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THE OPEN UNIVERSITY OF SRI LANKA
DEPARTMENT OF CIVIL ENGINEERING
Bachelor of Technology (Engineering)

Final Examination - 2010

CEX 6239 Construction Management

Time Allowed : Three Hours

Date: 12th March 2011 Time : 0930-1230 hrs.

Answer any four (4) questions.

All questions carry equal marks

Q1.

(a) Discuss in brief, the three main objectives of a project and hence justify 'Project Management' for construction projects. (15 marks)

(b) Indicate the organizational structure of a typical medium sized **construction company** including the **site organizational structure by means of diagrams,** and describe the departmental roles within such a company. (10 marks)

Q2.

(a) Name four types of 'Lifting' equipment. Describe the process of selecting the most appropriate construction plant to lift different construction materials/components. (08 marks)

(b) Discuss the factors on which the *maintenance cost* of equipment will depend (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 simple method of checking the progress of construction (04 marks)

Q3.

(a) Using an example from the construction industry discuss the *Value Management* Concept at the inception of a project. (07 marks)

(b) Describe the steps to be followed in a Recruitment & Selection Procedure for recruiting a Construction Site Supervisor (05 marks)

(c) State the objectives of financial incentive schemes and describe the 'hours saved' system for operating a production bonus on a construction project. (07 marks)

(d) Discuss accident prevention measures in materials handling on building repair and renovation sites. (06 marks)

Q4.

(a) The table below gives the major activities for a bridge construction project.

No.	Activity	Description	Duration (weeks)	Precedence
1	A	Pile and cap east	2	-
2	B	Pile and cap west	1.5	-
3	C	Pile and cap center	1	-
4	D	Substructure east	4.5	A
5	E	Substructure west	4	B
6	F	Substructure center	3.5	C
7	G	Construct in-situ span	6	D,F
8	H	Construct precast span	1	E, F
9	I	Surface bridge	1	G, H
10	J	Finishes	3	I

(i) Draw the activity-on-arrow (A-O-A) network for the project. Calculate Early Start Time (EST) and Late Start Time (LST) for all activities and tabulate. Indicate the critical path. Tabulate the total floats of activities.
(ii) Draw the Bar Chart for the project using the EST
(iii) Draw the activity-on-node (A-O-N) network giving all time information in the nodes
(iv) Compare the A-O-A and A-O-N network diagrams.

(16 marks)

(b) Using an example describe how Work Study may be implemented during the construction phase of a project. What are the practical difficulties in collecting the data required? (09 marks)

Q5.

Table 5.1 gives the Contractors monthly budget for a contract where the contract sum is Rs.Million 26.8.

Retention is 10% of Contract Sum
Assume a one month credit facility for Costs

As per the conditions of contract, interim measurements are to be made monthly.
Payments of the amount certified less 10% retention are to be made one month later.
The retention is to be repaid six months after completion of the works.

Table 5.1

Month	Contractor's Cost Rs Million	Contractors profit percentage added to costs to give monthly values
1	3	10%
2	2	10%
3	6	10%
4	4	5%
5	8	5%
6	2	5%

(a) Prepare the Cash flow forecast for the contract. Make necessary assumptions stating them clearly.
(12 marks)

(b) On the same graph sheet,
(i) Draw the cumulative 'Cash In' vs 'Time' and 'Cash Out' vs 'Time' graph for this contract.
(ii) Draw the Cumulative project cash flow vs Time graph.
(iii) Indicate any negative cash flow areas

(05 marks)

(c) Suggest methods for improving the cash flow and explain clearly how it will effectively improve.

(08 marks)

Q6.

(a) Explain the important factors that should be considered by a contractor when making a decision to tender for a construction project.
(08 marks)

(b) A contractor intends to bid for a building construction project. What are the items to be included in the Tender Documents?
(07 marks)

(c) Explain the additions that should be made to the estimated cost in order to arrive at the tender price.
(05 marks)

(d) Give reasons for cost over-runs on construction projects
(05 marks)