Total number of printed pages–5

53 (CE 812) CSMN

2021

CONSTRUCTION MANAGEMENT

Paper : CE 812

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* *(i)* What are different phases of implementation of a construction project ?

   (ii) What is the utility of a project schedule ?

   (iii) How is a project schedule used in construction phase ?

   (iv) Name the different types of documents that are included in a typical construction contract/ agreement. 3+3+3+3=12

   (b) *(i)* What are the steps to be followed for creating a project schedule ?

Contd.

(ii) What do you mean by "mark-up" and 'as-built' drawings? 6+2=8

2. Write brief notes on ***any five*** of the following: 4×5=20

(a) Work Breakdown Structure
(b) Dependency mapping
(c) Gantt chart
(d) Float
(e) Critical path
(f) 'SHE' and 'PPE'

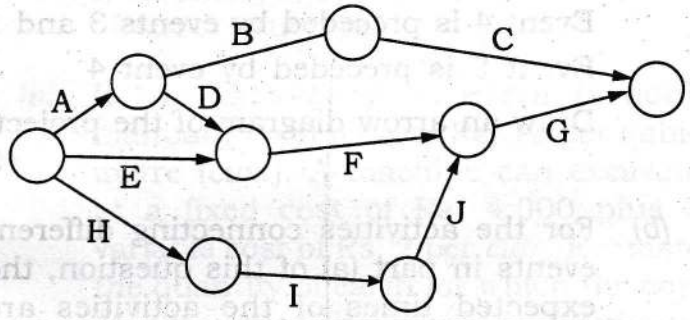
3. Write brief notes on ***any five*** of the following: 4×5=20

(a) Earnest money
(b) Security deposit
(c) Mobilization Advance
(d) Retention money
(e) Arbitration
(f) Defect Liability Period.

4. (a) What are the two basic elements in a network plan? What are the differences between Programme Evaluation and Review Technique (PERT) and Critical Path Method (CPM) of network analysis? 4+6=10

(b) Various activities in the following activity network are indicated by capital letters. Note that the letters indicating the

activities are for reference only, and may not be sequenced in the correct order. For each activity, the optimistic, the most likely and the pessimistic time estimates, i.e. t_0 , t_l and t_p respectively, are given in the adjoining table. Number the events by following Fulkerson's rule. You may use numbers in multiples of 10. Estimate the variance σ^2 and the expected completion time t_E of each activity, preferably using a tabular format. 10



Activity Indicator	$t_0 - t_l - t_p$
A	6 – 12 – 17
B	9 – 11 – 13
C	14 – 17 – 21
D	5 – 8 – 9
E	8 – 10 – 13
F	20 – 24 – 30
G	7 – 9 – 12
H	10 – 11 – 12
I	15 – 18 – 22
J	9 – 13 – 17

5. *(a)* The following information could be obtained from the Work-Breakdown Structure and dependency mapping of various activities of a construction project :

Event 0 is the initial event

Event 1 is preceded by event 0

Event 3 is preceded by event 1

Event 4 is preceded by event 1

Event 2 is preceded by event 1

Event 3 is preceded by events 2 and 1

Event 4 is preceded by events 3 and 1

Event 5 is preceded by event 4

Draw an arrow diagram of the project. 10

(b) For the activities connecting different events in part (a) of this question, the expected times of the activities are provided below :

Activity	Expected Time
0 – 1	4
1 – 3	13
1 – 2	7
2 – 3	8
1 – 4	12
3 – 4	7
4 – 5	4

If the scheduled completion date is equal to the earliest expected time for the end event, calculate the slack time for each event and identify the critical path. 10

6. *(a)* List the equipment that would be required for constructing a multi-storeyed building complex, starting from laying out of site to the completion of superstructure. 8

(b) If the excavation of earth is done manually then it costs Rs. 10 per cubic metre (*cum*). A machine can excavate at a fixed cost of Rs. 4,000 plus a variable cost of Rs. 2 per *cum*. Estimate the quantity of earth for which the cost of excavation by machine would be equal to the cost of manual excavation. 2

(c) In what type of constructions would you expect applications of guniting and shotcreting? Describe the processes involved in carrying out these activities. 2+8=10