Bachelor of Engineering (Civil Engineering)

Fifth Year Second Semester Exam -2023

Sub: Construction Management

Time: Three Hours   Full Marks: 100

Answer any five questions

1.   (a) What do you mean by 'Delegation of Authority'? Mention the factors for determining the amount of centralization /decentralization appropriate for an enterprise.

2+4

(b) Define 'Forecasting'. State the process of 'Market Survey Method' of Forecasting.

2+4

(c) A Machine costs Rs 7,50,000. Annual operating costs are Rs 35,000 for the first year, and they are increased by Rs 1,30,000 every year. Determine the least age at which to replace the machine. Assume that the resale value of the machine is zero.   8

2.   (a) A renowned Oil Company took a decision for exploration of a certain land for availability of oil. The company offers the land owner an amount of Rs 12,50,000/- for obtaining permission for exploration and if oil is available, the land owner will be paid a further sum of Rs 75,00,000/-. The company also made an alternative suggestion that If the land owner himself can incur the cost of Rs 19,00,000/- for exploration, he can expect the return of Rs 1,20,00,000/-. From the past exploration record, 65% chance of availability of oil can be predicted. Determine the choice of the land owner using Decision Tree Technique.   10

(b)Explain the importance of Organizing & Controlling in Construction Management.   6

(c)What is the role of Decision Theory in Construction Management?   4

3.   (a) A Construction Company has acquired a high-rise building in a Metropolitan city to be used as its head office. As per norms of the state, experienced firefighting operator is to be engaged for ensuring fire safety of the high-rise buildings. The Project Manager of the Company wants to find a measure for salaries of the fire fighting operators. A sample data collected from the Fire and emergency services authority is presented:

[Turn over

Years of Service:	12	9	10	6	9	7	11
Income (in thousands):	20	16	12	10	18	14	22

What should be the salary of a fire operator with 13 years of experience applied for the post?

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(b) A company will bid for a project consisting of several activities. Due to the uncertainties and risks, the engineer estimated the most optimistic, most likely and most pessimistic time for each activity as shown below (duration in weeks):

Activity	most optimistic time	most likely time	most pessimistic time
(1,2)	9	12	15
(2,3)	1	4	7
(2,4)	12	15	48
(3,5)	3	5	7
(4,5)	0	0	0
(4,6)	14	20	26
(5,7)	3	6	9"
(5,8)	8	9	10
(7,9)	4	8	12
(8,9)	10	15	20
(9,10)	5	8	11
(6,10)	4	6	8

The Project manager now advised the engineer to do the following

i) Draw the PERT network of the project.

ii) Find out the completion period.

iii) Determine the expected time and variance for each activity 12

4. **(a)** X Co. is a large private sector power producing company having plants all over the country. Recently, it has decided to establish a R&D centre at New Town, Kolkata. The total task for the same has been broken down into several activities and the interdependencies of various activities and their expected time are depicted in the following table.

Activity	Immediate Preceding	Activity time (week)
A	--------	3
B	--------	4
C	A	5
D	A	6
E	A	7
F	C	8
G	C	9
H	C	3
J	B, D	8
K	F, J	7
L	E, H, G,K	11
M	E,H	9
N	L, M	10

(i) Draw the network. Find out the completion period.

(ii) Find out the total float, free float and independent float for each activity   12

(b) Mention the importance of Bar chart in Time Management and Scheduling.   4

(c) Compare PERT and CPM techniques in project management.   4

5. (a) At the end of the accounting year, the accountant of your Co. extracts the following balances from his accounts books as on 31.12 2022.

(Rs)

Capital	98,00,000
Purchases	17,00,000
Freight	98,000
Wages	6,60,000
Sales	62,20,000
Sales Return	1,23,000
Rent on premises paid	40,000
Repairs	32,000
Stock at Jan 01,2022	23,70,000
Discount allowed	1,00,000
Discount Received	80,000
General expenses	1,00,000
Purchase return	20,000
Office Equipments	20,850
Bad debt	1,10,000
Plant & Machinery	4,00,000
Furniture & Fixtures	87,300
Sundry Debtors	9,00,000

You are required to prepare Trading Account and Profit & Loss Account for the year ended Dec 31,2022, taking the following information into account.

i) A bad debt provision equal to 4% of the Sundry Debtors is to be made.

ii) Depreciation on Plant and Machinery and Furniture and Fixture @10% and on Office Equipments @ 20% to be provided

iii) Stock at December 31,2022 was Rs 8,86,000   12

b) Mention the factors for determining the amount of centralization /decentralization appropriate for an enterprise.   4

c) Differentiate between Fixed Assets and Current Assets of an organization.   4

6. a) Prepare a balance sheet for X Co. with the following balances as on 31.3.2023.

	(Rs)
Capital	80,00,000
Land property	50,50,000
Stock in trade	7,00,000
Furniture	1,00,000
Buildings	15,00,000
Debtors	2,50,000
Creditors	2,50,000
Plant & Machinery	9,00,000
Investment	8,00,000
Goodwill	6,00,000
Cash in hand	4,00,000
Bank Overdraft	4,00,000
Loans	3,50,000
Bills payables	3,00,000
Net profit for the year	10,00,000

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b) A construction Manager has two independent investments 'A' and 'B' available to him, but he lacks the capital to undertake both. Simultaneously, he can choose to take 'A' first and then stop, or if 'A 'is successful then take 'B' or vice versa. The probability of success on 'A' is 0.7 while for 'B' it is 0.4, Both investments require an initial capital outlay of Rs 2,50,000/- and both return nothing, if the venture is unsuccessful. Successful completion of 'A' will return Rs 3,50,000/-(over cost) and successful completion of 'B' will return Rs 6,00,000/- (over cost).

Draw the decision tree and determine the best strategy. 12

7. Write short notes on any four: 5X4=20

    a) Expected Monetary Value in connection with Decision Theory

    b) Regression and Correlation

    c) Event and Activity in Network Analysis

    d) Independent float of an activity.

    e) Role of "Planning" as a process of Management.