Ex/Met/HS/B/T/424/2025

Bachelor of Metallurgical and Material Engineering Examination, 2025

(4th Year, 2nd Semester)

Industrial Management & Engineering Economics

Time: Three Hours Full Marks: 100

Different parts of the same question should be answered together

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1. **Answer any one question**
   - **a)** Describe scope of management. Enumerate fourteen principles of management as prescribed by Henry Fayol. What are the advantages and disadvantages of scientific management? **6 + 9 + 5**
   - **b)** Summarise important factors for selection of plant facility location, Describe fixed position layout, What are its advantages and disadvantages? **10 + 5 + 5**

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2 **Answer any one question**

a) **i)** Saraswati Publishing Company produces books for the retail market. Demand for a current book is expected to occur at a constant rate of 7,000 copies. The cost of one copy of book is Rs. 1,450. The carrying cost is based on an 18% annual rate of the product cost per unit. Annual setup cost is Rs. 15,000 per setup. Annual production volume is 25,000 copies. There are 250 working days per year. Set time for production run is 15 working days. Use the production lot size model to determine the following:

5 x 4

a) Minimum cost production lot size.
b) Number of production runs per year.
c) Total annual cost.
d) Re-order point.

ii) Enumerate various types of wastes that JIT reduces. State advantages and disadvantages of JIT. **4 + 6**

b)

Activity	**Immediate Predecessor(s)**	**Duration (Weeks)**
A	------	6
B	------	5
C	A	4
D	B, C	9
E	B, C	11
F	D	10
G	E	8
H	E	12

(i) Draw a network diagram. **8**
(II) Find project completion time and the critical path by activity on arrow method. **4 + 3**
(iii) Show floats of each activity. **8**

[Turn over

(iv) Describe project crashing. **7**

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3. Answer any one question.

a) Write short notes on any four of the following: **4 x 5**
i) least cost combination of inputs, **ii)** production possibility frontier, **iii)** law of returns, **iv)** factors of production, **v)** assumptions of law of equi-marginal utility

b)Define 'Law of Variable Proportions'. What assumptions are related to this law? With the help of a graphical presentation explain various stages of this law. Which stage is beneficial for production and why? **2 + 4 + 11 + 3**

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4. Answer any one question

a) I) Compare the following two mutually exclusive projects on the basis of NPV and IRR by trial and error method (with critical comments). Cash flows and salvage values are in crore of rupees. The minimum required annual return is 10%, **8 + 12**

	Project A				**Project B**			
Year	0	1	2	3	0	1	2	3
Cash Outflow	220				198			
Cash Inflow		91	130	105		87	110	84
Salvage Value				10				18

ii) The expense for budgeted production of 10,000 units in a factory are furnished below. Prepare a flexible budget for 60% capacity. **10**

Particulars	**Per Unit Cost (Rs.)**
Material	70
Labour	25
Variable overheads	20
Fixed overheads (Rs. 1,00,000)	10
Variable expenses (direct)	5
Selling expenses (10% fixed)	13
Distribution expenses (20% fixed)	7
Administration expenses (Rs. 50,000)	5
Total cost per unit	155

b) I) Prepare journal entries, ledger entries and the respective month-end trial balance

A. On 1/1/25, Shani opened a company called Shani Forging Co. with a fund of Rs. 40 lakh.
B. On 3/1/25, rented an office and workshop in cash for Rs. 5 Lakh per month.
C. On 15/1/25, purchased machineries for Rs. 10 lakh on credit.
D. On 25/1/25, made sales of Rs. 30 Lakh in cash.
E. On 31/1/25, paid wages & salaries of Rs. 1 lakh through NEFT

4 + 8 + 3

ii) From the following balances extracted from the books of Durga Co., prepare a trading account, a profit & loss account for the year ending 31st December, 2024, and a balance sheet as on 31st December, 2024: **5 + 5 + 5**

Cash	Rs. 13,000	Sundry Debtors	Rs. 10,000
Bills receivables	Rs. 8,500	Opening Stock	Rs. 45,000
Building	Rs. 50,000	Furniture & Fittings	Rs. 10,000
Investment (temporary)	Rs. 5,000	Plant & Machinery	Rs. 15,500
Bills Payables	Rs. 9,000	Sundry Creditors	Rs. 20,000
Durga's Capital	Rs. 78,200	Durga's Drawings	Rs. 1,000
Sales	Rs. 1,00,000	Sales Discount	Rs. 500
Purchases	Rs. 30,000	Freight In	Rs. 1,000
Purchase Discount	Rs. 500	Sales Salary Expenses	Rs. 5,000
Advertising Expenses	Rs. 4,000	Misc. Sales Expenses	Rs. 500
Office Salary Expenses	Rs. 8,000	Misc.General Expenses	Rs. 1,000
Interest Income	Rs. 1,000	Interest Expenses	Rs. 800

Note: Stock as on 31st December, 2024 was valued at Rs. 10,000.