



Final Examination - 2013/14

CEX 6239 Construction Management

Time Allowed : Three Hours

Date: 16th August 2014

Time : 0930-1230 hrs.

Answer any four (4) questions.
All questions carry equal marks

Q1.

- (a) Name four types of 'Lifting' equipment. Describe the process of selecting the most appropriate equipment to lift different construction materials/components. (08 marks)
- (b) Discuss the factors on which affect the *maintenance cost* of equipment (07 marks)
- (c) Describe how a contractor can implement 'resources scheduling' on a construction project. Use diagrams to illustrate your answer. (06 marks)
- (d) Explain a method of checking the progress of construction (04 marks)

Q2.

A project has been awarded for the construction of a single storey house of area 250 sq.m. The major activities are identified below.

Excavation of foundations, construction of foundations and DPC, Brickwork in superstructure, Fabricating doors & windows, roof construction, Plastering external walls, plastering internal walls, brick paving in floors & rendering floors, fixing doors and windows, all painting work, electrical and plumbing work, finishes.

- (a) Making reasonable assumptions prepare a table of activities indicating the items of work and the sequence in which they are to be carried out. Identify realistic durations for the activities such that the house can be completed in four months, assuming a 'five day working week'. (07 marks)
- (b) Draw a suitable activity-on-arrow network for the construction of this project indicating activity times and the critical path. (04 marks)
- (c) Draw a suitable activity-on-node network for the construction of this project indicating activity times and the critical path. (06 marks)
- (d) Prepare a bar chart for working at earliest event times.
Comment on the use of network diagrams and bar charts for different projects.(08 marks)

Q3.

A company has undertaken a renovation project of a small building. The monthly budget for this project is given in Table 1.

Table 1.- Contractor's monthly budget for the contract

Month	1	2	3	4	5	6
Contractor's costs (Rs.'000,000)	5	8	10	12	16	20
Contractor's profit given as % added to costs to give monthly values	5	5	4	4	3	3

- (a) Prepare the contractor's cash flow using the following data, making reasonable assumptions where necessary.
- A delay of one month may be assumed between the contractor incurring a cost liability and the outward cash flow.
 - Payment to the contractor is made one month after each month's interim measurement.
 - Retention at the rate of 5% is deducted from each monthly payment
 - Half the retention is paid to the contractor, in the final monthly payment. The remaining half is paid six months after completion.

(25 marks)

Q4.

- (a) Explain the importance of a good organisational structure for a typical construction organisation undertaking building construction. (06 marks)
- (b) How would you justify the importance of Project Management for a construction project? Explain in relation to a road construction project. (06 marks)
- (c) Explain how 'Work Study' can be used to prepare efficient activity schedules using an example from construction. What are the reasons which give rise to problems in collecting data when applying Work Study Technique in the construction industry? (07 marks)
- (d) Explain the importance of the Design Phase of a construction project taking a construction project of your choice as an example. (06 marks)

Q5.

- (a) It is required to concrete an overhead water tank. Indicate all the operations involved in the concrete work from production to completion, in the form of a flow chart. (06 marks)
- (b) Explain the operations of two types of equipment/machinery used for excavation & hauling of earth. (06 marks)

(c) List the cost elements of the operating costs of equipment.

Determine the direct cost per hour of owning and operating a 1/4 Cu.m capacity hydraulic back hoe excavator from the following data. (09 marks)

Initial cost	Rs. 1,500,000
Resale value	Negligible
Useful life	10 years
Interest on capital	15% per annum
Fuel consumption	10 litres per hour
Cost of fuel	20 Rs per litre
Oil & grease	10% of fuel cost
Repairs to machine	10 % of initial price per annum
Operator	'all in' cost of Rs 100 per hour
Insurance & tax	1 1/2 % of initial price per annum
Average working hours per year	2000

(d) List the important points to consider when planning an incentive scheme for construction workers. (04 marks)

Q6.

(a) Name three types of Contract that can be used in construction work, giving examples of the construction works for which each type of contract can be applied. (09 marks)

(b) The law requires the fulfillment of four basic elements for a 'Contract'. Explain briefly. (05 marks)

(c) As per the ICTAD definition, explain the items included in a 'Contract' for the contract agreement to be complete. (04 marks)

(d) When calculating variances at the end of six months on a road construction project, it is found that there is an adverse variance for the item 'construction plant'. List & explain possible reasons for the adverse variance and advice on how to better manage future projects. (07 marks)