**EXAM #2**

**EXAM 2-11**

**NAME\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**CHAPTER 3: PROJECT MANAGEMENT**

The Southern Textile Company has decided to install a new computerized order processing system that will link the company with customers and suppliers. In the past, orders were processed manually, which contributed to delays in the delivery of orders and resulted in lost sales. The new system will improve the quality of the service the company provides. The company wants to develop a project network for the installation of the new system.

The network begins with three concurrent activities: 1) the new computer equipment is installed (Activity 1); 2) the computerized order processing system is developed (Activity 2); and people are recruited to operate the system (Activity 3). Once people are hired, they are trained for the job (Activity 6), and other personnel in the company, such as marketing, accounting, and production personnel, are introduced to the new system (Activity 7). Once the system is developed (Activity 2) it is tested manually to make sure that it is logical (Activity 5). Following activity 1, the new equipment is tested, any necessary modifications are made (Activity 4), and the newly trained personnel begin training on the computerized system (Activity 8). Also, node 9 begins the testing of the system on the computer to check for errors (Activity 9). The final activities include a trial run and changeover to the system (Activity 11), and final debugging of the computer system (Activity 10).

The activity name and description, the immediate preceding activities, and the three time estimates are listed in the following table:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | | **Time Estimates (weeks)** | | |
| **Activity** | **Description** | **Immediate**  **Preceding**  **Activity** | **Optimistic**  **“*a*”** | **Most**  **Likely**  **“*m*”** | **Pessimistic**  **“*b*”** |
| **A** | Equipment installation | -- | 6 | 8 | 10 |
| **B** | System development | -- | 3 | 6 | 9 |
| **C** | Position recruiting | -- | 1 | 3 | 5 |
| **D** | Equipment testing and modification | A | 2 | 9 | 18 |
| **E** | Manual testing | B | 2 | 6 | 12 |
| **F** | Job training | C | 3 | 9 | 15 |
| **G** | Orientation | C | 3 | 6 | 12 |
| **H** | System training | A, E, F | 3 | 8 | 15 |
| **I** | System testing | A, E, F | 5 | 10 | 20 |
| **J** | Final debugging | D | 6 | 10 | 18 |
| **K** | System changeover | G, H, I | 4 | 10 | 12 |

**Perform PERT/CPM analysis including the following steps:**

1. Estimate the completion time, “*t*”, and the variance, “σ2”, for each activity. Use the page for Time Calculation to show the calculation of the time and variance.
2. Draw a project network diagram showing the activities and immediate predecessors listed for each activity. Use a blank page. Make sure you use a straight edge of a ruler to draw the lines between the activities in the network diagram.
3. Using the project network and activity time estimates, determine the Earliest Start (ES) and Earliest Finish (EF) time for each activity by making a forward pass through the network.
4. Using the project completion time identified in the previous step (Step 3) as the latest finish time for the last activity, make a backward pass through the network calculating the Latest Start (LS) and Latest Finish (LF) time for each activity.
5. Calculate the completion time for each path through the network and then identify the critical path through the network (the path with the greatest time). Perform the calculation for each path through the network on the Path Calculation table.
6. Complete the Master Table (which includes the Activity Time, Variance, ES, EF, LS, LF,
7. Calculate the slack time for each activity (the difference between the latest start time and the earliest start time *OR* the difference between the latest finish time and the earliest start time).
8. Use the calculated slack times to identify the paths on the critical path and list the variance time for each of those activities (list **ONLY** the ones on the critical path). The activities with a zero slack value are ones that are on the critical path. Calculate the sum of the variances of the activities included on the critical path. Determine the project standard deviation (take the square root of the summed variances).
9. Determine the probability associated with the project.

Southern Textile has told its customers that the new system will be operational in 33 weeks. **What is the probability that the system will be ready in less than 33 weeks?**

**EXTRA CREDIT:**

A customer has gotten frustrated with the delays in the project and told Southern Textile that if the project is not done in 32.75 weeks it will stop doing business with them and move its business to its largest competitor. **What is the probability that the project will be done in less than 32.75 weeks?**

You will have one week to work this project management problem and submit the results. Make sure you show all your calculations required for all values. Draw the network and include the Activity name, estimated time, the Earliest Start, Earliest Finish, Latest Start, and the Latest Finish for each activity included in the project.