

**PROJECT ENGINEERING
(CHEN 3202)**

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) Interest on depreciation fund is taken into consideration in
 - (a) Declining Balance method
 - (b) sum of the years digit method
 - (c) sinking fund method
 - (d) Straight Line method
 - (ii) In Modified Accelerated Cost Recovery System (MACRS) the concept of _____ is incorporated.
 - (a) Present worth method
 - (b) Return on investment
 - (c) One extra half year
 - (d) Break even point
 - (iii) Asset value of a property
 - (a) is the worth of the property in the market
 - (b) is the worth of the property as shown in the owner's accounting records
 - (c) is independent of time
 - (d) cannot be predicted, without experimental determination
 - (iv) In a Chemical Process Plant 15 ton product is obtained from 100 ton of raw-material. Such a plant should be located
 - (a) Near raw-material source
 - (b) Near an Airport
 - (c) Half-way between raw-material source and metropolitan city
 - (d) Near a port
 - (v) The CPM network is
 - (a) A deterministic network
 - (b) A probabilistic network
 - (c) A virtual network
 - (d) Sometimes deterministic & sometimes probabilistic

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- (vi) The PERT network is invented by
(a) US Navy (b) Diamond Alkali Co.
(c) NASA (d) Du pont international
- (vii) At break-even capacity the annual manufacturing cost is
(a) Greater than annual sales revenue
(b) Less than annual sales revenue
(c) Equal to annual sales revenue.
(d) Equal to annual sales revenue minus taxable amount
- (viii) The β – distribution is
(a) a discrete distribution (b) a synonym of normal distribution
(c) a skewed distribution (d) a virtual distribution
- (ix) The Du-pont Chart actually represents
(a) dependence between pressure and entropy
(b) ratio of return on equity
(c) vapour pressure at different temperatures
(d) comparative study of depreciation methods
- (x) Identify the standard related to Safety and Health Aspects of a project
(a) ISO 9000 (b) SA 8000
(c) OHSAS 18000 (d) ISO 14000

Group – B

2. You are going to advice a leading Chemical Industry for setting up their new Chemical Manufacturing Unit in India. Discuss the aspects of Plant location/site selection highlighting the relevant current issues.

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3. (a) Define the following terminologies:
(i) Capitalized Cost, (ii) Present worth
(b) Show that the capitalized cost of an asset can be expressed as

$$K_v = C_v + \frac{C_R}{e^{in} - 1}$$

If the interest is compounded continuously, Where, K_v = capitalized cost, C_v =original cost, C_R = replacement cost i = annual interest rate, n = service, life year

(2 + 2) + 8 = 12**Group – C**

4. A piece of equipment having a salvage value Rs 20,000 is estimated to have a service life of 10 years. The original cost of the equipment was 2,00,000. Determine the following;
(i) The depreciation charge for the fifth year if text book declining-balance depreciation is used.

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- (ii) The depreciation charge for the fifth year if sum-of-the-years-depreciation is used.
- (iii) The percent of the original investment paid off in the first-half of the service life using the text book declining-balance method.
- (iv) The percent of the original investment paid off in the first half of the service life using the sum-of-the-years-digits method.

(4 × 3) = 12

5. A plant is producing 10,000t/y of a product. The overall yield is 70% on a mass basis (kg of product per kg raw material). The raw material costs Rs. 1,000/t, and the product sells for Rs. 3,500/t. A process modification has been devised that will increase the yield to 75%. The additional investment required is Rs. 35,00,000, and the additional operating costs are negligible. Is the modification worth-making?

12**Group – D**

6. A plant produces Heating Mantles at the rate of P units per day. The variable costs per unit have been established to be Rs $(47.73 + 0.1 \cdot P^{1.2})$. The total daily fixed charges are Rs 1750, and all other expenses are constant at Rs 7325 per day. If the selling price per Heating Mantle is Rs 173, determine:

- (i) The daily profit at a production schedule giving the minimum cost per mantle.
- (ii) The production schedule at the breakeven point.

(6 + 6) = 12

7. Derive an expression for optimum economic pipe diameter for flow of fluid at a given volumetric flow rate. Define the notations used in the expression.

12**Group – E**

8. The following table gives data on normal time-cost and crash time-cost for a project

Activity	Normal		Crash	
	Time (days)	Cost (Rs.)	Time (days)	Cost (Rs.)
10--20	6	600	4	1000
10--30	4	600	2	2000
20--40	5	500	3	1500
20--50	3	450	1	650
30--40	6	900	4	2000
40--60	8	800	4	3000
50--60	4	400	2	1000
60--70	3	450	2	800

The indirect cost per day is Rs. 100. Drawing the Network, Crash the relevant activities systematically and determine the optimum project completion time and cost.

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9. What is Gantt Chart? How does it differ from a milestone chart? Discuss the evolution of Network Planning methodologies from Milestone chart. Enumerate the salient points of Fulkerson's rule for numbering Network.

(1 + 2 + 6 + 3) = 12

Department & Section	Submission Link
CHE	https://classroom.google.com/c/MzY0NTU4MjMyODc3/a/MzY0NTU4MjMyODgy/details