Roll No: | | | | | | | | | | | | | |

BTECH
(SEM V) THEORY EXAMINATION 2023-24
INDUSTRIAL ENGINEERING

TIME: 3 HRS **M.MARKS: 100**

Notes: 1. Attempt all sections. if require any missing data; then choose suitably

SECTION A

1. Attempt all **2x10=20**

a.	Define Productivity and how productivity is measured.
b.	Explain the terms in brief. (i) Group Technology and (ii) Process Planning
c.	How is forecasting different from prediction?
d.	Explain the terms: (i) Crashing and (ii) Dummy Activity
e.	What is the breakeven point?
f.	Explain the term "depreciation".
g.	What is motion study?
h.	What is the purpose of work sampling?
i.	Why is simulation needed?
j.	What do you mean by Assignment?

SECTION B

2. Attempt any *03 parts* of the following: **10x3=30**

a.	Define Productivity. Explain different types of production systems with appropriate examples.
b.	Why do you need production planning and control?
c.	Explain the importance of 'ABC' analysis in the problem of inventory control of an organization using a large number of items
d.	Explain and overview about the Taylor's scientific management and Gilbert's contribution.
e.	How do you know the problem is unbalanced in the case of transportation problems?

SECTION C

3. Attempt any *01* part of the following: **10x1=10**

(a)	A company is manufacturing 24000 components per month by employing 100 workers in 8-hour shifts for 30 days. The company gets additional orders from the government to supply additional 6000 components. The management decides to employ additional workers to fulfill the demand on time: (i) 20 (ii) 25 (iii) 30 Compare all the above three conditions and give your statement in terms of productivity achieved after additional workers 20, 25, 30.
(b)	"Proper selection of material handling equipment is a must." Why? Explain the different principles of selecting material handling equipment.

4. Attempt any *01* part of the following: **10x1=10**

(a)	Explain the concept of JIT. How does it help the manufacturing system to improve productivity?
(b)	A small engineering project consists of six activities. The three-time estimates in the number of days for each activity are given below.

Activity	**t_o**	**t_m**	**t_p**
1-2	**2**	**5**	**8**
2-3	**1**	**1**	**1**

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3-5	**0**	**6**	**18**
5-6	**7**	**7**	**7**
1-4	**3**	**3**	**3**
4-5	**2**	**8**	**14**

(a) Calculate the value of expected time (t_e), Standard deviation (σ_t) and Variance (V_i) for each activity.
(b) Draw a network diagram and mark t_e on each activity.
(c) Calculate EST and LFT and mark them on the network diagram.
(d) Calculate the total slack for each activity.
Identify the critical path and mark on the network diagram.

5. Attempt any *01* part of the following: **10x1=10**

(a)	A repair shop is managed by a single worker. Customers arrive at the rate of 30 per hour. time required to provide service is exponentially distributed with a mean of 100 seconds. Find the mean waiting time of a customer, needing a repair facility in the queue. How do customer behaviors affect a queue?
(b)	What is VED analysis and explain their importance in materials management?

6. Attempt any *01* part of the following: **10x1=10**

(a)	Explain how 'Work study' and 'Work Measurement 'concepts can be utilized to improve 'Productivity'
(b)	Explain how with the help of ergonomic concepts motion economy can be ensured in designing a work-place-layout.

7. Attempt any *01* part of the following: **10x1=10**

(a) Solve the following LP problems using the simplex method.

Minimize Z = 3x + *2 y*

Subject to x+y □ 4
x -y □ 2
and x, y □ 0

(b) Transportation Cost in Rs.

	X	Y	Z	**Supply**
Vendor A	5	4	3	100
Vendor B	8	4	3	300
Vendor C	9	7	5	300
Demand	300	200	200	

Solve the problem with the help of NWCM and Check for the optimality.