**BBDNITM**

**MECHANICAL DEPARTMENT**

**SESSION(2018-19)**

**OPERATIONS RESEARCH (NME 051)**

**Assignment no. 5**

**Question 01.** Define project management. What do you mean by tree?

**Question 02.** What are the phases of project management ? explain each in brief. What are the guidelines for the network construction?

**Question 03.** Differentiate between CPM and PERT.

**Question 04.** The following table show the job of network along with their time estimates

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Job | 1-2 | 1-3 | 2-4 | 3-4 | 4-5 | 3-5 |
| Optimistic time | 2 | 9 | 5 | 2 | 6 | 8 |
| Most likely time | 5 | 12 | 14 | 5 | 6 | 17 |
| Pessimistic time | 4 | 15 | 17 | 8 | 12 | 20 |

* 1. Draw the project network
  2. Calculate the length and variance of the critical path
  3. Find the probability that the project will be completed within 30 days.

**Question 05.** A project has these activities, precedence relationship with activity duration in days.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Activity | a | b | c | d | e | f | g | H | i |
| Immediate predecessor | - | - | - | a | c | b | b | d,f | g,h |
| Duration | 12 | 12 | 25 | 13 | 15 | 14 | 10 | 8 | 6 |

Construct a CPM Network for the project, and compute free float for each activity

**Question 06.** The following table show the job of network along with their time estimates

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Job | 1-2 | 1-6 | 2-3 | 2-4 | 3-5 | 4-5 | 6-5 | 5-8 | 7-8 |
| a (days) | 1 | 2 | 2 | 2 | 7 | 5 | 5 | 3 | 8 |
| m (days) | 3 | 1 | 2 | 5 | 4 | 6 | 7 | 8 | 1 |
| b (days) | 2 | 5 | 1 | 4 | 5 | 8 | 5 | 5 | 1 |

Draw the project network and find the probability that the project is completed in 40 days.

**Question 07.** A project has these activities, precedence relationship with activity duration in days.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Activity | a | b | c | d | e | f | g | H | i |
| Immediate predecessor | - | - | - | a | c | b | b | d,f | g,h |
| Duration | 10 | 15 | 20 | 15 | 17 | 12 | 9 | 10 | 7 |

Construct a CPM Network for the project, and compute free float for each activity.

**Question 08.** Arrival rate of telephone calls at a telephone booth is according to Poisson distribution with an average time of 10 minutes between consecutive arrivals. The length of phone call is assume to be exponentially distributed with mean 5 minutes.

* 1. Find the probability that a person arriving at the booth will have to wait.
  2. Find the average queue length that is formed from time to time.
  3. Telephone Company will install a second booth when convinced that an arrival would expected to have to wait at least 4 minutes for the phone. Find the increase in flow of arrival which will justify a second booth.

**Question 09.** If in a period of 2 hours, in a day (8 to 10 am), trains arrive at the yard every 16 minutes but the service time continues to remain 40 minutes, then calculate, for this period:

**9.1** The probability that the yard is empty

* 1. The average no of trains in the system, on the assumption that the line capacity of the yard is only limited to 3 trains