JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
MID-SEMESTER EXAMINATION (March- 2015)
M. Tech. CM (II- SEM.)

COURSE CODE: 10M11CE213   MAX. MARKS: 30
COURSE NAME: Construction Cost Analysis
COURSE CREDIT: 3   MAX. TIME: 2 HRS

Note: Attempt all Questions. Assume suitable data if required.

Section A – (6 x 1 = 6 Marks)

1. Answer the following questions with suitable diagrams (where ever necessary). Answers should be to the point only.

a) How can we effectively plan the schedule for residential projects and how can we update and monitor the schedule and the progress?

b) What is an open end activity in primavera?

c) How do you measure & compare the progress using primavera?

d) Define S – Curve and how to create S Curve in primavera?

e) How can you define the Critical Path in primavera?

f) In what three major ways does a CPM network differ from a PERT network?

Section B – (3 x 3 = 9 Marks)

Table below summarized the activity, duration and inter-relationships for a simple energy management project, i.e. replacing an existing boiler with an energy efficient boiler.

Activity Code	Activity	Duration in days	Depends on
A	Prepare technical specifications	10	-
B	Tender Processing	25	A
C	Release of work orders	3	B
D	Supply of Boiler equipment	60	C
E	Supply of Auxiliaries	20	C
F	Supply of Pipes & Pipe fittings	10	C
G	Civil Work	15	C
H	Installation of Auxiliary equipment & piping	5	E, F&G
I	Installation of Boiler	10	D & H

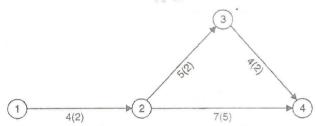|	Testing and Commissioning	2	I
J			

2. Draw a simple Gantt Chart for boiler replacement.

3. Draw a PERT/CPM network for boiler replacement.

4. Find out the Critical path and project duration from the network proposed in (3).

Section C – (3 x 2+9x1 = 15 Marks)

5. Table below gives the data about durations and costs for various activities of the network shown in Fig. below. The project overhead costs are Rs. 2000 per week. Draw indirect, direct and total cost corves and find the optimum duration and cost.

Activity	Normal Time (weeks)	Normal Cost (Rs.)	Crash Time (weeks)	Crash Cost (Rs.)
1-2	4	4000	2	12000
2-3	5	3000	2	7500
2-4	7	33600	5	6000
3-4	4	5000	2	10000

6. A construction company purchases materials worth 50 lakh every year. Calculate the present worth of material purchase for a five-year period, if the material price follows a geometric pattern with
   (a) g= −5%, (b) g= 0%, and (c) g= 5%.
The interest rate can be assumed to be 8%. Also draw cash flow diagrams.

7. For the following data of a project, (a) prepare the month-wise running account bill, (b) prepare the cash inflow diagram for the contractor, and (c) prepare the cash outflow diagram for the owner.
   * Value of contract: Rs 7,625,000 (Seventy-six lakh twenty-five thousands rupees only)
   * Duration: Four months
   * The owner makes an advance payment of Rs. 5 lakh, which is to be recovered in four equal instalments.
   * The owner also supplies materials worth Rs. 3.2 lakh, which is also to be recovered equally from each running account (RA) bill.
   * The owner will recover from the payments made to the contractor two per cent of the value of the work done as income tax deducted at source, and deposit this amount with the Reserve Bank of India (RBI).

Table: Construction schedule

S. No.	Item description	Unit	Total quantity	Rate (Rs.)	Amount (Rs.)	Quantities to be executed in			
						Month1	Month2	Month3	Month4
1	Earthwork in exvavation	m^3	500	50	25,000	500			
2	R.C.C	m^3	1,000	4,000	4,000,000	250	500	250	
3	Brickwork	m^3	2,000	1,000	2,000,000	500	600	900	
4	Sanitary works	L.S	-	-	200,000			50%	50%
5	Electrical works	L.S	-	-	200,000			50%	50%
6	Woodwork	L.S	-	-	250,000			50%	50%
7	Finishing work	m^3	4,750	200	950,000				4,750

Contractor has prepared the construction schedule, which has been approved by the owner. The construction schedule is shown in Table. Also shown are the estimated quantities that are likely to be executed during each month.

Additional conditions and assumptions:

- The cost for the contractor to execute a particular item is 90 per cent of their quoted rates.
- The total cost for a particular item consists of labour (20 per cent), material (60 per cent), plant and machinery (10 per cent) and subcontractor cost (10 per cent).
- Assume that there is no delay in payment to labour, but a delay of one month occurs in paying to the subcontractors, material suppliers, and plant and machinery supplier.
- Retention is 10 percent of billed amount in every bill. Fifty per cent retention amount is payable after one month of practical completion, while the remaining 50 percent is payable six months later.