

Seat No.: _____

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GUJARAT TECHNOLOGICAL UNIVERSITY

Subject code: 170601

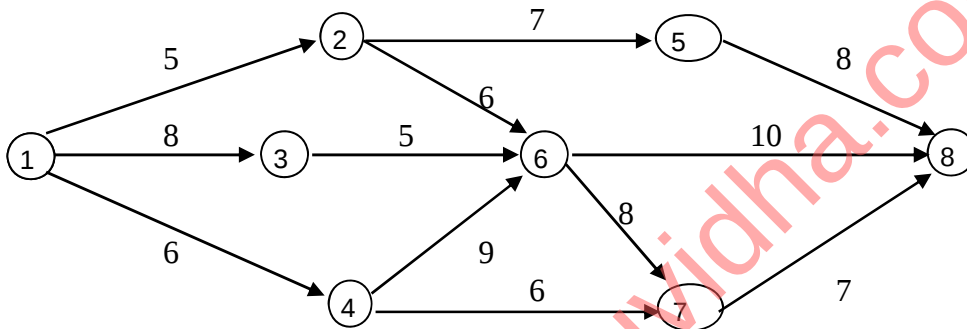
Subject Name: Construction Management
and Equipments

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) For the network shown below find out the project completion time. Draw the time scale diagram and crash suitable activities and find out the total cost of project for completing it in (i) 27 weeks (ii) 25 weeks 07

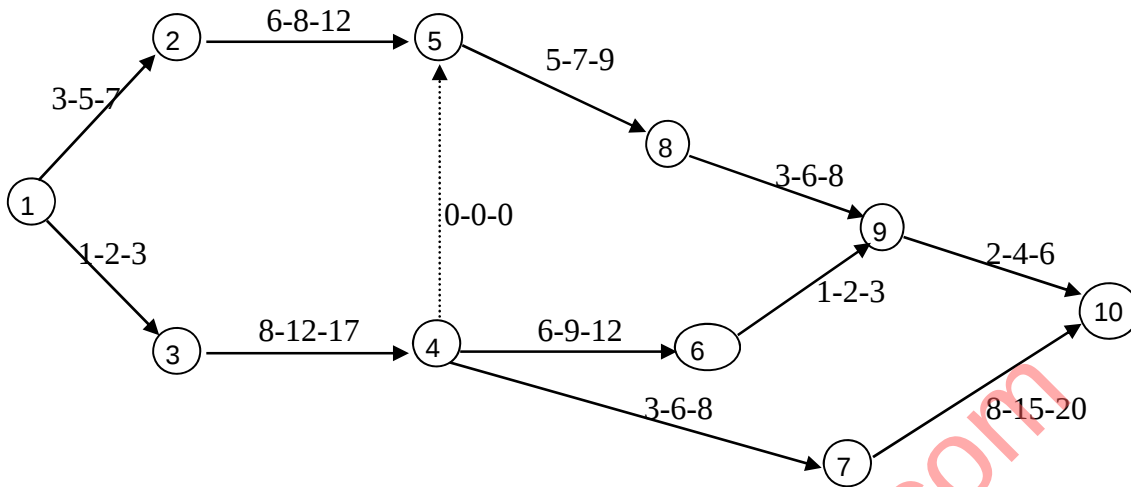


Activity	Normal Duration	Crash Duration	Normal cost	Crash cost
1-2	5	4	4000	10000
1-3	8	5	5000	8000
1-4	6	4	4000	7000
2-5	7	5	5000	6000
2-6	6	4	4000	8000
3-6	5	3	3000	7000
4-6	9	6	6000	9000
4-7	6	4	4000	7000
5-8	8	6	6000	8000
6-8	10	7	7000	10000
6-7	8	5	5000	8000
7-8	7	5	5000	10000

Indirect cost is Rs. 3000/week

- Q-1 (b) i Draw a neat sketch of a crawler mounted bulldozer and show various parts 07
 ii What is a good efficiency factor for a front shovel working on highway construction projects?

- Q-2(a) For the network shown below, determine the critical path and probability of finishing the project within scheduled time of (i) $T_s = 34.67$ days (ii) $T_s = 36$ days. Also calculate earliest and latest event occurrence times. 07



The three time estimates for each activity are written on the arrow showing the respective activity. Probability corresponding to Z value may be interpolated from following table

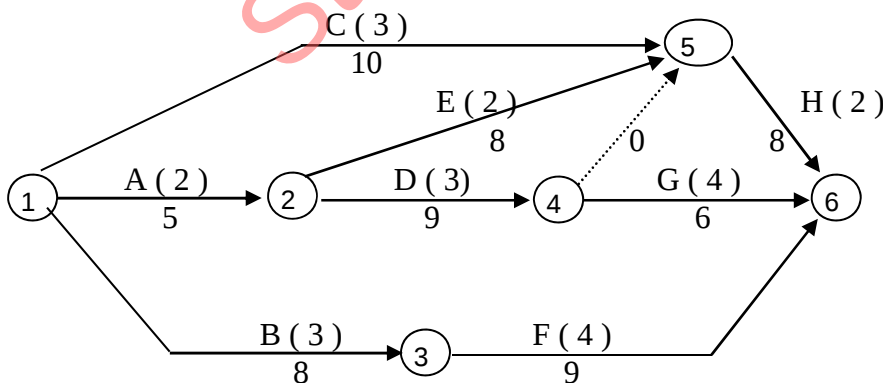
Value of Z	0.00	0.40	0.50	0.60
Probability	0.50	0.69	0.72	0.75

- Q-2(b) Describe the belt conveyors 07

OR

- Q-2(b) Discuss equipment replacement policy 07

- Q-3 (a) Determine the aggregate resources requirements period by period for the network given below. The figure over the arrows indicate the requirement of masons and figures below the arrows are the durations of the activities for the project. Smooth out the requirement of resources and indicate resulting revised schedule 10



- Q-3 (b) Discuss factors affecting output of a drag line 04

OR

- Q-3 (a) Consider the problem of project scheduling as shown in the following table. Obtain a schedule which will minimize the peak man power requirement and also smooth out period to period variation of man power requirement 10

Activity	Duration	Man power requirement
1-2	8	7
1-3	6	13
1-4	8	9
2-4	12	11
2-5	4	6
3-5	4	3
4-6	10	15
5-6	10	5

- Q-3 (b) Write short note on " Network Updating " 04

- Q-4 (a) i Explain cash flow diagram with simple example 04

- ii Enlist various safety codes to be used to reduce accidents at various construction sites 03

- Q-4 (b) i Discuss importance of safety in construction sites 04

- ii State and describe various causes of accidents at the construction site. 03

OR

- Q-4 (a) Explain the term " Job layout" and draw a job layout for a construction site of a large multistoreyed building 07

- Q-4 (b) Define and explain 07
(1) Depreciation (2) Obsolescence cost (3) Down time (4) Investment cost

- Q-5 (a) Determine the following costs of a powershovel 10

- (I) Annual investment cost
- (II) Depreciation cost per year
- (III) Maintenance and repair cost per year
- (VI) Lubrication oil cost / hour
- (V) Diesel cost / hour

The following data about power shovel are available

Engine : 160 HP
Crank Case capacity = 30 Litre
Useful life 5 years
Time between oil changes = 100 hours

Shipping weight - 104 tonnes
 Factory price - Rs26 Lakhs
 Operating factor - 0.6
 Freight charges = Rs. 300 / tonne
 Hours used per year = 5000
 Oil cost = Rs 150 / litre
 Diesel cost = Rs 40 / litre

- Q-5 (b) The weight of a tractor is 15 tonnes
 it has a drawbar pull of 4500kg while operating on a level surface in the fifth gear. The rolling resistance of surface is 49.5 N / KN. Determine the drawbar pull of tractor when it is operating on a level surface having rolling resistance of 90 N / KN

04

OR

- Q-5 (a) Define and explain the following
 (a) Drawbar pull (b) Rimpull (c) Coefficient of traction (d) Rolling Resistance

07

- Q-5 (b) A Builder is considering three methods for acquiring pick up trucks, the alternatives are
 (x) Purchase the trucks for Rs.16.8 Lakhs each and sell after four years for an estimated amount of Rs. 5.0 Lakhs

07

(y) Lease the trucks for four year for Rs. 4.1Lakhs per year paid in advance at the beginning of each year. The contractor pays all operating and maintenance cost for the trucks and the leasing company retains ownership.

(z) Purchase the truck on special time payment with Rs.4.0 Lakh down payment now and Rs.4.5 Lakhs per year at the end of each year for three year. Assume the truck will be sold after four years for Rs. 5.0 Lakh each

If the builder's minimum attractive rate of return is 8 %. Which alternative should be used ?

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