Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech (CHE-NEW)/SEM-6/CHE-604B/2013

2013

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 : $10 \times 1 = 10$

   i) Design capacity of a plant should always be

      a) equal to the break-even capacity.

      b) less than the break-even capacity.

      c) greater than the break-even capacity.

      d) twice the break-even capacity.

   ii) Pessimistic time of an activity is the time required to complete the activity assuming

      a) everything goes wrong.

      b) everything proceeds as normal.

      c) everything proceeds better than normal.

      d) possibility of a major catastrophe.

iii) In safety rules the term TLV indicates

a) Temperature Limit Value.

b) Threshold Limit Value.

c) Tension Limit Value.

d) Thrust Limit Value.

iv) Matheson formula fails when

a) service life is short.

b) service life is long.

c) salvage value is zero.

d) original value is low.

v) Functional depreciation of an equipment is the measure of decrease in its value due to its

a) aging

b) wear & tear

c) obsolescence

d) breakdown & accident.

vi) A common type of annuity involves payments which occur

a) at the beginning of each interest period

b) at the end of each interest period

c) after a definite number of years

d) none of these.

vii) The total capital investment for a chemical process plant comprises the fixed capital investment and the

a) overhead cost

b) working capital

c) indirect production cost

d) direct production cost.

viii) Book 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.

ix) Critical path in a project network indicates the

a) path to be decided by the project engineer.

b) longest path through the network.

c) shortest path through the network.

d) fixed path until the project completion.

x) Merged 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.

xi) The full form of PERT is

a) Process Equipment Reading Technique

b) Programme Evaluation Review Technique

c) Process Evaluation Review Technique

d) Probabilistic Estimation of Research Technique.

xii) Present worth

a) can be influenced by inflation

b) cannot be influenced by inflation

c) is not important for project

d) none of these.

GROUP – B

(Short Answer Type Questions)

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

2. a) Who is project Engineer ? What role does he play for implementation of a project ?

b) Name the factors to be considered for selection of location for a proposed plant. 3 + 2

3. Define capitalized cost. Find an expression for capitalized cost of an equipment when the interest is compounded continuously. Define the notations used in the expression. 1 + 4

4. a) State Fulkerson's rule with an illustration for numbering the event in a logical sequence while constructing PERT network.

b) What is the difference between time estimates of a PERT and a CPM in the network of events and activities of a project ? 3 + 2

5. Distinguish between strategic and tactical investment choices.

6. Distinguish between float and slack in evaluation of a project.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

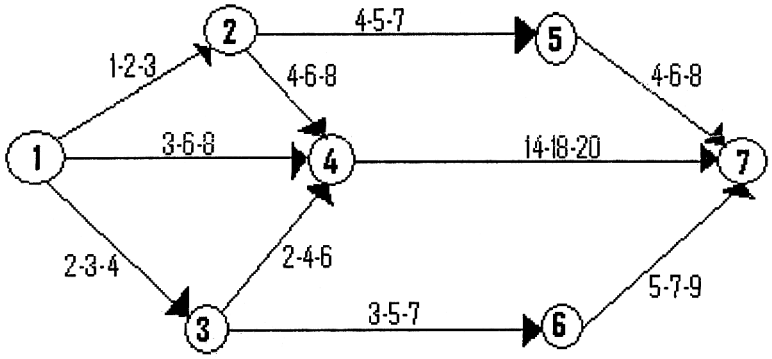
7. a) The plant of chemical company has an initial worth of Rs. 50 lakhs in a service life of 8 years.

   i) Given a choice between the straight line and declining balance method of depreciation. What method would you recommend to save tax and why ?

   ii) Estimate the back value of the plant at the end of 4 years for each case of the two methods of depreciation.

   b) A reactor has been installed at a cost of Rs 50,000 and is expected to have a working life of 10 years with a scarp value of Rs. 10,000. Find out the capitalized cost (in Rs.) of the reactor based on an annual compound interest rate of 5%. 8 + 7

8. From the network given below, find the expected time for each of the paths. Also find the critical path as well as the expected time for the project completion.



9. Write short notes on any *three* of the following : 3 × 5

   a) Sum of the years' digit method

   b) Break-even chart

   c) Regression analysis

   d) Health & Health hazards.

10. a) The following is a typical cash flow in a company with expected rate (*r*) of 10%.

Year	Cash flow (Rs.)
0	10,00,000
1	2,00,000
2	2,00,000
3	3,00,000
4	3,00,000
5	3,50,000

Calculate its net present worth. Comment on whether the project be accepted or rejected.

b) Discuss break-even analysis and payout period analysis with a suitable hypothetical example, as investment evaluation technique. 9 + 6

11. A condenser is to be designed to condense 2500 kg/hr of a dry saturated vapour at 77°C. The latent heat of condensation of vapour is 465 kJ/kg. Cooling water is available at 21°C. Cost of this cooling water is 1·6 per 1000 kg. Overall heat transfer co-efficient in the condenser may be taken to be 284 watt/m^2K. The cost of installed heat exchanger is Rs. 22,800 per square metre of heat transfer area and annual fixed charges including maintenance are 20% of initial investment. The heat capacity of water may be assumed to be constant at 4·2 kJ/kg.K. If the condenser is to operate 300 days in a year, determine the optimum cooling water outlet temperature and corresponding flow rate of water in kg/hr. Assume that the driving force in the condenser is arithmetic mean between two terminal temperature differences.