# Lukhdhirji Engineering College, Morbi

## Department of Mechanical Engineering

## Assignment7-Project Management (CO5)

**Subject: Operation Research**                                    **(3151910) Semester: 5ᵗʰ**

**Year : 2022-23**

1. Whatisthemeaningfloatinprojectmanagement?Statethevarious typesfloat
2. WhatisCPMandPERT.? Discusssignificanceof usingCPMandPERT.
3. Define event, activity, precede activity, successor activity, dummy activity with respect to CPM/PERT
4. What are the 3 time estimates? How are the expected duration of a project, and its standard deviation calculated?
5. A project consists of 10 activities for which the relevant data are given below:

| Activity | PrecedingActivity | Duration(Hours) |
|----------|-------------------|-----------------|
| A | -- | 0.5 |
| B | A | 1 |
| C | B | 1.5 |
| D | B | 1.4 |
| E | D | 1.2 |
| F | B | 0.8 |
| G | F | 1.0 |
| H | C,E,G | 0.4 |
| I | H | 1.4 |
| J | I | 0.5 |

a. Draw the network and find the project completion time.
b. Calculate Total float for each of the activities.

**6.** The data for a network is given below.

| Activity | TimesinDays | | Directcost | |
|---|---|---|---|---|
| | Normal | Crash | Normal | Crash |
| 1-2 | 10 | 4 | 2300 | 3100 |
| 1-3 | 12 | 3 | 1700 | 2600 |
| 2-4 | 20 | 10 | 2400 | 4400 |
| 3-5 | 10 | 9 | 1100 | 1500 |
| 4-5 | 6 | 6 | 800 | 800 |

Considering indirect cost as Rs.1000 per/day.

(i) Find the normal duration of project completion and corresponding cost.

(ii)What can be minimum compression of project and corresponding total time?

(iii)Find the optimal duration of project completion and related cost

**7.** A construction company is preparing a PERT network for laying the foundation of a new artmuseum.Giventhefollowingsetofactivities,theirpredecessorrequirementsandthreetimeesti matesofcompletiontime:

| Activity | Predecessors | TimesinWeeks | | |
|---|---|---|---|---|
| | | Optimistic | Pessimistik | Most Likely |
| A | None | 2 | 4 | 3 |
| B | None | 8 | 8 | 8 |
| C | A | 7 | 11 | 9 |
| D | B | 6 | 6 | 6 |
| E | C | 9 | 11 | 10 |
| F | C | 10 | 18 | 14 |
| G | C, D | 11 | 11 | 11 |
| H | F,G | 6 | 14 | 10 |
| I | E | 4 | 6 | 5 |
| J | I | 3 | 5 | 4 |
| K | H | 1 | 1 | 1 |

(a) Draw the PERT network.

(b) What is the expected time of the duration of the project?

**8.** A small project involves 7 activities, and their time estimates are listed in the following table.

| Activity | EstimatedDuration(Weeks) | | |
| --- | --- | --- | --- |
| | Optimistic | Mostlikely | Pessimistic |
| 1-2 | 1 | 1 | 7 |
| 1-3 | 1 | 4 | 7 |
| 1-4 | 2 | 2 | 8 |
| 2-5 | 1 | 1 | 1 |
| 3-5 | 2 | 5 | 14 |
| 4-6 | 2 | 5 | 8 |
| 5-6 | 3 | 6 | 15 |

(a) Draw the network diagram of the activities in the project.

(b) Find the expected duration and variance for each activity.What is the expected project length?

(c) What is the probability that the project will be completed at least 4 weeks earlier than expected time?

**9.** Tasks A to I constitutes a project in which the precedence relationships are A< D; A<E; B <F; D< F; C< G; C<H, F< I; G< I.

Time in day for each task is as follows:

| Task | A | B | C | D | E | F | G | H | I |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Time | 8 | 10 | 8 | 10 | 16 | 17 | 18 | 14 | 9 |

Draw the network to represent the project and find out total float of each activity and identify critical path

**10.** The details of activity and duration are shown below:

| Activity | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| Dependson | - | A | A | A | B,C | C,D | E,F |
| Time,Days | 10 | 5 | 4 | 7 | 6 | 4 | 7 |

Find:

1. Draw a network diagram
2. Find the critical path
3. Project duration

**11.** Draw the network diagram for given relationship of activities

| Activity | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| Predecessor | - | - | A | B | B | C | D | E,F,G |