



Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech (CHE-NEW)/SEM-7/CHE-703/2010-11

2010-11

PROJECT ENGINEERING

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

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

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

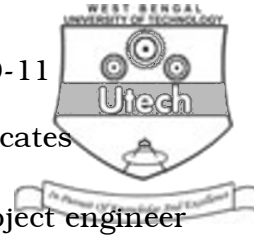
- i) At break-even capacity the annual manufacturing cost is
 - a) greater than annual sales revenue
 - b) less than annual sales revenue
 - c) equal to annual sales revenue
 - d) none of these.
- ii) Optimum production rate signifies
 - a) the rate of production with no loss condition
 - b) the rate of production which gives maximum profit per unit time
 - c) the rate of production having minimum production cost
 - d) none of these.



- iii) Meaning of capitalized cost of an equipment is
- a) present worth value of the equipment
 - b) highest market value of the equipment
 - c) price of a completely installed equipment
 - d) sum of the original cost and present value of renewable perpetuity.
- iv) Optimum economic pipe diameter for fluid flow is determined by the
- a) viscosity of the fluid
 - b) density of the fluid
 - c) total cost considerations (pumping cost plus fixed cost of the pipe)
 - d) none of these
- v) Feasibility study aims to determine the project feasibility
- a) technically
 - b) financially
 - c) socially
 - d) all of these.



- vi) Under safety measures the term TLV indicates
- a) temperature limit value
 - b) threshold limit value
 - c) tension limit value
 - d) track limit value.
- vii) At break-even point
- a) total product cost equals to the total income
 - b) production rate should be higher than the market demand
 - c) production time per batch should be reduced
 - d) manpower required should be increased.
- viii) Superproduction cost is related to
- a) normal expenses due to normal production rate
 - b) extra expenses due to accidental events
 - c) extra expenses due to increasing production rate
 - d) extra expenses due to raw materials cost.
- ix) Pessimistic time is the maximum possible time required to accomplish a task
- a) assuming everything goes wrong
 - b) assuming everything proceeds as normal
 - c) assuming everything proceeds better than normal
 - d) assuming everything leads to a major catastrophe.



- x) Critical path in a project network indicates
 - a) the path to be decided by the project engineer
 - b) the longest path through the network
 - c) the shortest path through the network
 - d) the fixed path until the project completion.
- xi) Burst event is an event which represents
 - a) the joint completion of more than one activity
 - b) the joint starting of more than one activity
 - c) an independent starting of an activity
 - d) an independent completion of an activity.
- xii) Slack of an event in a network is the difference between
 - a) the latest event time and earliest event time at the terminal point
 - b) the latest event time and earliest event time at the starting point
 - c) the latest event time and earliest event time at any point
 - d) the latest event time and earliest event time at the end of the project.



GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. a) What are the steps to be considered in making Feasibility Report for a plant design ?
b) Explain the term salvage value and junk value in depreciation. $3 + 2$
3. a) Show that for a cylindrical container the minimum surface area to enclose a given volume is obtained when length is made equal to the diameter.
b) Define the terms Codes and Standards and their importance in plant design. $3 + 2$
4. In consideration of Health & Safety Hazards, describe the term short-term effect & long-term effect with example. What are the steps to be taken to control the exposed hazards ? $3 + 2$
5. Find the expression for optimum production cost & optimum production rate for minimum cost per unit of product. Define the notation used for this expression. 5
6. Construct a network for the project whose activities and their precedence relationships are given below :

Activity	A	B	C	D	E	F	G	H	I
Predecessor Activity	—	—	A, B	B	B	A, B	F, D	F, D	C, G

5



GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) What do you mean by present worth of annuity ? 5
- b) It is desired to borrow \$ 1000 to meet a financial obligation. This money can be borrowed from a loan agency at a monthly interest rate of 2 per cent. Determine the following :
- i) The total amount of principal plus simple interest due after 2 years if no intermediate payments are made.
- ii) The total amount of principal plus compounded interest due after 2 years, if no intermediate payments are made.
- iii) The nominal interest rate when the interest is compounded monthly.
- iv) The effective interest rate when the interest is compounded monthly. 10
8. a) What are the differences between a CPM network and PERT network ? 3
- b) Represent the following project in bar chart. The activities and their durations being as indicated : 4

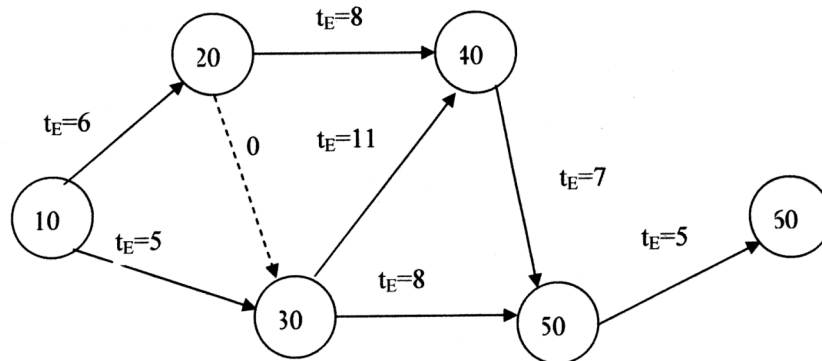
Conducting an examination

Activities	Design questionnaire	Print question paper	Distribute to various centers	Answer questionnaire	Collect answer books at main office
Durations	7 days	2 days	4 days	1 day	4 days



- c) For the project represented by the network in Figure, the value of the expected time for each activity is shown along the arrows. If the scheduled completion time is 30 hours, determine the slack time for each event and identify the critical path. Enter the values in a tabular form.

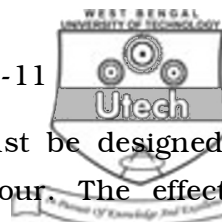
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9. a) The original value of a piece of equipment is \$ 22,000, completely installed and ready for use. Its salvage value is estimated to be \$ 2,000 at the end of a service life estimated to be 10 years. Determine the asset (or book) value of the equipment at the end of 5 years using
- Straight-line method.
 - Textbook declining-balance method
 - Double declining-balance (200 per cent) method (i.e., the declining-balance method using a fixed-percentage factor giving a depreciation rate equivalent to twice the minimum rate with the straight-line method).
- b) What is its salvage value ? Write short note on Modified Accelerated Cost Recovery System (MACRS).

10

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10. a) A condenser for distillation unit must be designed to condense 2300 kg of vapor per hour. The effective condensation temperature for the vapor is 77°C . The heat of condensation for the vapor is 465 kJ/kg. The cost of cooling water at 21°C is \$ 2.56 per 100 m^3 . The overall heat-transfer coefficient at the optimum may be taken as $0.284\text{ kJ}/(\text{m}^2\cdot\text{s}\cdot\text{K})$. The cost for the installed heat exchanger is \$ 380 per square metre of heat-transfer area, and annual fixed charges including maintenance are 20 per cent of the initial investment. The heat capacity of the water may be assumed to be constant at $4.2\text{ kJ}/(\text{kg}\cdot\text{K})$. If the condenser is to operate 6000 hr/yr, determine the cooling water flow rate in kilograms per hour optimum economic conditions. 12
- b) Define mean, variance and standard deviation. 3
11. Write short notes on any *three* of the following : 3×5
- Plant layout
 - F-test method
 - Scale-up and scale-down technique
 - Break-even chart
 - Critical path method.
