

Seat No./Enrollment No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 6 – EXAMINATION – SUMMER 2026

Subject Code: 3161907

Date: 26/05/2026

Subject Name: Basics of Industrial Engineering

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**
- 4. Simple and non-programmable scientific calculators are allowed.**

- Q.1**
- (a)** Enlist the objectives of plant location selection **03**
 - (b)** Explain process layout **04**
 - (c)** Discuss the various factors to be considered for selection of site for Cement manufacturing plant. **07**

- Q.2**
- (a)** Explain job order production system **03**
 - (b)** Define: a) Routing, b) Scheduling, c) Loading and d) Dispatching with reference to PPC. **04**
 - (c)** The data given below represents sales figure of ABC company for 12 months for the year 2010. Compute three months moving average and forecast the demand for the month Jan 2011. **07**

Month	Demand/sale for month	Month	Demand/sale for month
Jan	96	Jul	76
Feb	101	Aug	79
Mar	88	Sep	107
Apr	124	Oct	105
May	91	Nov	90
Jun	97	Dec	84

OR

- Q.2**
- (c)** List down the methods of forecasting and discuss the various factors affecting the forecasting. **07**
- Q.3**
- (a)** Write the basic procedure of the method study. **03**
 - (b)** Discuss any two symbols of therbligs. **04**
 - (c)** Explain the need and procedure for line balancing. **07**

OR

- Q.3**
- (a)** Classify different recording techniques **03**
 - (b)** Explain cronocycle graph **04**
 - (c)** Explain the phases of PPC in detail **07**

- Q.4**
- (a)** Enlist techniques of work measurement. **03**
 - (b)** Explain the following quality indices; **04**
 - 1) Acceptance Quality Level 2) Rejectable Quality Level 3) Indifference Quality Level 4) Average Outgoing Quality

(c) Explain types of wage plans in detail. 07

OR

Q.4 (a) Explain fly back stop watch and non-fly back stop watch 03

(b) Explain Six sigma 04

(c) Enlist the methods of job evaluation. Explain any one with advantages and disadvantages. 07

Q.5 (a) Justify the need of industrial legislation. 03

(b) Write down the roll of quality engineer in manufacturing plant. 04

(c) Define and classify the waste with respect to Industry. 07

OR

Q.5 (a) Write down the characteristics of an entrepreneur. 03

(b) Explain Total Quality management. 04

(c) Explain the basic concept of ISO 9000 and ISO 14000 07

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI EXAMINATION – SUMMER 2025****Subject Code: 3161907****Date: 26-05-2025****Subject Name: Basics of Industrial Engineering****Time: 10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1*	(a) List the factors that influence the selection of a plant location.	03
	(b) Describe the impact of material handling considerations on plant layout.	04
	(c) Discuss the various factors to be considered for selection of site for Thermal Power plant.	07
Q.2	(a) List out advantage of Production Planning and Control	03
	(b) What do you mean by Process Planning? Explain step by step procedure of Process Planning	04
	(c) A Company has to choose one of three locations on basis of the given data, suggest a suitable location and justify	07

Factors	Location X	Location Y	Location Z
Total Investment	2,00,000	3,00,000	2,50,000
Cost of raw material	80000	75000	60000
Power and water supply expenses	20000	30000	25000
Cost of distribution	45000	40000	55000
Miscellaneous expenses	40000	30000	30000
Salaries and wages	20000	25000	20000
Expected sales	2,25,000	2,50,000	2,25,000

OR

	(c) Define the following types of production systems: Job Shop, Batch Production, Mass Production, and Continuous Production with example.	07
Q.3	(a) What is Productivity? Define various ways to increase Productivity	03
	(b) Explain with reference to PPC, the following: Routing, Scheduling, Loading and Dispatching.	04
	(c) List sales forecasting technique to develop a production plan. Explain any one in detail.	07

OR

Q.3	(a) Define Production and Productivity. List Factor affecting the Productivity.	03
	(b) State objective of work study.	04
	(c) What do you mean by Line balancing? What is the procedure for line balancing?	07

- Q.4 (a)** Define allowance: State importance of allowance. **03**
- (b)** Explain : **04**
- 1) Observed time
 - 2) Rating Factor
 - 3) Standard time
 - 4) Normal Time
 - 5) Working environment
 - 6) Anthropometry
- (c)** Briefly explain different types of wages. Also explain various types of incentives. **07**
- OR**
- Q.4 (a)** Write short note on : Ergonomics **03**
- (b)** Write short note on **04**
1. MTM
 2. PMT
- (c)** State various method of Job Evolution. Discuss in brief. **07**
- Q.5 (a)** What is Industrial Legislation and why it is required? **03**
- (b)** Discuss the function of inspection department in manufacturing plant. **04**
- (c)** Define waste. Classify waste in terms of industrial aspect? **07**
- OR**
- Q.5 (a)** What is Industrial Dispute? State aims of Industrial Dispute Act. **03**
- (b)** Define Following Terms: **04**
1. Quality Control
 2. Reliability
 3. Quality Audit
 4. Quality Assurance
 5. T.Q.M
- (c)** Differentiate between variable charts and attribute charts. **07**

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2024****Subject Code:3161907****Date:20-05-2024****Subject Name: Basics of Industrial Engineering****Time: 10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

- Q.1** (a) Define the following terms. **03**
1. Acceptable Quality Level (AQL)
 2. Rejectable Quality Level (RQL)
 3. Average Outgoing Quality (AOQ)
- (b) What type of layout is used in Shipbuilding? Justify your answer. **04**
- (c) Differentiate between Process layout and Product layout. **07**
- Q.2** (a) Enlist the factors influencing plant layout. **03**
- (b) List any eight objectives of Production Planning and Control. **04**
- (c) Explain operating characteristics curves for the acceptance sampling. **07**

OR

- (c) The following table shows the number of defects observed in 25 similar castings. **07**

Casting No.	No. of Defects	Casting No.	No. of Defects	Casting No.	No. of Defects
1	7	11	22	21	9
2	14	12	15	22	11
3	14	13	8	23	7
4	18	14	24	24	26
5	8	15	14	25	8
6	14	16	9		
7	8	17	9		
8	11	18	11		
9	20	19	10		
10	12	20	8		

1. Find $\bar{C}$.
2. Compute trial control limits.

- Q.3** (a) Define the following terms. **03**
1. Cycle time
 2. Balance Delay
 3. Line efficiency
- (b) For the following given data, calculate the forecast for the 11th month using 1) two months average; 2) Three months average. **04**

Month	1	2	3	4	5	6	7	8	9	10
Actual sale	10	12	8	11	9	10	15	14	16	15

- (c) Give a detailed explanation of the three phases of PPC. **07**

OR

- Q.3 (a)** Enlist the six applications of Sales forecasting techniques. **03**

- (b) The following table represents sales data of cars sold by XYZ showroom during the January to December month. Take $\alpha=0.2$ and for the January month forecast of 100 cars. Calculate the forecast value by the exponential smoothing method. **04**

Month	1	2	3	4	5	6	7	8	9	10	11	12
Actual sale	96	106	92	114	108	98	99	115	106	91	102	99

- (c) What is Line balancing? Discuss the steps involved in line balancing by taking a suitable example. **07**

- Q.4 (a)** What is Productivity? Enlist various ways to improve productivity. **03**

- (b) Make a list of the goals and objectives of Industrial Legislation. **04**

- (c) Discuss the Operation Process Chart by considering any appropriate example. **07**

OR

- Q.4 (a)** Define the following: **03**

1. Productivity
2. Work study
3. Ergonomics

- (b) What is Therbling? State its importance in micro motion study. **04**

- (c) Discuss the String diagram by considering any appropriate example and also state its advantages. **07**

- Q.5 (a)** Enlist the various kinds of waste. **03**

- (b) List out obstacles in the way of an Entrepreneur's development. **04**

- (c) Enlist various sampling plans and explain the Double sampling plan with suitable examples. **07**

OR

- Q.5 (a)** Briefly justify the need for waste management. **03**

- (b) State various government incentives to entrepreneurs. **04**

- (c) Define "Process capability". For the examples listed below, what will be the process's final outcome? **07**

1. $CP > 1$
2. $CP < 1$
3. $CP = 1$

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2023****Subject Code:3161907****Date:10-07-2023****Subject Name:Basics of Industrial Engineering****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

- Q.1** (a) Differentiate the product layout and process layout. **03**
 (b) Explain Operation Process Chart with suitable example. **04**
 (c) Discuss the factors to be considered for the location of the thermal power plant. **07**

- Q.2** (a) What is Routing? Explain in brief. **03**
 (b) Explain the ways to improve productivity. **04**
 (c) What is line of balance? Describe the procedure of line of balance. **07**

OR

- (c) The data given in below Table shows sales data of XYZ company for last 10 years. **07**

Years	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Sales	95	100	87	123	90	96	75	78	106	104

Forecast the sales for the year 2024 using three months moving average.

- Q.3** (a) State objectives of work study. **03**
 (b) What is therbligs? Explain any two therbligs with their abbreviation and symbol. **04**
 (c) Explain the principles of motion economy and work place design. **07**

OR

- Q.3** (a) Write in brief about work content. **03**
 (b) Explain the two handed process chart with neat sketch. **04**
 (c) Define ergonomics and explain how it helps to improve system performance. **07**

- Q.4** (a) Explain Taylor's differential piece rate system. **03**
 (b) What is an industrial dispute? State aims of Industrial Dispute Act. **04**
 (c) Describe various government financial initiatives for entrepreneurship development. **07**

OR

- Q.4** (a) Describe important attributes required in entrepreneur. **03**
 (b) Discuss the major provisions of Factory Act, 1948. **04**
 (c) Define job evaluation and describe ranking method of job evaluation with its advantages and disadvantages. **07**

- Q.5** (a) What is acceptance sampling? Describe its benefits. **03**
 (b) State and explain the causes of obsolescence. **04**
 (c) Explain control chart patterns and reasons for such patterns. **07**

OR

- Q.5** (a) Explain brief about process capability. **03**
 (b) Discuss in brief about identification and control of waste. **04**

- (c) The samples are taken of product manufactured in industry. Below table shows the data 07

Sample size (n)	100	100	100	100	100	100	100	100	100	100
Defective product (d)	6	2	4	2	3	3	0	4	3	4

Draw p-chart and give your comments.

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2022****Subject Code:3161907****Date:06/06/2022****Subject Name:Basics of Industrial Engineering****Time:10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

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|------------|---|-----------|
| Q.1 | (a) Which are the different analytical tools of Plant Layouts. | 03 |
| | (b) List the different factors affecting plant layouts. Explain any Three factors. | 04 |
| | (c) Name various types of plant layouts. Explain any two with neat sketch. | 07 |
| Q.2 | (a) Write the steps for process planning. | 03 |
| | (b) What are the major functions of dispatching process? | 04 |
| | (c) Name the various methods of sales forecasting. Describe any two of them. | 07 |
| OR | | |
| | (c) Explain the terms Loading, scheduling, dispatching, and expediting. | 07 |
| Q.3 | (a) Which are the various tools and techniques to improve productivity? | 03 |
| | (b) What is job evaluation? Discuss any one method of job evaluation. | 04 |
| | (c) Explain string diagram. What are its advantages? | 07 |
| OR | | |
| Q.3 | (a) Differentiate: Minimum Wage, Fair Wage and Living Wage. | 03 |
| | (b) What is method study? List the objectives of method study. | 04 |
| | (c) How time study is carried out? Explain equipments used for carrying out time study. | 07 |
| Q.4 | (a) Explain the purpose of a Quality Circle. | 03 |
| | (b) What is quality assurance? Distinguish between Quality Control (QC) and Quality Assurance (QA). | 04 |
| | (c) Describe the processes of Single and Double sampling plans. | 07 |
| OR | | |
| Q.4 | (a) List the different types of Inspection to confirm the quality of the product. | 03 |
| | (b) Define (i) Mean (ii) Range (iii) Standard Deviation and (iv) Variance | 04 |
| | (c) What is an OC curve? Write the step by step procedure for construction of an OC curve. | 07 |
| Q.5 | (a) Define Entrepreneur and Entrepreneurship. | 03 |
| | (b) Discuss the provisions of 'Working hours' as per Factories Act, 1948. | 04 |
| | (c) Write short note on 'Identification and Control of Waste'. | 07 |

OR

- | | | | |
|------------|------------|--|-----------|
| Q.5 | (a) | List the obstacles in the way of Entrepreneur's development. | 03 |
| | (b) | Briefly state sources of industrial finance. | 04 |
| | (c) | Explain the workmen's compensation Act 1923 (with latest amendments) | 07 |
