

GUJARAT TECHNOLOGICAL UNIVERSITY**M.E Sem-I Examination January 2010****Subject code: 711401****Subject Name: Construction Management****Date: 20 / 01 / 2010****Time: 12.00 - 2:30pm****Total Marks: 60****Instructions:**

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

- Q.1 (a)** Discuss Construction project life cycle along with activities being carried out during its various stages. **06**
How construction industry is unique and different than other industries?
- (b)** Discuss the importance and benefits of planning, scheduling and controlling for the success of a construction project. **06**

- Q.2 (a)** What is the importance of a Work Breakdown Structure? Prepare a work breakdown structure of a workshop building construction project for a degree engineering college. **06**
- (b)** Information of the activities required for a project is as follows: **06**

Name	A	B	C	D	E	F	G	H	I	J	K
Activity Node	1-2	1-3	1-4	2-5	3-5	3-6	3-7	4-6	5-7	6-8	7-8
Duration (Days)	2	7	8	3	6	10	4	6	2	5	6

Find Total float, Free float, Interfering float and Independent float for each activity.

- (1) If activity 6-8 gets delayed by 2 days, will it affect the completion of a project?
- (2) If activity 3-7 is given more resources and gets completed in 2 days instead of 4 days, what will be the effect on project completion?
- (3) If activity 4-6 is delayed and gets completed in 10 days instead of 6 days of scheduled duration, what will be the effect on its successor activity?

OR

- (b)** What are the advantages of precedence networks? What are the different logic used in precedence diagramming? **06**

Following is the information of a project. Draw A-O-N network and determine critical path.

Name	A	B	C	D	E	F	G	H	I	J	K
Activity Node	1-2	1-3	3-4	4-5	2-5	5-6	3-6	6-7	2-7	5-7	7-8
Duration (Days)	10	12	6	8	8	8	5	6	12	10	12

- Q.3 (a)** How do you distinguish resource levelling and resource smoothing problems? State and explain an algorithm for resource allocation. **06**
- (b)** What is budgeted cost analysis? Define: Cost variance, schedule variance, cost performance index and schedule performance index. **06**
Discuss time and cost over-run situations with graphical explanations.
What is the importance of cost reports generated by budgeted cost analysis?

OR

- Q.3 (a)** For a construction project, duration and manpower requirement is given as follows: **06**

Activity	Duration (Weeks)	Manpower required
1-2	2	10
2-3	8	18
2-4	6	10
3-5	12	15
3-6	5	6
4-5	5	8
5-7	3	6
5-8	5	10
6-7	4	8
6-9	3	9
7-9	4	12
8-9	6	8

- (a) Show graphically the level of resource employment through time, assuming that all activities are scheduled as soon as possible.
- (b) Perform resource smoothing, assuming that non-critical activities are scheduled as late as possible.
- (b)** Explain different variances for controlling direct cost of a construction project. Discuss causes for unfavourable direct cost variances. **06**
- Q.4 (a)** Following table gives data on Normal cost and crash cost and time for a project. The indirect cost is Rs. 50 per week. **06**

Activity	Normal		Crash	
	Time (weeks)	Cost (Rs.)	Time (weeks)	Cost (Rs.)
1-2	3	300	2	400
2-3	3	30	3	30
2-4	7	420	5	580
2-5	9	720	7	810
3-5	5	250	4	300
4-5	0	0	0	0
5-6	6	320	4	410
6-7	4	400	3	470
6-8	13	780	10	900
7-8	10	1000	9	1200

- (1) Draw the network diagram and label it.
- (2) Identify critical path and find out normal project duration corresponding to the cost.
- (3) Crash the relevant activities systematically and determine the optimum project duration and its cost.
- (4) Determine the minimum project duration corresponding cost.
- (b)** Why updating of project network is essential? Discuss the factors affecting work scheduling. **06**

OR

- Q.4 (a)** What is redundancy in precedence relationships of networks? **06**
The following precedence relationships are given for a project consisting of eight activities.

Activity	Immediate Predecessor (s)
A	-
B	A
C	A
D	A,C
E	B,D
F	B,D,E
G	B,D
H	E,F,G

Identify redundant immediate predecessor(s) if any.

Discuss the advantages of Line-of-Balance technique of scheduling.

- (b)** Discuss at length: Project Management Information Report. **06**
What is the importance of a weekly site meeting with reference to success of a construction project?

- Q.5 (a)** Explain the procedure of “Work Study” as a management tool applicable to construction industry. **06**
- (b)** The table given below gives a list of activities, the time duration and the required resources for carrying out each of the activities and their availability. Draw the network and critical path. Find the project duration under the given resource constraints. **06**

Activity	1-2	1-3	1-4	2-6	3-5	4-5	4-8	5-7	6-7	7-8
Duration (Days)	3	2	6	4	2	1	4	3	2	4
Resources R ₁	3	6	4	-	2	4	4	3	1	4
R ₂	2	-	-	4	2	-	-	2	3	5

Resource constraints: Maximum number of R₁ available is 7 and R₂ is 5 only.

OR

- Q.5 (a)** Explain the concept of ‘Decision Tree’ with suitable example. What is GERT? Explain the advantages of GERT networks. **06**
- (b)** What is time and motion study with reference to construction industry? **06**
Discuss the use of computers in different fields of construction industry.
Which are the major project management softwares available in the market? Give their key features in very brief.
