Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

V SEMESTER B. TECH (CIVIL) END SEMESTER EXAMINATIONS

JANUARY 2021

SUBJECT: CONSTRUCTION MANAGEMENT [CIE- 3153]

Date of Exam: 04/02/2021 Time of Exam: 9 AM - 12 PM , Max. Marks: **50**

Instructions to Candidates:

- Answer ALL the questions & missing data may be suitably assumed.

1A For the list of activity given in the table below, i) Draw a neat bar chart and determine the project duration. ii) What is the % completion for all activities at the end of 7th day? **3**

Activity ID	Start date	Duration (days)
A	2	4
B	3	5
C	4	4
D	5	5
E	5	4
F	9	2

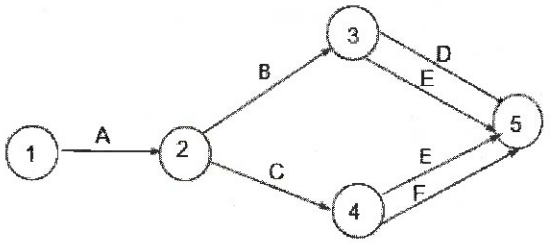
1B For the sequence of activities listed in the table below, draw a neat A-O-A network and number the events. **5**

Activity	A	B	C	D	E	F	G	H	I	J	K	L
Predecessor	--	A	G, H	G, H	B, C, D	B, C	--	--	H	H	--	J, K

1C Identify the errors in the network shown below. Correct the network to satisfy the following interdependency: **2**

Activity E is the immediate successor to B and C.

Completion of activities D, E and F marks the completion of the project. Other conditions remain as shown in the network diagram.



2A Explain the significance of central limit theorem in PERT analysis. With the help of a neat sketch, explain the significance of probability factors 0, +1 and -1 on project completion. **3**

2B For the activity details provided in the table below, draw the network, and determine i) event times and ii) critical path using **tabular approach**. **5**

Activity	1-2	1-3	1-4	2-6	3-5	4-5	4-8	5-6	5-8	6-7	7-9	8-9
Duration	2	4	5	3	7	6	10	0	8	7	9	8

2C The expected duration of a construction project is 32 days. If the variance of the critical path is 8.833, determine i) the probability that the project will finish at least 2 days early ii) the completion date with 90 % confidence level. **2**

Z (+)	Probability %	Z (-)	Probability %
0.6	72.57	0.6	27.43
0.7	75.80	0.7	24.20
1.2	88.49	1.2	11.51
1.3	90.32	1.3	9.68

3A There are three activities viz., shuttering, placing reinforcements and concreting planned for a small roof slab. The first activity (shuttering) requires 4 hours, the second activity (placing reinforcements) requires 2 hours and the third (concreting) requires 3 hours. All three activities are planned for start at 8:00 A.M. and finish at 12.00 noon. **3**

For the above-mentioned set of activities, i) work out all activity times and floats ii) identify the critical activity.

iii) discuss the significance of cost slope in time-cost tradeoff.

3B The repetitive projects such as building construction follow deterministic approach. Justify. **2**

3C For the activity details provided in the table below, determine the optimum duration and minimum cost. Indirect cost of the project is ₹ 500 per day. **5**

Activity	t_n	t_c	C_n	C_c
10-20	8	6	800	1800
10-30	10	6	1800	5800
10-40	7	5	2800	5400
20-50	7	4	1800	2700
30-50	9	7	3800	4300
40-50	7	6	3300	3900

4A Discuss the significance of 'equipment-specific' and 'job-specific' factors in selection of a construction equipment. List any 2 advantages and limitations of mechanization in construction. **4**

4B Bring out the i) essential features ii) advantages and iii) disadvantages of various types of equipment maintenance. **3**

4C List all the cost components aggregating for the 'operating cost' of a large construction equipment. Explain any two. **3**

5A Determine the probable owning and operating cost of an electrically operated batching plant having the following details. **3**

Power required-150 hp, cost of set-up- ₹ 90,00,000, set-up costs- ₹4,50,000, useful life- 18 years, hours used per year- 3000, salvage value- ₹ 3,00,000, bank interest @ 13 %, contingencies, and risk factor @ 12 %, electricity @ ₹ 15 per unit. Consider 14 % of average investment wherever applicable.

5B List the basic parts of a scraper. Explain how these parts work while scrapping, hauling, and spreading operations. List the application where dozers are deployed. **3**

5C Compare between S-blade and U-blade with respect to their construction and application scenario. How articulated dump trucks are superior to rigid frame dump trucks? **4**