

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VII • EXAMINATION – WINTER • 2014****Subject Code: 170601****Date: 25-11-2014****Subject Name: Construction Management and Equipments****Time: 10:30 am - 01:00 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) Explain in detail: Role of construction project manager on construction project **07**  
 (b) Draw work breakdown structure for Residential Building. **07**
- Q.2** (a) What is Gantt bar chart and mile stone chart? Differentiate both. Also explain line of balance technique. **07**  
 (b) A small project consists of seven activities. The time estimates are given below. **07**

Activity/ Time (in weeks)	1-2	1-3	1-4	2-5	3-5	4-6	5-6
$t_o$	1	1	2	1	2	2	3
$t_m$	1	4	2	1	5	5	6
$t_p$	7	7	8	1	14	8	15

- (1) Draw the network.
- (2) Determine the critical path.
- (3) What is the probability of completing the project within 18 weeks?

Z value	+0.3	+0.4	-1.0	+1.0
Probability	61.79	65.54	15.87	84.13

**OR**

- (b) From the given data, prepare the network diagram; find total float, free float and critical path. **07**

Activity	1-2	1-3	1-4	3-4	2-6	3-6	3-5	4-5	5-6
Time (days)	3	4	14	5	5	6	4	1	1

- Q.3** (a) Define: Rolling resistance, grade resistance and Total resistance. Explain the factors affecting rolling resistance. **07**  
 (b) The following table shows Normal time, crash time, normal cost and crash cost of the project. Find optimum time-cost relation. Indirect cost is Rs.2000/- per week. **07**

Activity	Normal		Crash	
	Time (weeks)	Cost (Rs)	Time (weeks)	Cost (Rs)
1-2	7	12000	3	20000
1-3	6	18000	3	25500
2-4	4	20000	2	23000
3-4	4	16000	2	20000
4-5	5	30000	4	33000

**OR**

**Q.3 (a)** What is job layout? Enlist essential features required to show in job layout plan. **07**  
Draw the job layout for construction of high rise building.

**(b)** A contractor has undertaken a construction work. For each activity to be carried out similar kind of machines required. The contractor has only four machines. As a project manager how to conduct work satisfactory by smoothing the resources. **07**

Activity	1-2	1-3	1-4	2-5	3-7	4-6	4-7	5-9	6-9	7-8	8-9
Weeks	4	5	4	2	1	5	4	4	3	3	1
Machine required	1	2	1	2	1	1	1	1	1	2	3

**Q.4 (a)** Draw neat sketch of belt conveyor and explain its component in detail. **07**

**(b)** A construction company is planning to purchase equipment. If it is purchase under down payment, the cost of equipment is Rs. 10,000,000. If it is purchased under installment basis, the company has to pay 30% of the cost at the time of purchase and remaining amount in 12 equal installment of Rs. 1000000 each. Using the present worth basis at  $i = 15\%$  compounded annually, suggest the best alternative for company. **07**

**OR**

**Q.4 (a)** Which are the causes of accident in construction project? Also explain why safety is important on construction project site. **07**

**(b)** The cost of power shovel is Rs. 5 lacs and its salvage value is 10% of original cost. The power shovel is used for 1400 hrs per year and its life is 5 years. The hiring cost including maintenance and repair is Rs. 25000 per month. Suggest whether to purchased or hired on rent? **07**

**Q.5 (a)** Explain economic life of construction equipment in detail. **07**

**(b)** Following data is available for equipment. **07**

1. Initial cost of acquisition : Rs. 50,00,000
2. Cost of tyre sets Rs. 250000 to be replaced after every 3000 hours of use
3. Cost of overhaul and repair Rs 600000 to be carried out after every 3000 hrs
4. Estimated life of machine: 10,500 hrs of operation
5. Estimated salvage value : 10% of initial cost
6. Estimated usage of equipment: 1500 hrs per year

If MARR is 20% per year, Estimate minimum hourly rental charge for equipment.

**OR**

**Q.5 (a)** Enlist excavating equipment. Draw a neat sketch and explain working of any one excavating equipment. **07**

**(b)** Estimate book value of equipment at the end of each year for following data. **07**

Initial Book value of equipment = 2500000 , Life of equipment= 5 years

Salvage value = Rs. 200000, rate of interest = 16%

Calculate using sinking fund method.

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