THE OPEN UNIVERSITY OF SRI LANKA
DEPARTMENT OF CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT PROGRAMME - LEVEL 7
POST GRADUATE DIPLOMA / STAND ALONE COURSES

Final Examination - 2007

CEX7101 - Planning and Control in the Construction Industry   029

Time Allowed: Three Hours

Date: 21st April 2008   Time: 0930-1230 hrs.

Section A and Section B consist of three questions each.
Select **two (2) questions from each section** and answer a total of four (04) questions.

Section A
Q1.
    (a) The structure of the construction industry is very complex.

      (i)   Identify the main processes involved in delivering a product in the industry.
      (ii)   Name the resource inputs to the industry.
      (iii)   Who are the constituent Partners of the industry?
      (iv)   Identify the broad sub sectors across which the construction industry spans.
                                                     (15 marks)

    (b) Explain the impact of the Building Materials Industry on the National Economy.
                                                     (10 marks)

Q2.
(a) One of the problems faced by the construction sector is the rapid fluctuation of demand.
Identify the factors which can cause changes in demand.
What steps can be taken to stabilize such fluctuations and ensure an adequate sector workload?
                                                     (15 marks)

(b) To improve the existing system of planning in the construction industry, an 'Inventory' of the construction sector is essential. Explain how you would set about developing an inventory for the industry.   (10 marks)

Q3.
(a) Discuss the Financial Support which can be extended to Contractors to help them survive and develop.
                                                     (10 marks)
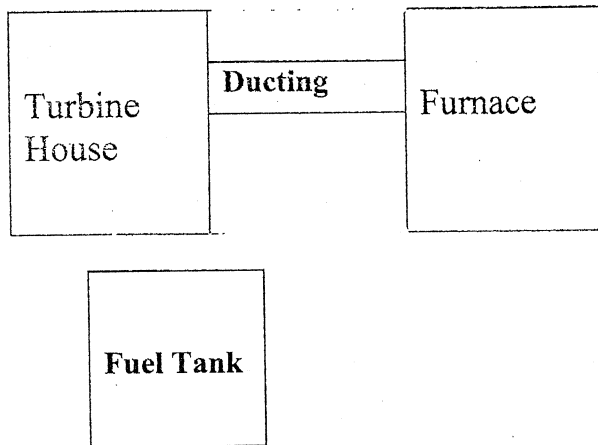(b) Explain how Government can use the construction industry as an economic regulator both at macro level and micro level.
                                                     (15 marks)

Section B

Q4. An oil refinery is planning the installation of a gas turbine based combined heat and power system. The gas turbine will be housed in a new building next to a furnace which uses the exhaust gas for pre-heating its air supply. The layout is shown below.

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┌──────────────┐  Ducting  ┌──────────────┐
│ Turbine      │───────────│ Furnace      │
│ House        │           │              │
└──────────────┘           └──────────────┘

      ┌──────────────┐
      │              │
      │  Fuel Tank   │
      └──────────────┘
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No	Task	Duration (weeks)
1	Finalise design	6
2	Procure generating set	20
3	Procure switch gear and control system	24
4	Manufacture ducting	6
5	Procure fuel tank	2
6	Build turbine house	8
7	Erect support structure for ducting	3
8	Erect support structure for fuel tank	3
9	Install ducting	1
10	Install fuel tank	1
11	Install generator	2
12	Install switch gear and control system	2
13	Commission	2

Design work can start immediately. The following conditions apply with regard to precedence requirements.

- The design work can start immediately and must be complete before procurement tasks can start
- The building work must be completed before the generator and switchgear can be installed and the support structures started
- The generator must be installed before the ducting
- The respective support structures must be installed before the fuel tank and ducting can be installed
- Commissioning takes place when all other tasks are completed

(a) Draw a activity-on-node diagram for the project and indicate the earliest start times, latest start times, earliest finish times and latest finish times for each activity. **(10 marks)**

(b) Calculate the total floats for each activity and comment on the events that have longest float

(05 marks)

(c) Identify the critical path and state the minimum duration for the project. **(10 marks)**

Q5.

(a)

Explain the advantages of preparing resource aggregation diagrams and their importance.

(10 marks)

Table 5.1 below gives a portion of a bar chart for construction of a two storey block.
All activities are to be carried out by a direct labour force.
Assume standard norms given in the Chart 5.1 and any other required data.

Table 5.1- Bar Chart

Description of work	Unit	Qty	March				April				May			
Excavation for foundation	M^3	100	█	█										
50mm Blinding layer of concrete under column bases	M^2	15		█	█									
1:2:4 concrete in column bases	M^3	08				█	█							
Column shaft upto 1st floor	M^3	45					█	█						
Rubble foundation up to DPC	M^3	50				█	█	█						
1st floor beams & slab concreting	M^3	90									█	█	█	█

Chart 5.1 Work Norms

Item	Quantity & Unit	Labour
1. Excavation for foundation	1 M^3	1 labour day
2. Blinding Concrete	3 M^2	1 labour day & 1 Mason day
3. Shuttering	1 M^3	1 Carpenter day & 1 labour day
4. Bar Bending	2 M^3	1 Bar Bender day
5. Concreting	1 M^3	1 Mason day & 3 labour days
6. Rubble Masonry	3 M^3	1 Mason day & 2 labour days

Cement requirement:
1 M³ of Blinding Concrete   6 bags
1 M³ 1:2:4 Concrete   9 bags
1 M³ Random Rubble Masonry   2 bags

(b)

    (i) Calculate the total number of labour required in the first month of operation

    (ii) Calculate the number of bags of cement required in the first and second month of operation and arrive at a suitable size of a cement store.

State all assumptions made.   (15 marks)

Q6.

Write short notes on any four of the following:

    (a) Desirability of using 'Work breakdown structures & Work packages' in the management of small construction projects

    (b) Discuss the advantages of using sub-nets in network construction

    (c) Discuss the procedure involved in controlling the progress of construction projects giving examples.

    (d) Explain the factors which affect the choice of a 'planning technique' for a construction project giving the particular advantages of selected techniques

    (e) The economic approach to design problem solving in 'design costing & management' for a building project.

(6.25 marks each= 25 marks)