INDIAN INSTITUTION OF INDUSTRIAL ENGINEERING

Internal Assignment for IIIE Students

February- 2027 Examination

The Internal Assignment for Preliminary, Section-A & Section-B will be required to be submitted by those students appearing for February 2027 exam. All eligible students are hereby directed to submit the completed Internal Assignment for the subjects they are appearing for February 2027 exam **on or before 10th December 2026**. Assignments are an important aspect of examinations. It is obvious that if you get good marks in assignment your overall percentage shall improve. The weightage for the Internal Assignment will be 20% of the total marks in the respective subject. Internal Assignments are attached below

INSTRUCTIONS FOR INTERNAL ASSIGNMENT

Submission of Assignment is Compulsory. If Assignment not submitted, such a students shall be given ZERO (0) marks.

1. **Students have to pass individually total 40 marks in each subject, written exam 80% and in Assignment 20% weightage.**
2. **Assignment is compulsory only for the subject's students appearing for Exam.**
3. **It will be the responsibility of student to appear or not to appear for the written paper if he / She has NOT SUBMITTED ASSIGNMENT in time as per instructions. IIIE shall not be responsible for the consequences.**
4. **Please write carefully your Name, Student membership number, Subject name on each Subject Assignment. Please take printout from first page and fill all details before tape binding the assignment pages.**
5. **It is advised that assignment should be written on the format page given below with this. All assignments to be separately submitted for each subject in a format pages. Write down on both sides of the papers.**
6. **The fees for Internal Assignment will be Rs.200/- per subject. This is to be paid through Demand Draft or Online only (Cheque payment will not be accepted) DD drawn in favour of Indian Institution of Industrial Engineering, payable at Mumbai and sent along with Assignment. Write your name and membership number on the back side of the Demand Draft, Online payment / transaction details should be attached with assignment. Bank details are given below for Online payment.**

   Name of Account: Indian Institution of Industrial Engineering
   Current Bank A/c No.: 00 5320 100000 720
   Bank Name : Bank of India
   Branch: Belapur, Navi Mumbai 400 614
   IFSC : BKID0000053

7. **Solve the questions as per instructions (do not leave any questions or sub questions). Detailed answers are expected. Keep sufficient gap between answers of different questions.**

8. **The paper should be written neat and clean. Leave left margin, top margin and bottom margin. Write up should be legible. Solve all questions sequence wise (from 1 to 7 in ascending order).**
9. **The expected length of the answer shall depend upon the nature of the question.**
10. **Answers shall include the definition, Diagrams, Tables, examples, etc. depending on the nature of the question. Do not waste your time in decorating assignments.**
11. **IE005: Engineering Drawing & Computer Graphics assignment, student may use drawing sheets.**
12. **Content that has been directly copied from each other or the Internet will NOT be accepted.**
13. **Assignments that have been copied and shared among student(s) will be automatically rejected and such students are liable for disqualification.**
14. **Ensure that your answers are according to the marks allocated. Students are advised to check their Assignments thoroughly before submitting the same.**
15. **Late submissions up to 15th December 2026 will be accepted with Rs. 200/- per subject as late fees.**
16. **Beyond 15th December 2026 Internal Assignment will not be accepted.**
17. **It is necessary to keep Xerox Copy of all documents (Assignments and DD) with you for your reference and safety.**
18. **The following Front Cover & second page is Compulsory should be Attached with Each Internal Assignment.**
19. Write page number from first page of Assignment like Page No 1/20, 2/20 etc & assignment to be written on printed format A4 size page only and bind properly.
20. All students are hereby informed that Internal **Assignments must be submitted in tape binding** only. Ensure that the binding is **neat and secure**. Submissions in spiral, stapler, or loose format will not be accepted. Assignments not submitted in tape binding will be considered incomplete.



Sample of Tape Binding

If students still have any doubt, they may call or email their queries to Controller of Examinations, IIIE.

Sd/-

Controller of Examinations

NOTE: DOWNLOAD THE BELOW PAGE FOR WRITING ASSINGMENTS.

STUDENT ASSIGNMENT FOR

FEBRUARY-2027 EXAMINATION

Student Name : _____

Membership No. : _____

Section : _____

Subject Code & Name : _____

Assignment Payment Details UTR No. / DD No. _____

Bank Name : _____

Payment Date : _____

Signature of the student with date _____

Student Membership Number-					
QUESTION NO	(a)	(b)	(c)	(d)	TOTAL MARKS (To be filled by Examiner)
CANDIDATE NEED TO TICK IF ATTEMPTED					
1					
2					
3					
4					
5					
6					
7					
TOTAL MARKS: -					

SIGNATURE OF THE EXAMAINER WITH DATE

Student Membership No: **Subject Name :**

SECTION: Preliminary/ Sec- A / Sec- B. (February-2027 Exam) **Subject Code:**

TAPE BINDING

TAPE BINDING

Student Membership No: **Subject Name :**

SECTION: Preliminary/ Sec- A / Sec- B. (February-2027 Exam) **Subject Code:**

Mandatory Format for who have done online payment for Internal Assignments February- 2027 Examination.

- Student Name: _____
- Student Membership No. : S-_____
- Section: _____
- Online Transaction Date: _____
- Amount Transferred (Rs.)_____
- Transaction ID/UTR/UPI/IMPS or Neft No._____
- Total Nos. of Assignments: _____

Important Notice: Transaction details hard copy should be submitted along with Assignment (Don't paste hard copy on Assignment) and soft copy of the same (transaction details) to be sent through e-mail to iiiereceiptdept@gmail.com is compulsory.

Date: -_____ Signature of Student

N.B.: This requirement of account section so please submit properly.

INDIAN INSTITUTION OF INDUSTRIAL ENGINEERING

GRADUATESHIP EXAMINATION

Internal Assignment for February 2027 (Old Syllabus)

Section-B

IEB 01: FACILITIES PLANNING AND MANAGEMENT

Max. Marks: 140

Instruction: All questions are compulsory.

Q1 a) Discuss the importance of facility planning in manufacturing industries.. (10)

b) Explain computer aided facility layout planning and its advantages (10)

Q2 a) Write short notes on the following: (20)

i. DCF method for equipment replacement
ii. Rank Order Clustering (ROC)
iii. Objectives of material handling
iv. Production Flow Analysis (PFA)

Q3 a) Explain any five material handling systems used in factories with their applications (10)

b) Describe the need and procedure for replacement of industrial equipment. (10)

Q4 a) Explain the various types of plant layouts with merits and demerits. (10)

b) Discuss the principles governing an effective plant layout. (10)

Q5 a) Explain the concept of assembly line balancing with suitable examples. (10)

b) Discuss the factors to be considered while designing warehouse layout and service facility layout (10)

Q6 a) Explain the characteristics of job production and continuous production systems. (10)

b) Discuss the importance of the following environmental factors in factory design: (10)

i. Dust control
ii. Humidity
iii. Safety
iv. Illumination

Q7 a) Perfect Industrial Systems Ltd. intends to establish a new smart manufacturing unit. Explain the complete facility planning procedure considering: (20)

i. Site selection
ii. Plant layout planning
iii. Automation considerations
iv. Material handling system
v. Environmental and safety requirements

INDIAN INSTITUTION OF INDUSTRIAL ENGINEERING

GRADUATESHIP EXAMINATION

Internal Assignment for February 2027 (Old Syllabus)

Section-B

IEB 02: SUPPLY CHAIN AND LOGISTICS MANAGEMENT

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Max. Marks: 140

Instruction: All questions are compulsory.

Q1	a) Explain the evolution and key components of Supply Chain Management.	(10)
	b) Discuss the importance of materials management in achieving organizational objectives.	(10)
Q2	a) Explain procurement management and its role in supply chain efficiency.	(10)
	b) Discuss the derivative models of EOQ and their applications.	(10)
Q3	a) Explain the drivers of supply chain performance	(10)
	b) Explain the relationship between supply chain decisions and organizational profitability.	(10)
Q4	a) Explain design options for transportation networks in a supply chain.	(10)
	b) Compare different transportation network designs with suitable examples	(10)
Q5	a) Describe the role of facility decisions in supply chain network design.	(10)
	b) Explain the factors influencing network design decisions in a supply chain.	(10)
Q6	a) Explain the framework for network design decisions in SCM	(10)
	b) Explain models for facility/warehouse location and capacity allocation.	(10)
Q7	a) Explain the use of IT for integration and coordination in supply chains.	(10)
	b) Discuss emerging IT-enabled supply chain practices and their benefits	(10)

INDIAN INSTITUTION OF INDUSTRIAL ENGINEERING

GRADUATESHIP EXAMINATION

Internal Assignment for February 2027 (Old Syllabus)

Section-B

IEB 03: PRODUCTION & OPERATIONS MANAGEMENT

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Max. Marks: 140

Instruction: All questions are compulsory.

Q1 a) Define and briefly explain the following types of production systems, highlighting their key characteristic features: (2 marks Each) (10)

i. Job Shop Production
ii. Batch Production
iii. Mass Production
iv. Continuous Production
v. Project-Based Production

b) What is the role of an operations plan in a production system? (10)
Explain with reference to the following functions: (2 marks Each)

i. Resource allocation
ii. Scheduling and sequencing
iii. Capacity planning
iv. Inventory management
v. Quality assurance

Q2 a) Briefly explain the following statistical forecasting methods, including their underlying principles, data requirements, and suitable use cases: (2 marks Each) (10)

i. Simple Moving Average (SMA)
ii. Weighted Moving Average (WMA)
iii. Single Exponential Smoothing (SES)
iv. Holt's Linear Trend Model (Double Exponential Smoothing)
v. Holt-Winters Seasonal Model (Triple Exponential Smoothing)

b) Write the mathematical formula for each of the following methods. Define all symbols used: (10)

i. 3-period Simple Moving Average
ii. Exponential Smoothing (single smoothing constant)
iii. Mean Absolute Deviation (MAD)
iv. Mean Squared Error (MSE)

Q3 a) Define the following terms in the context of production planning and control: (10)

i. Aggregate Planning
ii. Desegregation (or Disaggregation)
iii. Master Production Schedule (MPS)
iv. Capacity Requirement Planning (CRP)

b) Estimate the trend values using five yearly moving averages: (10)

Year	2012	2013	2014	2015	2016	2017	2018	2019
Value	12	25	39	54	70	87	105	100

Q4 a) Explain the key differences between a flow shop and a job shop on the following criteria: (2 marks Each) (10)

i. Workflow pattern
ii. Machine flexibility
iii. Product variety
iv. Setup time
v. Work-in-process inventory.

b) Distinguish between flow shop and job shop in terms of: (10)

i. Routing flexibility
ii. Machine utilization
iii. Scheduling complexity

Q5 a) Explain the difference between CPM (Critical Path Method) and PERT (Program Evaluation and Review Technique) with respect to: (10)

i. Type of activity time estimate
ii. Handling of uncertainty
iii. Suitable project type

b) Explain the concept of Earned Value Management (EVM). Define the following terms with formulas: (2 marks Each) (10)

i. Planned Value (PV)
ii. Earned Value (EV)
iii. Actual Cost (AC)
iv. Cost Performance Index (CPI)
v. Schedule Performance Index (SPI)

Q6 a) (i) Define Cellular Manufacturing (CM). (10)
(ii) How does it differ from traditional process-oriented layout?

b) (i) State five objectives of implementing a JIT system. (10)
(ii) Explain how CM and JIT complement each other in a lean manufacturing environment.

Q7 a) (i) Define information analysis in the context of operations management. Why is it critical for decision-making? (5)
(ii) What is a Management Information System (MIS)? How does it support operations management? (5)

(b) Explain the production control cycle with a diagram showing: (2 marks Each) (10)

i. Planning
ii. Routing
iii. Scheduling
iv. Dispatching
v. Follow-up (expediting)

INDIAN INSTITUTION OF INDUSTRIAL ENGINEERING

GRADUATESHIP EXAMINATION

Internal Assignment for February 2027 (Old Syllabus)

Section-B

IEB 04: TOTAL QUALITY MANAGEMENT

Max. Marks: 140

Instruction: All questions are compulsory.

Q1 a) Explain the concept of Total Quality Management (TQM). Discuss its fundamental Pillars, principles, and how it differs from traditional quality control methods. (10)

b) Explain W. Edwards Deming's 14 Points for quality improvement and their relevance to modern industry. (10)

Q2 a) Discuss the concepts of Building blocks of TQM. (10)

b) Describe the seven basic quality control tools with suitable practical use of each tool. (10)

Q3 a) What is Kaizen, and how does it impact organizational culture. Explain the philosophy and the steps involved in conducting a Kaizen implementation (10)

b) Write a note on cost of quality. (10)

Q4 a) Calculate the sigma level for the mobile phone Manufacturing process. The Number of units produced are 100000. Number of defects found are 4000 and Number of opportunities per unit are 5. (10)

b) Explain the DMAIC methodology in Six Sigma**.** Describe the objectives and key activities involved each phase. (10)

Q5 a) Explain the steps and importance of vendor development. (10)

b) What is FMEA. Explain the methodology with suitable example. (10)

Q6 a) Explain the concept of quality circles. What are the advantages of implementing Quality circles. . (10)

b) Explain Deming wheel and designing for quality. (10)

Q7 a) What is the purpose and objective of quality information system? (10)

b) Explain the structure and benefits of the ISO 9001 Quality Management System. How does achieving ISO certification benefit an organization operating in a global market . (10)

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GRADUATESHIP EXAMINATION

Internal Assignment for February 2027 (Old Syllabus)

Section-B

IEE 01: INNOVATION AND VALUE ENGINEERING

Max. Marks: 140

Instruction: All questions are compulsory.

Q1	a)	With the help of examples, discuss entrepreneurial qualities and skills.	(10
	b)	What is Intellectual Property? How Intellectual Property Right is protected in India?	(10)
Q2	a)	What is innovation? Discuss the distinctive characteristics of innovative persons.	(10)
	b)	Explain the need and challenges for a global company to survive and excel through innovations in Indian environment.	(10)
Q3	a)	Explain value engineering job plan with the help of suitable example.	(10)
	b)	State at least ten benefits of value engineering.	(10)
Q4	a)	Explain the benefits of intellectual property rights to individual and organization.	(10)
	b)	What are the various incentives that can be considered for motivating the individuals to be innovative?	(10)
Q5	a)	Explain behavioral and organizational aspects of value engineering.	(10)
	b)	Discuss DARSIRI method and its benefits in Value Engineering.	(10)
Q6	a)	Write one Basic and one Secondary function of each of the Following: Door, Shoes, Overhead Projector, and Radiator.	(10)
	b)	Discuss entrepreneurial qualities and skills with the help of examples.	(10)
Q7	a)	Explain- Use Value, Esteem Value, Scrap Value, Cost Value, and Exchange Value in brief.	(10)
	b)	With the help of suitable examples, highlight the risks and hardships an inventor faces.	(10)

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GRADUATESHIP EXAMINATION

Internal Assignment for February 2027 (Old Syllabus)

Section-B

IEE 02: STRATEGIC MANAGEMENT

Max. Marks: 140

Instruction: All questions are compulsory.

Q1 a) Explain the concept of strategic management. (10)

b) List and explain the different factors that shape a company's strategy. (10)

Q2 a)Differentiate between horizontal and vertical growth strategy. (10)

b) Explain SWOT analysis with a suitable example (10)

Q3 What is technical forecasting ? Explain technical forecasting by means of three real example and how it is useful for business in terms of profit? (20)

Q4 a) What are the diffrent methods of risk analysis ? State the applications of computers in carrying out risk analysis. (10)

b) Explain relation between strategy and business model of a company with examples. (10)

Q5 Discuss the porter's five force model of industry analysis with suitable illustration. Explain the generic building blocks of competitive advantage. (20)

Q6. Explain method of longe range planning applied to Research and Development in high technology industries with examples. (20)

Q7 Short notes on (20)

a) Elements of Futurology
b) Management information system

INDIAN INSTITUTION OF INDUSTRIAL ENGINEERING

GRADUATESHIP EXAMINATION

Internal Assignment for February 2027 (Old Syllabus)

Section-B

IEE 03: ADVANCED OPERATIONS RESEARCH

Max. Marks: 140

Instruction: All questions are compulsory.

Q1. (A) The Gaikwad Constructions Ltd. is building a modern hillside house at a hill station. The project involves several activities that must be completed in sequence. The details are given below. (15)

Activity	Description	Predecessor	Duration (days)
A	Clear land	–	5
B	Order building materials	–	7
C	Lay foundation	A	6
D	Install solar panels	A	8
E	Build rooms	B, C	5
F	Electrical wiring	C	7
G	Roofing	D, E	6
H	Interior finishing	F	4
I	Final inspection	G, H	5

Construct the **CPM network**, find the **project duration**, and **determine the critical path**.

Q1. (B) Describe the **Fibonacci Search Method** for solving single-variable optimization problems. (5)

Q2. (A) *EcoTech Appliances Ltd.* manufactures **Smart Fans (F)** and **Air Purifiers (P)**. Each F needs 4 man-hours; each P needs 3 man-hours. Weekly labour available: 48 man-hours. Profit per unit: ₹130 (F), ₹150 (P). Targets/priorities: (15)

P1: Supply ≥ 8 Smart Fans to a retail partner

P2 Profit ≥ ₹2,400 per week,

P3: Minimize underutilization of labour hours

Formulate and solve the goal program

Q2. (B) Show how the **Assignment Problem** can be treated as a special case of the **Transportation Problem** (5)

Q3. (A) Explain the concept of the Critical Path in project scheduling. (5)

Q3. (B) *AgroFresh Foods Pvt. Ltd.* produces three packaged products: P1 (Organic Flour), P2 (Nutri-Snacks), and P3 (Herbal Tea). These products are processed using three machines: Grinding (M1), Packing (M2), and Sealing (M3). Each machine has a limited number of working minutes per day, and each product requires a specific amount of time on each machine, as shown below: (15)

Machine	G1	G2	G3
M1 (Grinding)	2	3	4
M2 (Packing)	5	-	3
M3 (Sealing)	1	2	-

The profit earned per unit is ₹7 for P1, ₹9 for P2, and ₹8 for P3. All produced units are sold in the market.

Formulate a Linear Programming model to help the company maximize its daily profit, considering the machine time constraints.

Q4. (A) *Green Future Innovations Ltd.* has ₹15,000 to invest in three projects — P1: Wind Turbine Prototype, P2: Smart Irrigation System, and P3: Bio-Compost Unit (15)

The expected returns (in ₹) for different investment levels are given below:

Investment in ₹	Wind Turbine (P1)	Irrigation System (P2)	Bio-Compost (P3)
5000	700	800	750
10000	1200	1300	1250

Use **Dynamic Programming** to determine the optimal allocation of ₹15,000 among the three projects to maximize returns. Projects are independent

Q4. (B) Explain the concept of **Duality in Linear Programming**. Why is it important in optimization? (5)

Q5. (A) Solve the following integer programming problem using **Gomory's Cutting Plane Method**: (15)

Maximize $Z=7x_1+5x_2$

Subject to:

$3x_1+2x_2 \leq 18$

$x_1+4x_2 \leq 16$

$x_1, x_2 \geq 0$ and integers

Q5. (B) Differentiate between the **Maximal Flow Problem** and the **Shortest Path Problem** with suitable examples. (5)

Q6 (A) Describe the Hungarian Method for solving the Assignment Problem. (5)

Q6. (B) Solve the following non-linear programming problem using Kuhn-Tucker conditions: (15)

Minimize

$f(x_1,x_2)=(x_1-4)^2+(x_2-2)^2$

Subject to:

$2x_1+x_2 \leq 12$, $x_1, x_2 \geq 0$

Q7. (A) Q4. (A) Write short notes on: (Any 2) (10)

a) Geometric Programming
b) Conjugate Gradient Method
c) Fibonacci Search Method

Q7 (B) What is **simulation** in operations research? Explain how simulation can be used for **decision-making** in complex systems (10)

INDIAN INSTITUTION OF INDUSTRIAL ENGINEERING

GRADUATESHIP EXAMINATION

Internal Assignment for February 2027 (Old Syllabus)

Section-B

IEE 04: KNOWLEDGE MANAGEMENT

Max. Marks: 140

Instruction: All questions are compulsory.

Q1 a) Write a note on 'Structured Knowledge' (10)

b) Describe 'Knowledge Sharing' with suitable example (10)

Q2 a) Describe 'Data warehouse'. Explain its advantages (10)

b) Explain the drivers of Knowledge Management (10)

Q3 a) Describe 'Data Mining' with suitable example (10)

b) Explain the phases of KMS deployment in organization. (10)

Q4 a) Describe the requirements of a successful KM system. (10)

b) Explain 'Life cycle of Knowledge Management system'. (10)

Q 5 a) Describe 'Knowledge Testing' with some example (10)

b) Why Knowledge Management should be integrated with the organization's strategic business plan ? (10)

Q 6 a) Describe 'Balanced Scorecard'. Explain its benefits (10)

b) Describe the challenges in the implementation of knowledge management system. (10)

Q 7 Write short notes on following. (20)

a) Standard Protocols of Data Management
b) Nonaka's Model

INDIAN INSTITUTION OF INDUSTRIAL ENGINEERING

GRADUATESHIP EXAMINATION

Internal Assignment for February 2027 (Old Syllabus)

Section-B

IEE 05: MATERIALS HANDLING

Max. Marks: 140

Instruction: All questions are compulsory.

Q1 a) Write about general characteristics, principal groups of material handling & applications of it. (10)

b) Discuss the economic importance of efficient material handling in manufacturing and warehousing operations. (10)

Q2 a) Explain the construction and working of a Screw Conveyor with a neat sketch. (10)

b) Write about different roller conveyors and oscillating conveyors with neat sketch in material handling. (10)

Q3 a) Classify cranes used in material handling. Explain the principle of operation and applications of any four types. (10)

b) Explain the construction and working of an Apron Conveyor with a neat sketch. (10)

Q4 a) Explain the construction and working of Band Brakes and Block Brakes with neat diagram. (10)

b) Explain the construction and operation of Thrust Brakes. Discuss their applications in lifting equipment. (10)

Q5 a) Explain working of Walking Beam Conveyors with neat sketches. (10)

b) Explain Cradle Conveyors and discuss their advantages and limitations. (10)

Q6 a) Explain different types of Chains used in Material Handling. State their selection criteria. (10)

b) Discuss the design considerations and safety requirements for wire ropes used in lifting operations. (10)

Q7 a) Discuss recent developments in automated warehouses and smart material handling systems. (10)

b) Write short notes : (10)

(i) Oscillating Conveyors (ii) Bucket Conveyors

INDIAN INSTITUTION OF INDUSTRIAL ENGINEERING

GRADUATESHIP EXAMINATION

Internal Assignment for February 2027 (Old Syllabus)

Section-B

IEE 06: INDUSTRIAL AUTOMATION

Max. Marks: 140

Instruction: All questions are compulsory.

Q1 a) Explain the need, scope and advantages of automation in manufacturing industries. (10)

b) Describe semi automatic and fully automatic machine tools along with special purpose machines and material transfer devices. (10)

Q2 a) Explain direction control valves, flow control valves and relief valves used in pneumatic systems. (10)

b) Explain linear and rotary pneumatic actuators and their industrial applications. (10)

Q3 a) Explain pressure control, direction control and flow control methods in hydraulic systems. (10)

b) Draw and explain a simple hydraulic circuit used for machine tool automation. (10)

Q4 a) Explain feedback control system with block diagram and industrial applications. (10)

b) Discuss industrial automatic control systems and various control actions used in industries. (10)

Q5 a) Explain applications of pneumatic logic circuits based on AND, OR, NAND and NOR gates (10)

b) Explain PLC architecture, input-output modules and applications of PLC in automation (10)

Q6 a) Explain CNC programming concepts and discuss the working of CNC machine tools. (10)

b) Discuss automation and quality control in production shop floor environment. (10)

Q7 a) Explain the principles and construction of Coordinate Measuring Machine (CMM). (10)

b) Write short notes on: (10)

i) Flexible Manufacturing Systems

ii) Computer Aided Manufacturing (CAM) Systems

INDIAN INSTITUTION OF INDUSTRIAL ENGINEERING

GRADUATESHIP EXAMINATION

Internal Assignment for February 2027 (Old Syllabus)

Section-B

IEE 07: INDUSTRIAL SAFETY ENGINEERING

Max. Marks: 140

Instruction: All questions are compulsory.

Q1	a) Explain various tools used for Safety Analysis.	(10)
	b) What are the various functions of the safety committee? Explain.	(10)
Q2	a) Describe the safety rules for material handling jobs.	(10)
	b) Discuss various principles of safety required in heat treatment processes shop.	(10)
Q3	a) Discuss safety precautions required for boilers and pressure vessels.	(10)
	b) Discuss safety measures required in drilling and machine shop operations.	(10)
Q4	a) Explain safety measures in sewage disposal and cleaning operations.	(10)
	b) Explain the importance of Personal Protective Equipment (PPE) in industries.	(10)
Q5	a) What are the different health provisions in Factory Act.	(10)
	b) Write a short note on Workmen's Compensation Act.	(10)
Q6	a) Explain the provisions and benefits of the ESI Act.	(10)
	b) What is meant by industrial noise? Discuss its sources and effects.	(10)
Q7	a) Explain the causes and prevention of occupational health hazards.	(10)
	b) Discuss the importance of safety audit in industries.	(10)

INDIAN INSTITUTION OF INDUSTRIAL ENGINEERING

GRADUATESHIP EXAMINATION

Internal Assignment for February 2027 (Old Syllabus)

Section-B

IEE 08: PLANT ENGINEERING AND MAINTENANCE

Max. Marks: 140

Instruction: All questions are compulsory.

Q1 a) Explain the organizational structure required for an effective maintenance system.(10)

b) What are the basic requirements of a maintenance management system? (10)

Q2 a) Explain the classification of failures with suitable examples. (10)

b)What are statistical and reliability concepts and how are they used in failure analysis?. (10)

Q3 a) Explain the concept of decision models used in maintenance planning. (10)

b) Define optimum maintenance level and discuss its importance in maintenance planning. (10)

Q4 a) What are the factors considered in maintenance replacement decisions? (10)

b) Differentiate between breakdown maintenance and preventive maintenance. (10)

Q5 a) What are slow-moving spares and how are they managed? (10)

b) What is manpower planning in maintenance management? Explain its objectives. (10)

Q6 a) What is monitoring and updating in maintenance manpower planning and why it is important? (10)

b) What are the economic aspects considered in maintenance manpower planning? (10)

Q7 a) Discuss the significance of cost summarization and cost distribution in maintenance cost management. (10)

b) Explain maintenance budget in detail. (10)

INDIAN INSTITUTION OF INDUSTRIAL ENGINEERING
GRADUATESHIP EXAMINATION
Internal Assignment for February 2027 (Old Syllabus)
Section-B
IEE 09: MANAGERIAL FINANCE

Max. Marks: 140

Instruction: All questions are compulsory.

Q1	a)	What is a regulatory framework for businesses? Briefly explain why business organizations must follow it.	(10)
	b)	State the core difference between a public limited company and a private limited company with respect to the minimum number of members needed to start.	(10)
Q2	a)	Define the term 'Annuity'. What is the basic difference between a regular annuity and an annuity due?	(10)
	b)	How does an increase in the borrowing interest rate affect a company's investment decisions? Explain briefly	(10)
Q3	a)	What is a 'Turnover Ratio'? Explain how it helps a manager understand the utilization of assets.	(10)
	b)	Define 'Leverage Ratio'. Why is it critical to check a business's long-term debt-paying capacity?	(10)
Q4	a)	Explain how an efficient operating cycle of business can reduce the amount of locked-up cash in inventory.	(10)
	b)	What are 'Receivables' in working capital? Explain why a business needs to monitor its collection period.	(10)
Q5	a)	What are 'Preferential Shares'? How do they differ from normal equity shares regarding dividend payment priority?	(10)
	b)	Explain the concept of 'Public Deposits' as a means of short-term or medium-term business financing..	(10)
Q6	a)	What is 'Excise Duty'? Explain how its implementation affects the product cost structure of manufacturing items.	(10)
	b)	What do you understand by 'Techno-Financial Appraisal' of a project? Why do banks ask for it?	(10)
Q7	a)	List any three distinct structural features of a well-functioning Capital Market.	(10)
	b)	Briefly outline two positive effects that economic liberalization brought to India's capital market frameworks.	(10)

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Internal Assignment for February 2027 (Old Syllabus)
Section-B
IEE 10: TOTAL PRODUCTIVITY MANAGEMENT AND BUSINESS PROCESS RE-ENGINEERING

Max. Marks: 140

Instruction: All questions are compulsory.

Q1	a) Describe the mission and objectives of productivity management.	(10)
	b) Explain financial and non-financial motivational strategies used by organizations to improve employee productivity and job satisfaction.	(10)
Q2	a) Explain the concept and significance of productivity in manufacturing industries	(10)
	b) Describe the methodology for measuring productivity in manufacturing industries using input-output models.	(10)
Q3	a) Differentiate between micro-level and macro-level productivity measurement. Explain suitable productivity indicators for each level.	(10)
	b) Explain the role of productivity measurement models in performance evaluation and decision-making.	(10)
Q4	a) Explain various productivity measurement techniques used at enterprise and national levels with suitable examples.	(10)
	b) Explain the steps involved in identifying, analyzing, and redesigning business processes under a BPR framework.	(10)
Q5	a) Describe various Human Resource Development strategies adopted by organizations to enhance employee performance and productivity.	(10)
	b) What is process mapping? Discuss its importance in Business Process Re-engineering and explain different process mapping techniques.	(10)
Q6	a) Explain the importance of training and skill development in productivity improvement.	(10)
	b) Discuss the importance of skill development in achieving higher productivity. Explain various methods of skill development in modern organizations.	(10)
Q7	a) Discuss the process of organizing productivity planning in an industrial organization. Explain the role of management and employees in the process.	(10)
	b) How does Business Process Re-engineering contribute to cost reduction, quality improvement, and customer satisfaction? Explain with examples.	(10)

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Section-B

IEE 11: BUSINESS PROCESS SIMULATION

Max. Marks: 140

Instruction: All questions are compulsory.

Q 1. a) Outline the structural architecture of a simulation program by explaining the roles of the Event Calendar, the Timing Routine, and the Statistical Counter Routines during an active run cycle. (10)

b) Discuss how modern Process Mining-driven "Digital Twins" and interactive Business Games differ from traditional standalone simulation tools. Detail how modern software reduces human bias during model verification. (10)

Q 2. A company is engaged in manufacturing different types of equipment by various consumer . The company has two assembly lines to their product. The processing time for each of the assembly line is regarded as random variable and is described by the following distributions as

Processing Time	Assembly line X	Assembly line Y
40	0.20	0.20
42	0.40	0.60
44	0.20	0.80
46	0.15	0.95
48	0.05	1.00

Using the following random number, generate the data on processing time for ten units of the item and compute the expected process time for the product.

4236 , 7573, 4943, 1283, 2014, 3604, 9344, 5316, 7606, 0089 (20)

Q 3. a) Describe how a manufacturing facility uses simulation modeling to solve multi-machine job-shop scheduling conflicts when equipment breakdowns and worker absenteeism occur randomly. (10)

b) Explain how corporate planning executives and marketing managers deploy Monte Carlo simulations to assess risk before launching a new product line, specifically focusing on variable manufacturing costs and uncertain market adoption rates. (10)

Q 4. a) What are "Business Games," and how do they use simulation to develop managerial decision-making skills? (10)

b) Explain the role and mechanism of a "Simulation Clock" (time-advance mechanism) in a discrete-event simulation model? (10)

Q 5. a) Explain in details the function of an event list in controlling simulation programming logic? (10)

b) Explain with a block diagram for a single-channel, single phase queuing system. (10)

Q 6. Montegut Manufacturing produces a product for which the annual demand is 10,000 units. Production averages 100 units per day, while demand is 40 units per day. Holding costs are $2.00 per unit per year, and setup cost is $200.00. (20)

a) If the firm wishes to produce this product in economic batches, what size batch should be used?
b) What is the maximum inventory level?
c) How many order cycles are there per year?
d) What are the total annual holding and setup costs?

Q 7. a) A multinational retail chain wants to build a simulation model to optimize its automated checkout counters. Detail the individual roles and responsibilities of the Executive Sponsor, the Simulation Engineer, and the Subject Matter Experts (SMEs) in this initiative. (10)

b) Explain the critical steps involved in moving from an "As-Is" baseline process model to a validated "To-Be" scenario. Discuss the distinct operational risks of under-scoping and over-scoping during the planning phase. (10)

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Section-B

IEE 12: ENTREPRENEURSHIP DEVELOPMENT

Max. Marks: 140

Instruction: All questions are compulsory.

Q1 a) Discuss the relationship between entrepreneurship and economic development. State socio-economic benefits. (10)

b) What are the characteristics of an entrepreneur? (10)

Q2 a) Discuss the challenges faced by entrepreneurs during venture creation. (10)

b) Explain need of Entrepreneurship training and development Programme in detail.(10)

Q3 a) Explain the process of business opportunity identification and evaluation. Discuss its importance in entrepreneurship development. (10)

b) Explain the structure and contents of a project report. Why it is important for entrepreneurs? (10)

Q4 a) Explain the importance of feasibility studies, market surveys, and risk assessment in entrepreneurial decision-making. (10)

b) Explain role of government in supporting entrepreneurship. (10)

Q5 a) Explain the role of venture capital, technology transfer, and business incubation in fostering entrepreneurship. (10)

b) What is market assessment? Explain the various techniques used to assess market potential for a new venture. (10)

Q6 a) Discuss the factors affecting the success and growth of small business enterprises.(10)

b) Explain the process of industrial risk assessment with suitable examples. (10)

Q7 a) What is Business Incubation? Explain its objectives, functions, and benefits. (10)

b) Discuss the assumptions, advantages, and limitations of Break-Even Analysis. (10)

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Section- B

IEE 13: MATERIALS MANAGEMENT

Max. Marks: 140

Instruction: All questions are compulsory.

Q1 a) Explain the importance and functions of Materials Management in modern industries. (10)

b) Explain various quantitative techniques of demand forecasting. (10)

Q2 a) Explain the objectives, scope, and challenges of Materials Management. (10)

b) Explain different inventory control systems with suitable examples. (10)

Q3 a) Discuss inventory costs and the effects of shortages and lead-time variations on EOQ. (10)

b) Compare ABC, VED, FSN, and HML analysis methods. (10)

Q4 a) Explain coverage analysis and its significance in inventory management. (10)

b) Explain vendor rating methods and source selection techniques. (10)

Q5 a) Explain make-or-buy decisions with suitable examples. (10)

b) Explain the purchasing procedure and legal aspects involved in buying. (10)

Q6 a) Discuss store and material control systems along with stores records. (10)

b) Discuss strategic sourcing and source selection techniques in Materials Management. (10)

Q7 a) Explain computerized storage and procurement systems with suitable examples. (10)

b) Discuss the application of ERP and MIS in Materials Management. (10)

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Section-B

IEE 14: ENVIRONMENTAL MANAGEMENT

Max. Marks: 140

Instruction: All questions are compulsory.

Q1 a) Describe the different environmental analysis methods. (10)

b) With suitable example, explain cost effect analysis in Environmental Management. (10)

Q2 a) Differentiate between non-conventional and conventional methods of power generation. (10)

b) Discuss the effects of non-conventional and conventional method of power generation on Environment. (10)

Q3 a) Explain in detail Environment preservation and development. (10)

b) Explain Carbon Credit and how it is carried out. (10)

Q4 a) Explain Poverty and Environment degradation w.r.t. global environment change. (10)

b) How population growth affects global environment change. (10)

Q5 a) State and explain chemical sensor application with example. (10)

b) What do you understand by recycling? Explain its Advantages and disadvantages. (10)

Q6 a) Explain Global climatic change w.r.t. present scenario. (10)

b) Write short note on Risk analysis. (10)

Q7 a) Explain Environment Management system standards. (10)

b) State and explain environmental analysis methods. (10)

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Section-B

IEE 15: HUMAN RESOURCE PLANNING AND DEVELOPMENT

Max. Marks: 140

Instruction: All questions are compulsory.

Q1	a) Explain the objectives of human resource planning and development.	(10)
	b) Discuss about the policies of human resource planning.	(10)
Q2	a) What is the need of manpower forecasting for any industry? Explain	(10)
	b) Draw organization structure of any industry. Explain its need.	(10)
Q3	a) Write short note on manpower planning in the Indian industry.	(10)
	b) Why manpower skill analysis is done in the industry? Give example.	(10)
Q4	a) Explain the need of transfer and promotion policies in the industry.	(10)
	b) Explain how succession planning is carried out in the industry.	(10)
Q5	a) What are the different techniques of interview? Explain.	(10)
	b) Explain the objectives of the induction program for an employee.	(10)
Q6	a) Discuss the roles and responsibilities of HR manager.	(10)
	b) Why promotion is necessary for a working professional? Explain.	(10)
Q7	a) Discuss theories of motivation in the organization.	(10)
	b) Write short note on Management of Change.	(10)

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Section-B

IEE 16: PROJECT MANAGEMENT

Max. Marks: 140

Instruction: All questions are compulsory.

Q1 a) What is a Project Priority Matrix? Explain its role in balancing scope, cost, and time constraints with the help of a practical example. (10)

b) Describe the concept and significance of Work Breakdown Structure (WBS). Prepare a sample WBS for organizing a college management fest or a product launch event. (10)

Q2 a) Discuss the importance of project analysis and project selection in capital budgeting. Explain how risk and return are considered while selecting projects. (10)

b) A company is planning to set up a solar energy plant. Explain the capital budgeting process that should be followed from planning to implementation. (10)

Q3 a) Describe the process of market planning and marketing research for a new project. Explain how customer insights influence project success. (10)

b) Explain the concept of technical analysis in project formulation. Discuss the factors considered while assessing technical feasibility. (10)

Q4 a) Explain different means of financing a project. Discuss the advantages and limitations of internal and external financing methods. (10)

b) A manufacturing company is planning expansion. Explain how break-even analysis and profitability analysis can help management in financial decision-making. (10)

Q5 a) Explain the Internal Rate of Return (IRR) method. Discuss how IRR helps management in comparing multiple investment alternatives. (10)

b) Discuss the concept of project risk and social cost-benefit analysis. Explain their importance in public infrastructure projects (10)

Q6 a) Explain the Critical Path Method (CPM). Illustrate how CPM helps project managers in monitoring and controlling project activities. (10)

b) Explain how Gantt Charts and network diagrams generated through MS Project help project managers in decision-making. (10)

Q7 a) Describe the procedure for awarding contracts in large infrastructure projects. Explain the importance of transparency and compliance in the process. (10)

b) A government organization is planning a metro rail project. Explain how procurement planning, contractor selection, and contract monitoring contribute to project success. (10)

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Section-B

IEE 17: ELEMENTS OF AUTOMOBILE ENGINEERING

Max. Marks: 140

Instruction: All questions are compulsory.

Q1 a) Explain the construction and functioning of a single plate clutch with a neat sketch and state its functions. (10)

b) Explain the construction and working of a hydraulic torque converter. Discuss its advantages over a conventional clutch. (10)

Q2 a) What are universal joints? Explain the construction and working of any one type of universal joints used in automobiles. (10)

b) Explain the construction and working of a full floating rear axle. Compare it with semi-floating axle. (10)

Q3 a) Explain the construction and working of an air suspension system and state its applications. (10)

b) Define sprung mass and unsprung mass. Explain their effects on ride comfort and vehicle stability. (10)

Q4 a) Explain the requirements of an efficient braking system. Compare mechanical, hydraulic and pneumatic braking systems. (10)

b) Discuss the construction and working of disc brakes. State their advantages over drum brakes. (10)

Q5 a) Discuss the importance of body design in automobiles. Explain the effects of aerodynamic drag lift and side forces on vehicle performance. (10)

b) Explain the factors considered while designing a driver's seat and passenger compartment. How do these factors influence comfort and safety? (10)

Q6 a) Explain the construction and working of a Capacitor Discharge Ignition (CDI) System with a neat sketch. (10)

b) Describe the starting system of an automobile. Explain the functions of starter motor, Bendix drive and starter solenoid switch. (10)

Q7 a) Explain the principle, construction and working of Multipoint Fuel Injection (MPFI) system. (10)

b) Write short notes on: (10)

i. Hot wire air flow sensor

ii. Oxygen sensor