 10
Subjected to :
$4X1 + 3X2 \leq 12$
$4X1 - X2 \leq 8$
$X1 , X2 \geq 0$. (CO5)