GUJARAT TECHNOLOGICAL UNIVERSITY

BE-6 SEMESTER – OLD PAPER – S22 TO S26 – QUESTION BANK

Subject Name & Code: BASICS OF INDUSTRIAL ENGINEERING - 3161907

Chapter 1: Location Selection and Plant Layout

Repeated Questions:

1. Plant Location:

- **Q.** Discuss the factors to be considered for the location of the thermal power plant. **(SUMMER 2023, 7 Marks; SUMMER 2025, 7 Marks)**
- **Q.** List the factors that influence the selection of a plant location. / What are the factors deciding the location of a Plant? **(WINTER 2022, 3 Marks; SUMMER 2025, 3 Marks)**

2. Plant Layout:

- **Q.** Differentiate between product layout and process layout. **(WINTER 2022, 7 Marks; SUMMER 2023, 3 Marks; WINTER 2023, 4 Marks; SUMMER 2024, 7 Marks; WINTER 2025, 4 Marks)**
- **Q.** What type of layout is used in Shipbuilding? Justify your answer. **(SUMMER 2024, 4 Marks; WINTER 2024, 4 Marks)**
- **Q.** State the objectives of good plant layout. **(SUMMER 2022, 3 Marks; WINTER 2024, 3 Marks)**

Other Important Questions:

1. Plant Location:

- **Q.** Explain the importance of plant location in brief. **(WINTER 2025, 3 Marks)**
- **Q.** Enlist the objectives of plant location selection. **(SUMMER 2026)**
- **Q.** From the following data, select the site which is suitable for plant location considering the rate of return method: [Diagram required – refer to the original question paper] **(WINTER 2023, 7 Marks)**
- **Q.** A company has to choose one of three locations on the basis of the given data. Suggest a suitable location and justify. [Diagram required – refer to the original question paper] **(SUMMER 2025, 7 Marks)**
- **Q.** Discuss the factors to be considered for the location of the nuclear power plant. **(WINTER 2025, 7 Marks)**
- **Q.** Discuss the various factors to be considered for selection of site for Cement manufacturing plant. **(SUMMER 2026)**

2. Plant Layout – Factors, Tools and Impact:

- **Q.** List the different factors affecting plant layouts. Explain any three factors. **(SUMMER 2022, 4 Marks)**
- **Q.** Enlist the factors influencing plant layout. **(SUMMER 2024, 3 Marks)**
- **Q.** Describe the impact of material handling considerations on plant layout. **(SUMMER 2025, 4 Marks)**
- **Q.** Which are the different analytical tools of plant layouts? **(SUMMER 2022, 3 Marks)**

3. Types of Layout and Flow Charts:

- **Q.** Name various types of plant layouts. Explain any two with neat sketch. **(SUMMER 2022, 7 Marks)**
- **Q.** Explain process layout. **(SUMMER 2026)**
- **Q.** Explain the flow process chart (material type) with a suitable example. **(WINTER 2025, 4 Marks)**

Chapter 2: Production Planning and Control (PPC)

Repeated Questions:

1. PPC – Functions, Role and Phases:

- **Q.** Explain with reference to PPC, the following: Routing, Scheduling, Loading and Dispatching. **(SUMMER 2025, 4 Marks; SUMMER 2026)**
- **Q.** Explain the terms Loading, Scheduling, Dispatching, and Expediting. **(SUMMER 2022, 7 Marks OR; WINTER 2024, 7 Marks OR; WINTER 2025, 4 Marks)**
- **Q.** What is the role of production planning and control in industry? Also explain the functions of PPC. **(WINTER 2023, 7 Marks; WINTER 2024, 7 Marks OR)**
- **Q.** Give a detailed explanation of the three phases of PPC. **(SUMMER 2024, 7 Marks OR; SUMMER 2026 OR)**
- **Q.** What is Routing? Explain in brief. **(SUMMER 2023, 3 Marks; WINTER 2024, 3 Marks)**

2. Process Planning:

- **Q.** What do you mean by Process Planning? Explain the step-by-step procedure of Process Planning. **(WINTER 2022, 3 Marks; SUMMER 2025, 4 Marks)**

3. Production Systems:

- **Q.** Define the following types of production systems: Job Shop, Batch Production, Mass Production, and Continuous Production, with example. **(WINTER 2022, 7 Marks; SUMMER 2025, 7 Marks OR)**
- **Q.** Compare: Job type production and Batch type production system. **(WINTER 2023, 3 Marks; WINTER 2024, 3 Marks)**

4. Sales Forecasting:

- **Q.** Name the various methods of sales forecasting. Describe any two of them. **(SUMMER 2022, 7 Marks; WINTER 2025, 7 Marks)**
- **Q.** List sales forecasting techniques to develop a production plan. Explain any one in detail. **(SUMMER 2024, 3 Marks - source note: paraphrased - "Enlist the six applications..."; SUMMER 2025, 7 Marks)**
- **Q.** Discuss the following methods of sales forecasting: (i) Exponential smoothing (ii) Method of weighted moving average. **(WINTER 2023, 7 Marks OR; WINTER 2024, 7 Marks)**

5. Line Balancing:

- **Q.** What is line balancing? What is the procedure for line balancing? **(SUMMER 2025, 7 Marks OR; WINTER 2025, 3 Marks; SUMMER 2026)**

Other Important Questions:

1. PPC – Objectives, Functions and Advantages:

- **Q.** List out the advantages of Production Planning and Control. **(SUMMER 2025, 3 Marks)**
- **Q.** Explain the functions of Production Planning and Control. **(WINTER 2022, 4 Marks)**
- **Q.** List any eight objectives of Production Planning and Control. **(SUMMER 2024, 4 Marks)**

2. Process Planning and Dispatching:

- **Q.** Write the steps for process planning. **(SUMMER 2022, 3 Marks)**
- **Q.** What are the major functions of the dispatching process? **(SUMMER 2022, 4 Marks)**

3. Production Systems:

- **Q.** Explain job order production system. **(SUMMER 2026)**

4. Line of Balance and Line Balancing:

- **Q.** What is line of balance? Describe the procedure of line of balance. **(SUMMER 2023, 7 Marks)**

- **Q.** Define line balancing. Explain what is a precedence diagram with a simple example. **(WINTER 2022, 7 Marks OR)**

5. Sales Forecasting (Numerical):

- **Q.** The data given in the table below shows sales data of XYZ company for the last 10 years. Forecast the sales for the year 2024 using three months moving average. [Diagram required – refer to the original question paper] **(SUMMER 2023, 7 Marks OR)**
- **Q.** For the following given data, calculate the forecast for the 11th month using 1) two months average; 2) three months average. [Diagram required – refer to the original question paper] **(SUMMER 2024, 4 Marks)**
- **Q.** The following table represents sales data of cars sold by XYZ showroom during the January to December months. Take $\alpha = 0.2$ and for the January month a forecast of 100 cars. Calculate the forecast value by the exponential smoothing method. [Diagram required – refer to the original question paper] **(SUMMER 2024, 4 Marks OR)**
- **Q.** Calculate the sales forecast for the month of July 2020 if the sales for the last 8 months are shown as below: [Diagram required – refer to the original question paper] **(WINTER 2022, 7 Marks)**
- **Q.** The data given below represents sales figures of ABC company for 12 months of the year 2010. Compute the three months moving average and forecast the demand for the month of Jan 2011. [Diagram required – refer to the original question paper] **(SUMMER 2026)**

6. Sales Forecasting (Methods and Factors):

- **Q.** List down the methods of forecasting and discuss the various factors affecting forecasting. **(SUMMER 2026 OR)**

Chapter 3: Productivity and Work Study

Repeated Questions:

1. Productivity:

- **Q.** What is Productivity? Discuss the factors affecting the productivity of a manufacturing organization. **(WINTER 2023, 7 Marks; WINTER 2024, 7 Marks)**
- **Q.** Define Productivity. Give various ways to improve productivity. **(SUMMER 2023, 4 Marks; SUMMER 2024, 3 Marks; WINTER 2025, 7 Marks OR)**

2. Work Study and Method Study:

- **Q.** State objectives of work study. **(SUMMER 2023, 3 Marks; SUMMER 2025, 4 Marks OR)**
- **Q.** What is method study? List the objectives of method study. **(SUMMER 2022, 4 Marks OR; WINTER 2025, 3 Marks)**

3. Process Charts and Diagrams:

- **Q.** Explain "String diagram" and its uses. **(WINTER 2023, 4 Marks; WINTER 2024, 4 Marks)**
- **Q.** Explain the two-handed process chart with a neat sketch. **(SUMMER 2023, 4 Marks OR; WINTER 2025, 7 Marks)**
- **Q.** Explain the travel chart in brief. **(WINTER 2023, 3 Marks; WINTER 2025, 4 Marks OR)**
- **Q.** Explain the Operation Process Chart with a suitable example. / Discuss the Operation Process Chart by considering any appropriate example. **(SUMMER 2023, 4 Marks; SUMMER 2024, 7 Marks)**

4. Motion Study and Therbligs:

- **Q.** Explain the principles of motion economy and work place design. **(SUMMER 2023, 7 Marks; WINTER 2024, 7 Marks OR; WINTER 2025, 7 Marks)**
- **Q.** What is therbligs? Explain any two therbligs with their abbreviation and symbol. **(SUMMER 2023, 4 Marks; WINTER 2024, 4 Marks; SUMMER 2026)**

5. Work Measurement:

- **Q.** What is Work measurement? List the various techniques of work measurement and also explain how the Standard time is calculated. **(WINTER 2023, 7 Marks; WINTER 2025, 7 Marks OR; SUMMER 2026)**

6. Ergonomics:

- **Q.** Define ergonomics and explain how it helps to improve system performance. **(SUMMER 2023, 7 Marks OR; WINTER 2024, 7 Marks)**

7. Line Balancing Terms:

- **Q.** Define the following terms: 1. Cycle time 2. Balance Delay 3. Line efficiency. **(SUMMER 2024, 3 Marks; WINTER 2024, 3 Marks)**

Other Important Questions:

1. Productivity:

- **Q.** Explain the reasons for increase and decrease in productivity. **(WINTER 2022, 4 Marks)**
- **Q.** Which are the various tools and techniques to improve productivity? **(SUMMER 2022, 3 Marks)**
- **Q.** Define Production and Productivity. List the factors affecting the Productivity. **(SUMMER 2025, 3 Marks OR)**
- **Q.** Define the following: 1. Productivity 2. Work study 3. Ergonomics. **(SUMMER 2024, 3 Marks OR)**

2. Method Study:

- **Q.** Explain the objectives of Method study. **(WINTER 2022, 4 Marks)**

- **Q.** List the criteria for selecting a particular job for method study. **(WINTER 2023, 3 Marks)**
- **Q.** Write the basic procedure of the method study. **(SUMMER 2026)**
- **Q.** Classify different recording techniques. **(SUMMER 2026 OR)**

3. Process Charts and Diagrams:

- **Q.** Discuss the string diagram in detail. **(WINTER 2025, 3 Marks)**
- **Q.** Discuss the String diagram by considering any appropriate example and also state its advantages. **(SUMMER 2024, 7 Marks OR)**
- **Q.** What are the symbols used in the Flow Process chart? **(WINTER 2022, 3 Marks)**
- **Q.** Draw and give the meanings of the following symbols used in process charts: (i) Operation (ii) Transport (iii) Storage (iv) Inspection & Operation. **(WINTER 2023, 4 Marks)**
- **Q.** What is SIMO chart? **(WINTER 2022, 4 Marks OR)**
- **Q.** Explain chronocycle graph. **(SUMMER 2026 OR)**

4. Micromotion Study and Therbligs:

- **Q.** Prepare a list of Therbligs used in the industry. (Any Eight) **(WINTER 2025, 4 Marks OR)**
- **Q.** What is Therblig? State its importance in micro motion study. **(SUMMER 2024, 4 Marks OR)**
- **Q.** State the importance of micromotion study. **(WINTER 2025, 4 Marks)**

5. Time Study and Work Measurement:

- **Q.** List the equipment used for time study and explain the fly-back timing method. **(WINTER 2025, 3 Marks OR)**
- **Q.** How is time study carried out? Explain the equipment used for carrying out time study. **(SUMMER 2022, 7 Marks OR)**
- **Q.** Explain fly back stop watch and non-fly back stop watch. **(SUMMER 2026, 3 Marks OR)**
- **Q.** Define allowance. State the importance of allowance. **(SUMMER 2025, 3 Marks)**
- **Q.** Explain: 1) Observed time 2) Rating Factor 3) Standard time 4) Normal Time 5) Working environment 6) Anthropometry. **(SUMMER 2025, 4 Marks)**
- **Q.** Write short notes on: 1. MTM 2. PMT. **(SUMMER 2025, 4 Marks OR)**
- **Q.** Write in brief about work content. **(SUMMER 2023, 3 Marks OR)**

6. Ergonomics:

- **Q.** Write a short note on: Ergonomics. **(SUMMER 2025, 3 Marks OR)**

Chapter 4: Job Evaluation and Wage Plan / Wage Incentives

Repeated Questions:

1. Job Evaluation:

- **Q.** State various methods of Job Evaluation. Discuss in brief. / Discuss the different methods of Job Evaluation. **(WINTER 2022, 7 Marks; SUMMER 2025, 7 Marks OR; SUMMER 2026, 7 Marks)**

2. Wages and Incentives:

- **Q.** Explain Taylor's differential piece rate system. **(SUMMER 2023, 3 Marks; WINTER 2024, 3 Marks)**
- **Q.** Briefly explain different types of wages. Also explain various types of incentives. / What are different types of Wages? Explain briefly. **(WINTER 2023, 7 Marks OR; SUMMER 2025, 7 Marks)**
- **Q.** What is an incentive? State the different types of incentives. **(WINTER 2022, 7 Marks OR; WINTER 2024, 4 Marks)**
- **Q.** Differentiate: Minimum Wage, Fair Wage and Living Wage. **(SUMMER 2022, 3 Marks; WINTER 2025, 3 Marks OR)**

Other Important Questions:

1. Job Evaluation and Merit Rating:

- **Q.** What is job evaluation? Discuss any one method of job evaluation. **(WINTER 2025, 4 Marks)**
- **Q.** Define job evaluation and describe the ranking method of job evaluation with its advantages and disadvantages. **(SUMMER 2023, 7 Marks OR)**
- **Q.** Define Merit rating. **(WINTER 2022, 3 Marks OR)**

2. Incentive Plans:

- **Q.** Explain the different Incentive plans for workers. **(WINTER 2022, 7 Marks OR)**

Chapter 5: Industrial Legislation

Repeated Questions:

1. Need and Objectives of Industrial Legislation:

- **Q.** What is Industrial Legislation and why is it required? / What is the need of industrial legislation? **(WINTER 2024, 3 Marks; SUMMER 2025, 3 Marks; SUMMER 2026, 3 Marks)**
- **Q.** Aims and Objectives of Industrial Legislation. / Make a list of the goals and objectives of Industrial Legislation. **(WINTER 2023, 3 Marks OR; SUMMER 2024, 4 Marks)**

2. Industrial Disputes Act:

- **Q.** What is an industrial dispute? State the aims of the Industrial Dispute Act. **(SUMMER 2023, 4 Marks; WINTER 2024, 4 Marks; SUMMER 2025, 3 Marks OR)**

3. Factories Act:

- **Q.** Discuss Factory's Act 1948. / What is the Factories Act? What are the major provisions for safety and health? **(WINTER 2022, 3 Marks; WINTER 2023, 7 Marks)**

Other Important Questions:

1. Factories Act (Provisions):

- **Q.** Discuss the provisions of 'Working hours' as per Factories Act, 1948. **(SUMMER 2022, 4 Marks)**
- **Q.** Discuss the major provisions of Factory Act, 1948. **(SUMMER 2023, 4 Marks OR)**

2. Other Labour Acts:

- **Q.** Explain the Payment of Bonus Act 1965 in brief. **(WINTER 2025, 3 Marks)**
- **Q.** Explain the Workmen's Compensation Act 1923 (with latest amendments). **(SUMMER 2022, 7 Marks)**

Chapter 6: Entrepreneurship

Repeated Questions:

1. Entrepreneur – Characteristics:

- **Q.** State the characteristics of a good entrepreneur. / Discuss characteristics of a good Entrepreneur. / Describe important attributes required in an entrepreneur. **(SUMMER 2023, 3 Marks OR; WINTER 2023, 4 Marks OR; WINTER 2024, 7 Marks; SUMMER 2026, 3 Marks OR)**

2. Government Support and Incentives:

- **Q.** State various government incentives to entrepreneurs. / Describe various government financial initiatives for entrepreneurship development. / What financial initiatives does the government have in place to support the growth of entrepreneurship? **(SUMMER 2023, 7 Marks; WINTER 2023, 4 Marks; WINTER 2025, 7 Marks OR)**

3. Obstacles in Entrepreneurial Development:

- **Q.** List the obstacles in the way of Entrepreneur's development. / List out obstacles in the way of an Entrepreneur's development. **(SUMMER 2022, 3 Marks OR; SUMMER 2024, 4 Marks)**

Other Important Questions:

1. Concept of Entrepreneurship:

- **Q.** Define Entrepreneur and Entrepreneurship. **(SUMMER 2022, 3 Marks)**
- **Q.** Explain the concept of Entrepreneurship. **(WINTER 2022, 3 Marks OR)**

2. Industrial Finance:

- **Q.** Briefly state sources of industrial finance. **(SUMMER 2022, 4 Marks OR)**

Chapter 7: Inspection and Quality Control (SQC and TQM)

Repeated Questions:

1. Quality Control Terms and Definitions:

- **Q.** Define the following terms: 1. Quality Control 2. Reliability 3. Quality Audit 4. Quality Assurance 5. T.Q.M. **(WINTER 2023, 4 Marks; SUMMER 2025, 4 Marks OR)**
- **Q.** Define the following terms: 1. Acceptable Quality Level (AQL) 2. Rejectable Quality Level (RQL) 3. Average Outgoing Quality (AOQ). **(SUMMER 2024, 3 Marks; SUMMER 2026 - S26 version additionally asks for Indifference Quality Level)**
- **Q.** Define: (i) Mean (ii) Range (iii) Standard Deviation (iv) Variance. **(SUMMER 2022, 4 Marks OR; WINTER 2023, 4 Marks)**

2. Inspection:

- **Q.** Discuss the functions of Inspection department in a manufacturing plant. / Explain the function of inspection department in manufacturing plant. **(WINTER 2023, 3 Marks; SUMMER 2025, 4 Marks)**

3. OC Curve and Control Charts:

- **Q.** What is an OC curve? Write the step-by-step procedure for construction of an OC curve. **(SUMMER 2022, 7 Marks OR; WINTER 2024, 7 Marks)**
- **Q.** Differentiate between variable charts and attribute charts. **(SUMMER 2024, 7 Marks - source note: paraphrased - "Explain operating characteristics curves..."; SUMMER 2025, 7 Marks OR)**

4. Six Sigma and TQM:

- **Q.** Explain the Six Sigma concept, principle, and methodology. **(WINTER 2025, 3 Marks OR; SUMMER 2026, 4 Marks)**
- **Q.** Discuss Total Quality Management. **(WINTER 2022, 3 Marks; SUMMER 2026, 4 Marks OR)**

Other Important Questions:

1. Acceptance Sampling and Sampling Plans:

- **Q.** What is acceptance sampling? Describe its benefits. **(SUMMER 2023, 3 Marks)**
- **Q.** Explain the double sampling plan. When do you apply double sampling in place of single sampling? **(WINTER 2025, 4 Marks)**
- **Q.** Describe the processes of Single and Double sampling plans. **(SUMMER 2022, 7 Marks)**
- **Q.** Enlist various sampling plans and explain the Double sampling plan with suitable examples. **(SUMMER 2024, 7 Marks)**
- **Q.** What is Sampling and what are the different types of sampling plans? **(WINTER 2022, 7 Marks OR)**

2. Producer's and Consumer's Risk:

- **Q.** Distinguish consumer's risk and producer's risk. **(WINTER 2025, 4 Marks OR)**
- **Q.** Define the terms Producer's risk and Consumer's risk with respect to O.C. curve. **(WINTER 2022, 7 Marks)**

3. Control Charts and Process Capability:

- **Q.** Explain control chart patterns and reasons for such patterns. **(SUMMER 2023, 7 Marks)**
- **Q.** Explain briefly process capability. **(SUMMER 2023, 3 Marks OR)**
- **Q.** Define "Process capability". For the examples listed below, what will be the process's final outcome? 1. CP > 1 2. CP < 1 3. CP = 1. **(SUMMER 2024, 7 Marks OR)**
- **Q.** The samples are taken of a product manufactured in an industry. The table below shows the data. Draw a p-chart and give your comments. [Diagram required – refer to the original question paper] **(SUMMER 2023, 7 Marks OR)**

- **Q.** The following table shows the number of defects observed in 25 similar castings. 1. Find $\bar{C}$. 2. Compute trial control limits. [Diagram required – refer to the original question paper] **(SUMMER 2024, 7 Marks OR)**
- **Q.** Draw the X-bar chart for the following data and tell whether the process is under control. Value of A2 = 0.577. [Diagram required – refer to the original question paper] **(WINTER 2022, 7 Marks)**
- **Q.** How are X and R charts prepared? Explain. **(WINTER 2024, 4 Marks)**

4. Quality Circles, QA and SQC:

- **Q.** Explain the purpose of a Quality Circle. **(SUMMER 2022, 3 Marks)**
- **Q.** What are Quality Circles? **(WINTER 2022, 4 Marks)**
- **Q.** Explain briefly Quality Circles. **(WINTER 2023, 7 Marks)**
- **Q.** What is quality assurance? Distinguish between Quality Control (QC) and Quality Assurance (QA). **(SUMMER 2022, 4 Marks)**
- **Q.** What is the concept of S.Q.C.? **(WINTER 2023, 3 Marks OR)**

5. Inspection (Need and Types):

- **Q.** Why is inspection necessary and what are the types of inspection? **(WINTER 2022, 7 Marks OR)**
- **Q.** List the different types of Inspection to confirm the quality of the product. **(SUMMER 2022, 3 Marks OR)**

6. Six Sigma, ISO and Quality Management:

- **Q.** Explain the principle of Six Sigma. **(WINTER 2022, 4 Marks OR)**
- **Q.** Short note on ISO and Six Sigma. **(WINTER 2023, 7 Marks OR)**
- **Q.** Write down the role of quality engineer in a manufacturing plant. **(SUMMER 2026, 4 Marks)**
- **Q.** Explain the basic concept of ISO 9000 and ISO 14000. **(SUMMER 2026, 7 Marks OR)**

Chapter 8: Waste Management

Repeated Questions:

1. Waste – Meaning and Classification:

- **Q.** Define waste. Classify waste in terms of industrial aspect. / Enlist the various kinds of waste. **(SUMMER 2024, 3 Marks; SUMMER 2025, 7 Marks; SUMMER 2026, 7 Marks)**

2. Obsolescence:

- **Q.** Give the reasons for generation and accumulation of obsolete items. / State and explain the causes of obsolescence. **(SUMMER 2023, 4 Marks; WINTER 2023, 3 Marks; WINTER 2024, 3 Marks OR)**

3. Identification and Control of Waste:

- **Q.** Write short note on 'Identification and Control of Waste'. / Discuss in brief about identification and control of waste. **(SUMMER 2022, 7 Marks; SUMMER 2023, 4 Marks OR; WINTER 2025, 7 Marks)**

4. Need for Waste Management:

- **Q.** Briefly justify the need for waste management. / What are the ways of managing waste in industries? / Explain Waste management in Industries. **(WINTER 2022, 4 Marks; WINTER 2022, 3 Marks OR; SUMMER 2024, 3 Marks OR)**

Other Important Questions:

None identified.

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