

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2022

Subject Code:3164014

Date:08/06/2022

Subject Name:Construction Project Planning and Management

Time:10:30 AM TO 01:00 PM

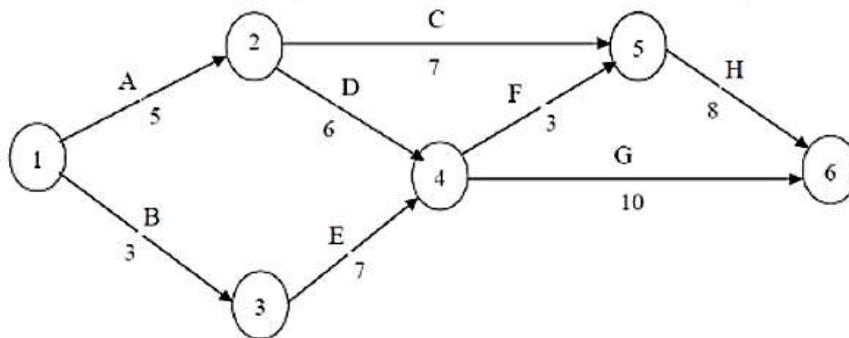
Total Marks: 70

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) Explain the scope of Project Management in Construction Industry. **03**
 - (b) What are the major functions of Construction Project Management? **04**
 - (c) Draw WBS for Construction of a typical University Building up to Task level. Choose any one Task and show its WBS up to Activity level. **07**
- Q.2**
- (a) Write down short note on various stages included in a typical construction project cycle. **03**
 - (b) Draw AOA network diagram for the following. (Do not use redundant dummy). **04**
 - Activity C & D cannot begin until both activity A & B are completed.
 - (c) Consider the following network diagram of a construction project and answer the following questions. (The time shown are in weeks). **07**



- Identify the critical path.
- How long it will take to complete the project?
- Can activity D be delayed without delaying entire project? If so, how many weeks?
- Can activity C be delayed without delaying entire project? If so, how many weeks?
- What is the schedule of activity E?

OR

- (c) Draw a network (AOA) from the following activities and find critical path and duration of project. **07**

Activity	Duration (Days)	Activity	Duration (Days)
1-2	5	5-9	3
1-3	8	6-10	5
2-4	6	7-10	4
2-5	4	8-11	9
2-6	4	9-12	2
3-7	5	10-12	4
3-8	3	11-13	1
4-9	1	12-13	1

- Q.3** (a) Write down rules for drawing CPM AON network diagram. **03**
 (b) In general, what is the effect of accelerating an activity on the direct costs of a project. Why? **04**
 (c) Draw AON diagram for the activities listed below. Also find critical path and total float. **07**

Activity	IPA	Duration (Weeks)
A	-	2
B	A	3
C	A	1
D	A	7
E	B	4
F	B	6
G	B	10
H	E, F	3
I	D, F, G	1
J	C, G	9
K	H	3
L	H, I, J	5
M	K, L	7

OR

- Q.3** (a) Discuss various rules for providing dummy in a network diagram. What are the redundant dummies? **03**
 (b) State your answer with justification. **04**
 Your critical path is 128 days long. The next-longest path is 122 days long.
 a. If you extend the longest path by 5 days, the entire project duration will increase by 5 days. True or false?
 b. If you reduce the longest path by 5 days, the entire project duration will decrease by 5 days. True or false?
 c. If you reduce the longest path by 10 days, the entire project duration will decrease by 10 days. True or false?
 (c) A subcontractor must do the following: **07**
 a. Framing (5 days)
 b. Drywall installation (4 days)
 c. Drywall finish and paint (3 days)
 Assuming he wants to make sure each activity finishes as least 1 day after its predecessor has finished, draw these three activities in a precedence diagram and calculate how much time the subcontractor would need to finish all three activities.

- Q.4** (a) Explain the term 'Earliest Expected Time'. Formulate an expression for determining the same. **03**

- (b) What does the term accelerating a project mean? Why would a project manager (or a contractor) accelerate a project? **04**
- (c) For the project data given below, calculate the cash flow requirement for first 10 weeks if the project is scheduled as per early start of activities (ES Schedule). **07**

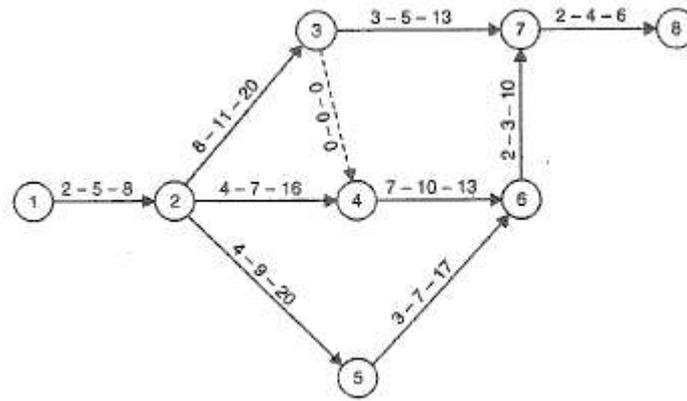
Activity	IPA	Duration (Weeks)	Total Cost (Rs)
A	-	4	6000
B	-	5	15000
C	A	3	5000
D	A	2	10000
E	B, C	6	9500
F	A	8	7000
G	D, E	3	7000
H	B, C	2	11000

OR

- Q.4** (a) The expected completion time for a project is 32 months with a variance of 7.6 months. What is the probability that project will not be completed in 30 months. **03**
- (b) What do you understand by Cash flow diagram? How does it influence a construction project? **04**
- (c) For the project data given below, calculate the cash flow requirement for first 12 weeks if the project is scheduled as per early start of activities (LS Schedule). **07**

Activity	IPA	Duration (Weeks)	Total Cost (Rs)
A	-	4	6000
B	-	5	15000
C	A	3	5000
D	A	2	10000
E	B, C	6	9500
F	A	8	7000
G	D, E	3	7000
H	B, C	2	11000

- Q.5** (a) Management must pay attention not only to critical activities, but also to near-critical activities. Explain this statement from a practical point of view. **03**
- (b) Explain central limit theorem and how it is used in PERT problems. **04**
- (c) Figure shows the network for a construction project, with the three time estimates of each activity marked. Determine, **07**
1. Probability of completion of the project in 45 days.
 2. The duration that will provide 95% probability of its completion in time.



OR

- Q.5** (a) What are the Advantages and Limitations of LOB method? **03**
- (b) The earned value (EV) analysis involves comparing what happened with what should have happened. Explain this statement regarding both the budget and the schedule. **04**
- (c) Calculate Normal Cost, Least Cost & Crash Duration for the following project. Calculate the cost associated with each duration. Indirect cost is \$100 per day. **07**

Activity	IPA	Duration (Days)		Cost (\$)	
		Normal	Crash	Normal	Crash
A	--	7	5	500	640
B	A	6	5	550	630
C	A	8	5	800	935
D	B	10	7	1200	1440
E	B,C	6	4	600	700
F	C	4	3	500	590
G	D,F	4	2	700	1000
H	E,F	7	4	650	950
I	G,H	2	2	300	300

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
