

**GUJARAT TECHNOLOGICAL UNIVERSITY**

M.E Sem-I Regular Examination January / February 2011

Subject code: 711401N

Subject Name: Construction Management

Date: 31 /01 /2011

Time: 02.30 pm – 05.00 pm

Total Marks: 70

**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Discuss the objectives of construction projects. Explain the benefits of planning and scheduling in construction projects. **07**
- (b) Explain various reasons for 'excess work content' with reference to construction projects. Define Work Study approach to reduce it. **07**
- Q.2** (a) The table given below gives data of a network for a small project. **07**

Activity	Time (Days)	Resource required per day
1-2	3	4
1-3	3	3
1-4	4	4
2-5	2	2
3-7	8	8
4-6	3	3
5-8	3	8
6-7	2	4
7-8	3	3

Draw CPM network and find expected duration. Construct time-scaled chart of the project. Prepare Resource histogram. Carry out resource smoothing to achieve balanced crew operation.

- (b) What is work-breakdown structure? Prepare work-breakdown structure for a pumping station project of a large city. **07**

**OR**

- (b) A building project consists of 10 activities, as given below: **07**

Activity	Duration (Days)
1-2 (A)	5
2-3 (B)	2
2-4 (C)	6
3-6 (D)	4
3-5 (E)	4
4-5 (F)	2
4-7 (G)	3
6-8 (H)	8
5-8 (I)	7
7-8 (J)	2

Prepare A-O-A and A-O-N networks and work out total float and free float for each activity.

- Q.3 (a)** For a township of 120 bungalows to be completed in 10 months, the data is available from planning cell of the company as given below: **07**  
 [Numbers shown in below table shows activity completion at the end of each month for given bungalows]

Month Activity	1	2	3	4	5	6	7	8	9	10
Super-structure	10	10	20	20	20	20	20	-	-	-
Plasterwork	-	10	20	20	20	20	20	10	-	-
Flooring-Painting	-	-	20	20	15	15	30	20	-	-
Finishing & Hand over	-	-	-	-	10	20	20	20	30	20

Following is the information of actual progress available at various stages of the project. Draw LOB Cyclograph and Control chart and give your comments on progress. Give your suggestions for masons' deployment for plastering, flooring and finishing works if you are reviewing the status on the 8<sup>th</sup> month. What is probable delay?

Month Activity	2nd	4th	6th	8 <sup>th</sup>
Superstructure	15	50	100	120
Plaster work	05	40	90	100
Flooring, Painting	-	10	65	95
Handover	-	-	45	80

- (b)** Differentiate between PERT and CPM. Define: Cost variance and Schedule performance index. **07**

**OR**

- Q.3 (a)** A project consists of 10 activities, each of which requires either or both, of the two types of resources  $R_1$  and  $R_2$  for its performance. The duration of the activities and their resource requirements are as follows: **07**

Activity	Duration (Days)	Resource Requirement	
		$R_1$	$R_2$
1-2	3	3	2
1-3	2	6	-
1-4	6	4	-
2-6	4	-	4
3-5	2	2	2
4-5	1	4	-
4-8	4	4	-
5-7	3	3	2
6-7	2	1	3
7-8	4	4	5

Resource availability:  $R_1 = 7$  units and  $R_2 = 5$  units.

Determine the duration of the project under the given resource constraints by performing resource allocation process.

- (b)** Write short note on: Monitoring of construction projects. **07**

- Q.4 (a)** Discuss role of construction managers in improving productivity of construction projects. **07**

- (b)** Discuss performance parameters to be controlled by project managers in construction projects. **07**

**OR**

**Q.4 (a)** State whether following statements are TRUE or FALSE: **07**

[1] It is possible to reduce an activity's duration below its crash time by allocating more resources and funds to it.

[2] Any reduction in project duration means increase in direct cost of that project.

[3] It is not possible for a network to have more than one critical path.

[4] If a non-critical activity has no free float, it implies that the start of one or more of its immediately succeeding activities is dependent on the completion time of this activity.

Give the advantages of GERT networks.

**(b)** The following is a table showing details of a project: **07**

Activity	Immediate predecessor	Normal		Crash	
		Time (weeks)	Cost (Rs in thousands)	Time (weeks)	Cost (Rs in thousands)
A	-	10	20	7	30
B	-	8	15	6	20
C	B	5	8	4	14
D	B	6	11	4	15
E	B	8	9	5	15
F	E	5	5	4	8
G	A,D,C	12	3	8	4

Indirect cost of the project is Rs. 400 per day. Find the optimum duration and the associated minimum project cost by performing network crashing process.

**Q.5 (a)** Explain updating of project network. Why is it necessary? Explain time and motion study concept with specific relevance to construction industry. **07**

**(b)** What is resource leveling? Give the difference between resource leveling and resource smoothening. What is sensitivity ranking of activity? Give the rules of it for scheduling of non-critical activities. **07**

**OR**

**Q.5 (a)** Give the list of project management functions and its related software needs in various areas of construction. **07**

**(b)** Discuss the factors affecting co-ordination between various agencies in construction projects. **07**

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