Bachelor of Engineering (Civil Engineering)
Fifth Year Second Semester Supplementary Exam -2024
Sub: Construction Management

Time: three hours   Full marks   100
  Answer any Five

No. of Q	Assume any reasonable value to data not given	Marks
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)	What is the role of Decision Theory in Construction Management?	3
c)	A manager will bid for a project consisting of several activities. Due to the uncertainties and risks, the manager estimated the most optimistic, most likely and most pessimistic time for each activity as shown below:	11

Activity	most optimistic time (wks)	most likely time (wks)	most pessimistic time (wks)
(1,2)	9	12	15
(2,3)	1	4	7
(2,4)	12	15	48
(3,5)	14	20	26
(3,6)	4	7	16
(3,7)	4	7	16
(6,7)	5	8	11
(4,7)	2	8	14
(7,8)	9	12	15
(8,9)	1	4	7
(5,6)	0	0	0

The manager now advised you to do the following

Draw the PERT network of the project. Determine the expected time and variance for each activity

| 2a) | A record of maintenance cost is kept on 6 identical machines of different ages. Management wants to determine whether there is functional relationship between machine age (X) and maintenance cost (Y). The following data are obtained: | 10 |

Machine	1	2	3	4	5	6
X (Years)	2	1	3	2	2	3
Y (Rupees)	7000	4000	1000	8000	3000	10000

Find the regression equation of Y on X. What would be the maintenance cost for a five year old machine?

b) A construction company is in the process of quoting a tender called by a Public Sector Undertaking for construction of a portion of National Highway. The winning of tender also depends on how soon the company is able to complete the work. The Construction manager has listed down the activities in the project as under:

Sl No	Activity	Immediate Preceding	Activity time (week)
1	A	--------	3
2	B	--------	4
3	C	A	5
4	D	A	6
5	E	C	7
6	F	D	8
7	G	B	9
8	H	E, F, G	3

(i) Find out the completion period.

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

3a) A Machine costs Rs 8,00,000. Annual operating costs are Rs 20,000 for the first year, and they are increased by Rs 1,50,000 every year. Determine the least age at which to replace the machine. Assume that the resale value of the machine is zero.

b) At the end of the accounting year, the accountant of your Co. extracts the following balances from his accounts books as on 31.12.2023.

Stock at Jan 01, 2023: Rs 12,00,000; Wages: Rs 3,20,000; Purchases: Rs 12,00,000; Freight: Rs 50,000; Sales: Rs 25,00,000; Sales Return: Rs 10,000; Rent on premises paid: Rs 20,000; Repairs: Rs 16,000; Discount allowed: Rs 50,000; Discount Received: Rs 40,000; General expenses: Rs 50,000; Bad debt: Rs 50,000; Plant & Machinery: Rs 2,00,000; Sundry Debtors: Rs 3,50,000.

You are required to prepare Trading Account and Profit & Loss Account for the year ended Dec 31, 2023 taking the following information into account.

Stock at December 31,2023 was Rs 3,50,000

4 a) Indian 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 12,00,000/- for obtaining permission for exploration and if oil is available, the land owner will be paid a further sum of Rs 120,00,000/-. The company also made an alternative suggestion that If the land owner himself can incur the cost of Rs 20,00,000/- for exploration, he can expect the return of Rs 2,00,00,000/-. From the past exploration record, 70% chance of availability of oil can be predicted. Determine the choice of the land owner using Decision Tree Technique.

b)	Jobs A, B, C.......H ,I constitute a project. The notations X<Y means that the task X must be finished before Y can begin. With this notation A<D, A<E, B<F, D<F,C<G,C<H,F<I,G<I. Draw a net work to represent the sequence of Jobs and find the critical path as well as the project completion time, when the time (in days) of completion of each job is as follows: Job: A B C D E F G H I Time: 16 20 16 20 32 34 36 28 18	10
5 a)	Differentiate between Trading Account and Profit & Loss account of a business concern	4
b)	Discuss the application of PERT and CPM techniques in Construction Industries.	4
c)	Differentiate between Total float, free float and independent float of an activity.	6
d)	Discuss 'Regression and Correlation' in connection with Forecasting Technique.	6
6) a)	Write short notes on any five: Direct Costs and indirect costs of a project.	
b)	Replacement theory in connection with replacement of construction equipment.	
c)	Expected Monetary Value in connection with Decision Theory	5x4=20
d)	Event and Activity in Network Analysis	
e)	Role of Controlling as a process of Management	
f)	Advantages and limitations of Bar Chart	