

**INDUSTRIAL ENGINEERING
(MECH 3224)**

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

**Group - A
(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) The unit cost in case of batch production compared to jobbing production is
(a) same (b) low (c) high (d) moderate.
 - (ii) Which of the following layout is suited for mass production?
(a) Process layout (b) Product layout
(c) Fixed position layout (d) Plant layout.
 - (iii) Basic tool in Work Study is
(a) graph paper (b) process chart
(c) planning chart (d) stop watch.
 - (iv) Which of the following industries should be located near the vicinity of raw materials?
(a) Bicycles (b) Televisions
(c) Sewing machines (d) Steel Plants.
 - (v) Just-In-Time production aims at
(a) zero inventories (b) reduced manpower
(c) over production (d) intermittent production.
 - (vi) In ship manufacturing, the type of layout preferred is
(a) product layout (b) process layout
(c) fixed position layout (d) combination layout.
 - (vii) When the fixed cost is divided by contribution margin per unit, it gives
(a) fixed output (b) variable output
(c) breakeven number of units (d) total number of units.
 - (viii) Work study is also recognized as : CO1, LOCQ
(a) time study (b) motion study
(c) both "(a)" and "(b)" (d) either "(a)" or "(b)"

- (ix) The most important objective behind plant layout is
(a) over simplification, safety of integration
(b) economy in space
(c) maximum travel time in plant
(d) to provide conveniently located shops.
- (x) The disadvantages of product layout is
(a) skilled labour to operate machines
(b) high initial investment for the specialized facilities
(c) production time is longer, requiring more goods in inventory
(d) high cost of inspection.

Group- B

2. (a) How do you define the term “Industrial Engineering (IE)”? Briefly mention the activities of Industrial Engineering. [(CO1)(Remember)/LOCQ]
- (b) Explain the concept of CVP analysis with a suitable diagram. [(CO1)(Understand)/LOCQ]
(2 + 4) + 6 = 12
3. (a) Mention the characteristics of a well designed product. [(CO1)(Remember)/LOCQ]
- (b) Over the past year, a small restaurant has averaged 224 customers served each day. Hours of work are 6:00 am to 2:00 pm and three staff makes up the total staff. On Tuesday of this week, 264 customers were served by the full staff. On Wednesday, 232 customers were served, two employees worked full days and one worked only two hours. Find the labour productivity for each day, Tuesday and Wednesday. [(CO2)(Understand)/LOCQ]
6 + 6 = 12

Group - C

4. (a) State the importance of selecting a good plant location. (any three point). [(CO2)(Understand)/LOCQ]
- (b) Discuss the advantages and disadvantages of using railway and road transportation in respect of plant location. [(CO2)(Analyze)/IOCQ]
6 + 6 = 12
5. (a) Define a process layout with a diagram. [(CO3)(Remember)/LOCQ]
- (b) Mention any three advantages of product layout. [(CO3)(Understand)/IOCQ]
6 + 6 = 12

Group - D

6. (a) What is meant by “Production Planning and Control(PPC)”? Mention the factors that determine production planning procedures. [(CO3)(Remember)/IOCQ]

- (b) Briefly discuss the concept for considerations in Make or Buy decision of a manufacturing unit. [[CO3](Understand) /IOCQ]
6 + 6 = 12
7. (a) Discuss the main functions of Production Planning. [[CO4](Remember)/LOCQ]
- (b) Briefly mention PPC function in continuous production. [[CO4](Understand)/LOCQ]
6 + 6 = 12

Group - E

8. (a) Mention the recording techniques used in Method Study with the usages of common symbols, activities and the implications of such activities. [[CO6](Remember)/HOCQ]
- (b) A work study practioner who conducted a work sampling study assesses the activity level of a worker to be 70%. During the space of 8 hours working, this worker turns out 320 components. . If the company policy is to inflate the normal time arrived by work sampling study by 20%, what would be the allowed time per unit? [[CO5](Evaluate)/HOCQ]
6 + 6 = 12
9. (a) The workmen in an engineering company are expected to work for 400 minutes in a shift of 8 hours. The remaining time is meant for rest and personal needs. Determine the standard time per piece of a job whose normal time is 2 minutes. [[CO5](Evaluate)/HOCQ]
- (b) Calculate standard time of a job for which the following data is available:
Average time of machine elements = 4 minutes
Average time for manual elements = 2.5 minutes
Performance rating = 80%
Allowances= 15%. [[CO5](Remember)/HOCQ]
6 + 6 = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	44	26	30

Course Outcomes (CO):

At the end of the course, a student will be able to

CO1: Identify different concepts of IE functions.(UNDERSTAND)

CO2: Execute product development and design-manufacturing decisions with IE tools. (EXECUTE)

CO3: Classify and implement plant layout/location decisions. (UNDERSTAND, APPLY)

CO4: Explain different types of production systems and their characteristics. (UNDERSTAND)

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CO5: Judge the production planning and inventory management with a mechanism of proper control. (EVALUATE)

CO6: Recognize and select appropriate tools of work-study for improvement in productivity. (UNDERSTAND, EVALUATE)

*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question