

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– VI (NEW) EXAMINATION – WINTER 2021****Subject Code:3164014****Date:02/12/2021****Subject Name:Construction Project Planning and Management****Time:10:30 AM TO 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.
4. Simple and non-programmable scientific calculators are allowed.

- | | | MARKS |
|------------|--|--------------|
| Q.1 | (a) Identify the cost associated with site establishment of a construction project. | 03 |
| | (b) Explain with suitable example for various techniques of scheduling of a project. | 04 |
| | (c) Enlist and explain various levels of a typical Work Breakdown Structure. Also give suitable example of each level. | 07 |
| Q.2 | (a) Explain the steps involved in Project Planning & Scheduling of a construction project. | 03 |
| | (b) Explain the following terms. <ol style="list-style-type: none"> I. Activity and Event II. Critical Path III. Resources IV. Lead & Lag | 04 |
| | (c) List out minimum 10 typical activities for construction of a Storage house at construction site having area of 50m x 50m. Give suitable duration and logical predecessor to each activity and draw network diagram for the same. | 07 |
| OR | | |
| | (c) List out minimum 10 typical activities for construction of a Boundary wall for a building site having area of 50m x 50m. Give suitable duration and logical predecessor to each activity and draw network diagram for the same. | 07 |
| Q.3 | (a) What are the advantages and disadvantages of Bar Chart? | 03 |
| | (b) Draw AON diagram for the activities listed below and find total project duration and critical path. | 04 |

Activity	Duration (days)	IPA
A	6	--
B	8	A
C	5	A
D	7	A
E	5	B
F	3	C,B

- (c) Draw AOA network diagram for the following activities and find the critical path. **07**

Activity	IPA	Duration (weeks)
A	-	4
B	A	6
C	A	2
D	B	10
E	B	4
F	C	3
G	C	5
H	E	4
I	E, F	8
J	D, H, I, G	9

OR

- Q.3** (a) How Precedence Diagram method is different from Node diagram of network? **03**
- (b) What do you understand by Float in the network diagram? Explain various types of floats with equation for each. **04**
- (c) Draw AOA network diagram for the following activities and find the critical path. **07**

Activity	IPA	Duration (weeks)
A	-	4
B	A	6
C	A	2
D	B	10
E	B	4
F	C	3
G	C	5
H	E	4
I	E, F	8
J	D, H, I, G	9

- Q.4** (a) Write down short note of Beta Distribution for the PERT analysis. **03**
- (b) What do you understand by Network Updating? Why is it essential? Justify your answer with suitable example. **04**
- (c) For the following network, level the resource without extending the total project duration. **07**

Activity	Duration (days)	IPA	Labors /day
A	6	--	3
B	8	A	2
C	5	A	4
D	7	A	3
E	5	B	4
F	3	C,B	2

OR

- Q.4** (a) On a network, PERT calculations yield a project length of 60 days with variance of 9 days. Estimate the number of days required to complete the project with probability of 98%. **03**

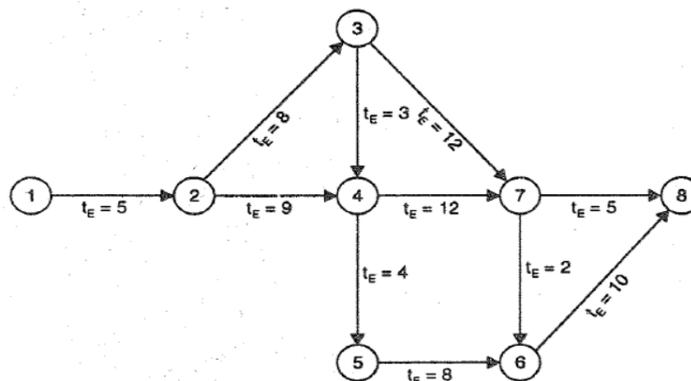
- (b) Explain the following terminologies in terms of Project Crashing. 04
- Cost Slope
 - Direct Cost
 - Indirect Cost
 - Crash Cost
- (c) A construction project was scheduled using below data. 07

Activity	IPA	Duration (Days)
A	-	6
B	-	2
C	A	8
D	A, B	5
E	B	3
F	D, E	6
G	C, D	5
H	F, G	2

Ten days after the project start, the following information received.

- Activities A & B are completed on time.
 - Activity C started, 3 days left
 - Activity D started, 2 days left
 - Activity E has not started yet but duration adjusted to 5 days.
- Draw updated network and calculate the new project duration.

- Q.5** (a) Why is project control needed in for construction projects? 03
- (b) For the network shown below, determine the slack for the various events, if the schedule data of completion of the project is 36 days. 04



- (c) For the table given below, draw the network for a construction project, with the three time estimates of each activity marked. 07

Activity	t_o	t_L	t_p
1 - 2	2	5	8
2 - 3	8	11	20
3 - 4	0	0	0
2 - 4	4	7	16
2 - 5	4	9	20
4 - 6	7	10	13
5 - 6	3	7	17
3 - 7	3	5	13
6 - 7	2	3	10
7 - 8	2	4	6

Also determine,

1. Critical path and its standard deviation.
2. Probability of completion of the project in 40 days.
3. The duration that will provide 95% probability of its completion in time.

OR

- Q.5** (a) What is Project Crashing? Explain the steps of project crashing for a typical project. **03**
- (b) Explain the LOB method of scheduling of a project with suitable example. **04**
- (c) Do the variance analysis of the following project after 7 days of starting of the project. The necessary data are given below. **07**

Activities	Duration (Days)	IPA	Cost/day	Total Cost	Actual % completed	Incur ed Cost
A	2	-	300	600	100	600
B	3	A	400	1200	100	1400
C	3	B	400	1200	33.33	500
D	2	B	200	400	50	200
E	3	D	100	300	0	0

Find the following and give necessary comments on the performance of the project.

- I. Cost Variance
- II. Cost Performance Index
- III. Schedule Variance

Normal Distribution Function

Normal Deviate -	Probability (%)	Normal Deviate +	Probability (%)
0	50.0	0	50.0
- 0.1	46.0	+ 0.1	54.0
- 0.2	42.1	+ 0.2	57.9
- 0.3	38.2	+ 0.3	61.8
- 0.4	34.5	+ 0.4	65.5
- 0.5	30.8	+ 0.5	69.2
- 0.6	27.4	+ 0.6	72.6
- 0.7	24.2	+ 0.7	75.5
- 0.8	21.2	+ 0.8	78.8
- 0.9	18.4	+ 0.9	81.6
- 1.0	15.9	+ 1.0	84.1
- 1.1	13.6	+ 1.1	86.4
- 1.2	11.5	+ 1.2	88.5
- 1.3	9.7	+ 1.3	90.3
- 1.4	8.1	+ 1.4	91.3
- 1.5	6.7	+ 1.5	93.3
- 1.6	5.5	+ 1.6	94.5
- 1.7	4.5	+ 1.7	95.5
- 1.8	3.6	+ 1.8	96.4
- 1.9	2.9	+ 1.9	97.1
- 2.0	2.3	+ 2.0	97.7
- 2.1	1.8	+ 2.1	98.2
- 2.2	1.4	+ 2.2	98.6
- 2.3	1.1	+ 2.3	98.9
- 2.4	0.8	+ 2.4	99.2
- 2.5	0.6	+ 2.5	99.4
- 2.6	0.5	+ 2.6	99.5
- 2.7	0.3	+ 2.7	99.7
- 2.8	0.3	+ 2.8	99.7
- 2.9	0.2	+ 2.9	99.8
- 3.0	0.1	+ 3.0	99.9
