Chapter 9

Student: _____

1. Without any formal planning, the president of a software company remarks in a speech that new technologically advanced software will be available in one year. This may lead to a project that must be done faster than anticipated. This is an example of reducing project duration caused by

   A. Imposed project deadlines.
   B. Time to market.
   C. Unforeseen project delays.
   D. High overhead.
   E. Incentive contracts.

2. Intense global competition and rapid technological advances create pressure to develop projects rapidly. This is an example of reducing project duration caused by

   A. Imposed project deadlines.
   B. Time to market.
   C. Unforeseen project delays.
   D. High overhead.
   E. Incentive contracts.

3. A contractor finished a bridge across a lake 18 months early and received more than $6 million for the early completion. This is an example of reducing project duration caused by

   A. Imposed project deadlines.
   B. Time to market.
   C. Unforeseen project delays.
   D. High overhead.
   E. Incentive contracts.

4. Adverse weather, design flaws, and equipment breakdown can create negative slack. This is an example of reducing project duration caused by

   A. Imposed project deadlines.
   B. Time to market.
   C. Unforeseen project delays.
   D. High overhead.
   E. Incentive contracts.

5. In a Project Cost-Duration Graph, total project costs are a sum of

   A. Labor, material and equipment costs.
   B. Direct costs plus interest.
   C. Direct labor costs and the project manager's salary.
   D. Direct costs and the project manager's salary.
   E. Direct and indirect costs.

6. Which of the following is <u>NOT</u> considered a project indirect cost?

   A. Supervision
   B. Consultants
   C. Equipment
   D. Interest
   E. The project manager's salary

7. As a project is crashed and project duration is reduced, indirect costs typically

   A. Increase.
   B. Become unstable.
   C. Decrease.
   D. Become unreliable.
   E. Stay the same.

8. Before crashing, direct costs for an activity represent normal costs, which typically mean low-cost, efficient methods for completing the activity in a(n) _____ amount of time.

   A. Normal
   B. Budgeted
   C. Optimized
   D. Expected
   E. Targeted

9. The shortest possible time an activity can be completed realistically is called ___---_____ time.

   A. Expedited
   B. Accelerated
   C. Crash
   D. Optimistic
   E. Optimal

10. As a project is crashed and project duration is reduced, direct costs typically

   A. Increase.
   B. Become unstable.
   C. Decrease.
   D. Become unreliable.
   E. Stay the same.

11. The direct cost for completing an activity in the shortest time it can realistically be completed in is called its _____ cost.

   A. Normal
   B. Reserve
   C. Crash
   D. Accelerated
   E. Expedited

12. An activity's crash cost includes _____ costs.

   A. Direct
   B. Indirect
   C. Overhead
   D. Total
   E. Normal

13. Cost slope can be determined by dividing the

   A. Run by the rise.
   B. Rise by the run.
   C. Crash cost by the normal cost.
   D. Normal cost by the crash cost.
   E. Indirect cost by direct cost.

14. The less steep the cost slope of an activity, the

   A. Less it costs to shorten one time period.
   B. More it costs to shorten one time period.
   C. Smaller the crash time is.
   D. Larger the crash time is.
   E. Cannot be determined by the information given.

15. Which of the following correctly calculates an activity's cost slope?

    A. (normal cost - crash cost)/(normal time - crash time)
    B. (crash cost - normal cost)/(normal time - crash time)
    C. (normal time - crash time)/(crash cost - normal cost)
    D. (normal time - crash time)/(normal cost - crash cost)
    E. (crash cost - normal cost)/(crash time - normal time)

16. Emily has recently learned that she needs to reduce the duration of her project to meet an imposed deadline. She has calculated the crash cost per unit and knows the maximum units each activity can be reduced. What is the next step?

    A. Find the activity with the lowest crash cost
    B. Calculate the optimum cost-time point
    C. Calculate the crash point
    D. Identify the critical path
    E. Find the activity with the highest crash cost

17. In selecting the best activity to crash you would first select the activity with the

    A. Earliest start time.
    B. Most steep slope.
    C. Least steep slope.
    D. Longest duration.
    E. Largest crash time.

18. When reducing project duration, the duration for a project that is optimal is at the point where

    A. Direct costs are the lowest.
    B. Indirect costs are the lowest.
    C. Direct costs equal indirect costs.
    D. Total project costs are the lowest.
    E. The project changes from time-constrained to resource-constrained.

19. When reducing project duration, the crash cost per unit has to be calculated and the maximum units each activity can be reduced must be known. After this, the critical path must be identified. What is the next step?

    A. Find the activity with the lowest crash cost
    B. Calculate the optimum cost-time point
    C. Calculate the crash point
    D. Calculate indirect cost per time unit
    E. Find the activity with the steepest cost slope

20. When determining which activity to crash, there are other factors that should be assessed beyond cost. Which of the following is <u>NOT</u> one of these factors?

    A. The inherent risk associated with the activity
    B. How crashing will impact the morale and motivation of the individuals working on that activity
    C. Resource availability after crashing that activity
    D. The level of difficulty involved in completing the activity
    E. When during the project the activity will occur

21. Reducing project duration

    A. Involves crashing all activities to their crash point.
    B. Can only be done when resources are not constrained.
    C. Is always more expensive.
    D. Tends to increase network sensitivity.
    E. Should be considered for all projects.

22. An activity's normal time and cost are 8 and $100, respectively. Its estimated crash time and cost are 6 and $160, respectively. What is this activity's crash cost per time unit?

    A. $33
    B. $30
    C. $60
    D. $65
    E. $153

23. The relationship between the normal point and the crash point is assumed to be

    A. Linear.
    B. Curvilinear.
    C. Variable.
    D. Conversely related.
    E. Exponentially related.

24. When a project manager must reduce project duration but resources are constrained, creating a software program that will have fewer features than originally planned or building a house without the bonus room the owner originally specified in the plans would both be examples of

    A. Fast-tracking.
    B. Using critical-chain project management.
    C. Reducing project scope.
    D. Compromising quality.
    E. Doing it twice—first fast and then correctly.

25. Which of the following is <u>NOT</u> a rational reason to reduce project duration?

   A. Incentive contracts
   B. High network sensitivity
   C. Imposed deadlines
   D. High overhead costs
   E. Unforeseen delays

26. Sometimes very high _____ costs are recognized before a project begins and reducing these costs through shorter project durations becomes a high priority.

   A. Labor
   B. Direct
   C. Project
   D. Overhead
   E. Interest

27. One way of reducing project costs is identifying tasks that _____ can do themselves.

   A. Vendors
   B. Suppliers
   C. Customers
   D. Company employees
   E. Project teams

28. Which of the following projects would be least benefited if additional resources were added?

   A. Splitting and stacking a cord of wood
   B. Developing new software
   C. Harvesting a crop by hand
   D. Building a cabin
   E. Moving to a new house

29. Which of the following is <u>NOT</u> one of the more commonly used options for cutting project costs?

   A. Reduce project scope
   B. Have owner take more responsibility
   C. Move the completion date further out
   D. Brainstorm cost savings options
   E. Outsource project activities

30. All of the following are disadvantages of scheduling overtime EXCEPT

A. Overtime is associated the with additional costs of coordination and communication.
B. Sustained overtime work by salaried employees may incur burnout.
C. Productivity is reduced the longer one is working.
D. More hours results in higher expenses if paying workers hourly.
E. Continued overtime can lead to a higher turnover rate.

31. According to Brooks' Law, adding more people to a late project is most likely to have which of the following impacts?

A. Keep the project from slipping any further
B. Get the project back on schedule
C. Make the project slip further
D. Lead to burnout
E. Decrease team motivation

32. When it is necessary to reduce project duration and resources are constrained, which of the following is NOT a reasonable option?

A. Establishing a core project team
B. Fast-tracking
C. Reduce project scope
D. Compromise quality
E. Critical-chain project management

33. Which of the following is NOT a technique for accelerating project completion when resources are *not* constrained?

A. Assign additional staff and equipment
B. Establish a core team
C. Do it twice—first fast and then correctly
D. Reduce project scope
E. Compromise quality

34. When the project team is salaried, which of the following is the preferred choice for accelerating project completion?

A. Assigning additional staff and equipment
B. Subcontract work
C. Schedule overtime
D. Outsource project work
E. Establish a core project team

35. It is going to cost $80,000 a day simply to house and feed a construction crew in the farthest reaches of northern Alaska. This would be an example of a situation requiring reducing the project duration due to

    A. Imposed project deadlines.
    B. Time to market.
    C. Unforeseen project delays.
    D. High overhead.
    E. Incentive contracts.

36. Without any formal planning, the president of a software company remarks in a speech that new technologically advanced software will be available in one year. This may lead to a project that must be done faster than anticipated. The completion date has been _____.

    _____

37. Intense global competition and rapid technological advances combine to create a(n) _____- imposed project duration date.

    _____

38. There are fewer options available for reducing project time if you are _____ than if you can spend more than your original budget.

    _____

39. Sometimes very high _____ costs are recognized before a project begins and reducing these costs through shorter project duration becomes a high priority.

    _____

40. The _____ project cost is the sum of the indirect and direct costs.

    _____

41. Overhead costs such as supervision, administration, consultants, and interest are examples of _____ project costs.

    _____

42. Costs such as labor, materials, equipment, or contractors are examples of _____ project costs.

    _____

43. Direct costs are assignable directly to a particular _____.

    _____

44. Because direct costs are assumed to be developed from normal methods and in a normal amount of time, any reduction in activity time should _____ the cost of the activity.

_____

45. In order to shorten the duration of a project the project manager should limit the choices of activities to just those which are on the _____.

_____

46. The _____ time for an activity represents low-costs, realistic, efficient methods for completing the activity under typical conditions.

_____

47. Reducing the duration of an activity is called _____.

_____

48. The direct cost for completing an activity as early as possible is called its _____ cost.

_____

49. An activity's _____ is calculated by dividing the rise by the run.

_____

50. When project managers know an activity's _____, they are able to compare which critical activities to shorten.

_____

51. The less steep the cost slope of an activity, the _____ it costs to shorten one time period.

_____

52. When considering whether to move the project to its optimum cost-time position, the manager should also consider _____.

_____

53. An activity's normal time and cost are 5 and $40, respectively. Its estimated crash time and cost are 4 and $70, respectively. This activity's crash cost per time unit is _____.

_____

54. When you schedule _____, you avoid the additional costs of coordination and communication when new people are added.

_____

55. According to _____ law, adding more manpower to a late software project makes it later.

_____

56. As a project's duration is reduced, indirect costs are _____.

_____

57. _____ is the rearranging of the project network logic so that critical activities are done in parallel rather than sequentially.

_____

58. Creation of the _____ graph keeps the importance of indirect costs in the forefront of decision making.

_____

59. One way of reducing project costs is identifying tasks that _____ can do themselves.

_____

60. There are more options available for reducing project time if you are not resource constrained.

    True   False

61. An activity must be crashed on each critical path in order to reduce project duration.

    True   False

62. Managers have several effective methods for crashing specific project activities when resources are not constrained.

    True   False

63. Indirect costs generally represent overhead costs such as supervision, administration, consultants, and interest.

    True   False

64. The total cost for each time unit of a project is the sum of labor, materials, and equipment.

    True   False

65. Direct costs are so named because they can be assigned directly to a work package and activity.

    True   False

66. Because direct costs are assumed to be developed from "normal" methods and in a "normal" amount of time, any reduction in activity time should add to the costs of the activity.

    True   False

67. Total cost for specific project durations is computed and then compared with the benefits of reducing project time, before the project begins or while it is in progress.

    True   False

68. Incentive contracts can make the reduction of project time rewarding—usually for both the project contractor and owner.

    True   False

69. Shortening an activity's duration is termed crashing.

    True   False

70. When adding resources, there are limits as to how much speed can be gained.

    True   False

71. Brooks' law states that adding manpower to a software project helps keep it on schedule.

    True   False

72. The cost slope of an activity is calculated by dividing the run by the rise.

    True   False

73. If indirect costs are a significant percentage of total project costs, reductions in project time can represent very real savings.

    True   False

74. The higher the cost slope of an activity the lower the cost to reduce its duration.

    True   False

75. When crashing an activity, you always crash to its crash point.

    True   False

76. Crashing a more expensive activity may be wise if fewer inherent risks are involved.

    True   False

77. Crashing frequently results in overallocation of resources.

    True   False

78. Crashing can negatively impact the morale and motivation of the project team.

    True   False

79. When reducing project duration, there will always be an optimum cost-time point where the total cost of the project is less than it was when the project was initially planned under normal conditions.

    True   False

80. The accuracy of crash times and costs is frequently rough at best, when compared with normal time and cost.

    True   False

81. One of the advantages of using a Project Cost-Duration Graph is that it keeps the importance of indirect costs in the forefront of decision making.

    True   False

82. Identify and briefly describe three out of the six reasons given in the text for attempting to reduce the duration of a project.

83. Why should a project manager be cautious when adding resources to reduce project duration?

84. The easiest way to add more labor to a project is not to add more people, but to schedule overtime. What are the disadvantages of scheduling overtime?

85. Why is the project duration with the lowest direct costs seldom the optimum duration for a project?

86. Given an equal level of risk and the need to reduce overall project duration, why would you <u>NOT</u> select the activity with the least slope, in the entire project network, to crash first?

87. What is crashing? Include a discussion of crash time and crash cost.

88. How would you calculate an activity's slope and what does it represent?

89. Given that an activity's normal time and cost are 10 days and $400, respectively, and its crash time and cost are 5 days and $800, respectively, what is the activity's slope?

90. What does it mean to say that a project network is *sensitive* and why is that important to a project manager who needs to reduce the duration of his or her project?

91. How is the optimum cost-time point determined? What are the conditions that must exist for one to be present at a project duration other than the duration originally created under normal conditions?

92. When do you know you have crashed project activities enough? In other words, when you are crashing a project, how do you know you are finished?

93. The cost-time crashing method relies on choosing the cheapest method for reducing the duration of the project. What are other factors that should be assessed beyond simply cost?

94. What if cost, not time, is the issue? What are some options available to project managers? Identify and briefly describe three.

Chapter 9 Key

1. Without any formal planning, the president of a software company remarks in a speech that new technologically advanced software will be available in one year. This may lead to a project that must be done faster than anticipated. This is an example of reducing project duration caused by

    A. Imposed project deadlines.
    B. Time to market.
    C. Unforeseen project delays.
    D. High overhead.
    E. Incentive contracts.

    Imposed deadlines are another reason for accelerating project completion. For example, the president of a software company remarks in a speech that new advanced software will be available in one year. Such statements too often become imposed project duration dates—without any consideration of the problems or cost of meeting such a date. The project duration time is set while the project is in its "concept" phase before or without any detailed scheduling of all the activities in the project. This phenomenon occurs very frequently in practice.

2. Intense global competition and rapid technological advances create pressure to develop projects rapidly. This is an example of reducing project duration caused by

    A. Imposed project deadlines.
    B. Time to market.
    C. Unforeseen project delays.
    D. High overhead.
    E. Incentive contracts.

    Intense global competition and rapid technological advances have made speed a competitive advantage. To succeed, companies have to spot new opportunities, launch project teams, and bring new products or services to the marketplace in a flash.

3.   A contractor finished a bridge across a lake 18 months early and received more than $6 million for the early completion. This is an example of reducing project duration caused by

       A. Imposed project deadlines.
       B. Time to market.
       C. Unforeseen project delays.
       D. High overhead.
       E. Incentive contracts.

Incentive contracts can make reduction of project time rewarding—usually for both the project contractor and owner. For example, a contractor finished a bridge across a lake 18 months early and received more than $6 million for the early completion. The availability of the bridge to the surrounding community 18 months early to reduce traffic grid-lock made the incentive cost to the community seem small to users.

4.   Adverse weather, design flaws, and equipment breakdown can create negative slack. This is an example of reducing project duration caused by

       A. Imposed project deadlines.
       B. Time to market.
       C. Unforeseen project delays.
       D. High overhead.
       E. Incentive contracts.

Another common reason for reducing project time occurs when unforeseen delays—for example, adverse weather, design flaws, and equipment breakdown—cause substantial delays midway in the project.

5.   In a Project Cost-Duration Graph, total project costs are a sum of

        A. Labor, material and equipment costs.
        B. Direct costs plus interest.
        C. Direct labor costs and the project manager's salary.
        D. Direct costs and the project manager's salary.
        E. Direct and indirect costs.

        Direct costs commonly represent labor, materials, equipment, and sometimes subcontractors.
        Indirect costs generally represent overhead costs such as supervision, administration,
        consultants, and interest. Total costs are a sum of direct and indirect costs.

6.   Which of the following is <u>NOT</u> considered a project indirect cost?

        A. Supervision
        B. Consultants
        C. Equipment
        D. Interest
        E. The project manager's salary

        Indirect costs generally represent overhead costs such as supervision, administration,
        consultants, and interest. Direct costs commonly represent labor, materials, equipment, and
        sometimes subcontractors.

7.   As a project is crashed and project duration is reduced, indirect costs typically

       A. Increase.
       B. Become unstable.
       C. Decrease.
       D. Become unreliable.
       E. Stay the same.

       Indirect costs vary with time. That is, any reduction in time should result in a reduction of
       indirect costs.

8.   Before crashing, direct costs for an activity represent normal costs, which typically mean low-
       cost, efficient methods for completing the activity in a(n) _____ amount of time.

       A. Normal
       B. Budgeted
       C. Optimized
       D. Expected
       E. Targeted

       Normal time assumes low-cost, efficient methods to complete the activity.

9.   The shortest possible time an activity can be completed realistically is called ___---_____
       time.

       A. Expedited
       B. Accelerated
       C. Crash
       D. Optimistic
       E. Optimal

       The shortest possible time an activity can realistically be completed in is called its crash time.

10.   As a project is crashed and project duration is reduced, direct costs typically

    A. Increase.
    B. Become unstable.
    C. Decrease.
    D. Become unreliable.
    E. Stay the same.

When project durations are imposed, direct costs may no longer represent low-cost methods. Costs for the imposed duration date will be higher than for a project duration developed from ideal normal times for activities.

11.   The direct cost for completing an activity in the shortest time it can realistically be completed in is called its _____ cost.

    A. Normal
    B. Reserve
    C. Crash
    D. Accelerated
    E. Expedited

The shortest possible time an activity can realistically be completed in is called its crash time. The direct cost for completing an activity in its crash time is called crash cost.

12.   An activity's crash cost includes _____ costs.

A. Direct
B. Indirect
C. Overhead
D. Total
E. Normal

The direct cost for completing an activity in its crash time is called crash cost. Both normal and crash times and costs are collected from personnel most familiar with completing the activity.

13.   Cost slope can be determined by dividing the

A. Run by the rise.
B. Rise by the run.
C. Crash cost by the normal cost.
D. Normal cost by the crash cost.
E. Indirect cost by direct cost.

Cost slope = Rise/Run.

14.   The less steep the cost slope of an activity, the

A. Less it costs to shorten one time period.
B. More it costs to shorten one time period.
C. Smaller the crash time is.
D. Larger the crash time is.
E. Cannot be determined by the information given.

The less steep the cost slope of an activity, the less it costs to shorten one time period.

15. Which of the following correctly calculates an activity's cost slope?

    A. (normal cost - crash cost)/(normal time - crash time)
    B. (crash cost - normal cost)/(normal time - crash time)
    C. (normal time - crash time)/(crash cost - normal cost)
    D. (normal time - crash time)/(normal cost - crash cost)
    E. (crash cost - normal cost)/(crash time - normal time)

The activity's cost slope is calculated by rise/run or (crash cost - normal cost)/(normal time - crash time).

16. Emily has recently learned that she needs to reduce the duration of her project to meet an imposed deadline. She has calculated the crash cost per unit and knows the maximum units each activity can be reduced. What is the next step?

    A. Find the activity with the lowest crash cost
    B. Calculate the optimum cost-time point
    C. Calculate the crash point
    D. Identify the critical path
    E. Find the activity with the highest crash cost

After the crash cost per unit has been calculated and the maximum units each activity can be reduced are known, it can be determined which activity or activities need to be crashed to reduce the project duration one time unit. In order to reduce project duration, activities must be crashed on the critical path.

17. In selecting the best activity to crash you would first select the activity with the

    A. Earliest start time.
    B. Most steep slope.
    C. Least steep slope.
    D. Longest duration.
    E. Largest crash time.

The less steep the cost slope of an activity, the less it costs to shorten one time period.

18. When reducing project duration, the duration for a project that is optimal is at the point where

    A. Direct costs are the lowest.
    B. Indirect costs are the lowest.
    C. Direct costs equal indirect costs.
    D. Total project costs are the lowest.
    E. The project changes from time-constrained to resource-constrained.

The optimum cost-time point for a project is when the total project costs are the lowest.

19. When reducing project duration, the crash cost per unit has to be calculated and the maximum units each activity can be reduced must be known. After this, the critical path must be identified. What is the next step?

    A. Find the activity with the lowest crash cost
    B. Calculate the optimum cost-time point
    C. Calculate the crash point
    D. Calculate indirect cost per time unit
    E. Find the activity with the steepest cost slope

After the critical path has been identified the activity with the lowest crash cost is reduced one time unit. This reduces the entire project by one time unit at the lowest cost.

20. When determining which activity to crash, there are other factors that should be assessed beyond cost. Which of the following is <u>NOT</u> one of these factors?

    A. The inherent risk associated with the activity
    B. How crashing will impact the morale and motivation of the individuals working on that activity
    C. Resource availability after crashing that activity
    D. The level of difficulty involved in completing the activity
    E. When during the project the activity will occur

The level of difficultly is not a major factor that needs to be assessed before determining which activity to crash.

21. Reducing project duration

    A. Involves crashing all activities to their crash point.
    B. Can only be done when resources are not constrained.
    C. Is always more expensive.
    D. Tends to increase network sensitivity.
    E. Should be considered for all projects.

Compression of projects reduces scheduling flexibility and increases the risk of delaying the project.

22. An activity's normal time and cost are 8 and $100, respectively. Its estimated crash time and cost are 6 and $160, respectively. What is this activity's crash cost per time unit?

A. $33
B. $30
C. $60
D. $65
E. $153

Crash cost per time unit equals the cost slope. Cost slope equals rise/run; therefore (crash cost - normal cost)/(normal time - crash time) or ($160 - $100)/(8 - 6) = $30.

23. The relationship between the normal point and the crash point is assumed to be

A. Linear.
B. Curvilinear.
C. Variable.
D. Conversely related.
E. Exponentially related.

The cost-time relationship is assumed to be linear.

24. When a project manager must reduce project duration but resources are constrained, creating a software program that will have fewer features than originally planned or building a house without the bonus room the owner originally specified in the plans would both be examples of

    A. Fast-tracking.
    B. Using critical-chain project management.
    C. Reducing project scope.
    D. Compromising quality.
    E. Doing it twice—first fast and then correctly.

Probably the most common response for meeting unattainable deadlines is to reduce or scale back the scope of the project. This invariably leads to a reduction in the functionality of the project. For example, the new car will average only 25 mpg instead of 30.

25. Which of the following is <u>NOT</u> a rational reason to reduce project duration?

    A. Incentive contracts
    B. High network sensitivity
    C. Imposed deadlines
    D. High overhead costs
    E. Unforeseen delays

Network sensitivity is not a reason to reduce project duration. Reducing project duration does impact network sensitivity; however, it typically increases it.

26. Sometimes very high _____ costs are recognized before a project begins and reducing these costs through shorter project durations becomes a high priority.

    A. Labor
    B. Direct
    C. Project
    D. Overhead
    E. Interest

Sometimes very high overhead costs are recognized before the project begins. In these cases it is prudent to examine the direct costs of shortening the critical path versus the overhead cost savings.

27. One way of reducing project costs is identifying tasks that _____ can do themselves.

    A. Vendors
    B. Suppliers
    C. Customers
    D. Company employees
    E. Project teams

One way of reducing project costs is identifying tasks that customers can do themselves. Homeowners frequently use this method to reduce costs on home improvement projects. For example, to reduce the cost of a bathroom remodel, a homeowner may agree to paint the room instead of paying the contractor to do it. On IS projects, a customer may agree to take on some of the responsibility for testing equipment or providing in-house training.

28. Which of the following projects would be least benefited if additional resources were added?

    A. Splitting and stacking a cord of wood
    B. Developing new software
    C. Harvesting a crop by hand
    D. Building a cabin
    E. Moving to a new house

Doubling the size of the workforce will not necessarily reduce completion time by half. The relationship would be correct only when tasks can be partitioned so minimal communication is needed between workers.

29. Which of the following is <u>NOT</u> one of the more commonly used options for cutting project costs?

    A. Reduce project scope
    B. Have owner take more responsibility
    C. Move the completion date further out
    D. Brainstorm cost savings options
    E. Outsource project activities

Ways to cut costs are to reduce project scope, have the owner take more responsibility, outsource project activities or even the entire project, brainstorm cost savings options.

30. All of the following are disadvantages of scheduling overtime EXCEPT

A. Overtime is associated the with additional costs of coordination and communication.
B. Sustained overtime work by salaried employees may incur burnout.
C. Productivity is reduced the longer one is working.
D. More hours results in higher expenses if paying workers hourly.
E. Continued overtime can lead to a higher turnover rate.

By scheduling overtime you avoid the costs of coordination and communication encountered when new people are added. This is an advantage to scheduling overtime.

31. According to Brooks' Law, adding more people to a late project is most likely to have which of the following impacts?

A. Keep the project from slipping any further
B. Get the project back on schedule
C. Make the project slip further
D. Lead to burnout
E. Decrease team motivation

Brooks' law: Adding manpower to a late project makes it later.

32. When it is necessary to reduce project duration and resources are constrained, which of the following is NOT a reasonable option?

A. Establishing a core project team
B. Fast-tracking
C. Reduce project scope
D. Compromise quality
E. Critical-chain project management

Project managers can speed up the completion date by establishing a core project team only if they have the additional resources and the additional funds.

33. Which of the following is <u>NOT</u> a technique for accelerating project completion when resources are *not* constrained?

    A. Assign additional staff and equipment
    B. Establish a core team
    C. Do it twice—first fast and then correctly
    D. Reduce project scope
    E. Compromise quality

Reducing quality is always an option, but it is rarely acceptable or used, especially if resources are available to maintain quality.

34. When the project team is salaried, which of the following is the preferred choice for accelerating project completion?

    A. Assigning additional staff and equipment
    B. Subcontract work
    C. Schedule overtime
    D. Outsource project work
    E. Establish a core project team

Overtime and working longer hours is the preferred choice for accelerating project completion, especially when the project team is salaried.

35. It is going to cost $80,000 a day simply to house and feed a construction crew in the farthest reaches of northern Alaska. This would be an example of a situation requiring reducing the project duration due to

   A. Imposed project deadlines.
   B. Time to market.
   C. Unforeseen project delays.
   D. High overhead.
   E. Incentive contracts.

   Sometimes very high overhead costs are recognized before the project begins. In these cases it is prudent to examine the direct costs of shortening the critical path versus the overhead cost savings.

36. Without any formal planning, the president of a software company remarks in a speech that new technologically advanced software will be available in one year. This may lead to a project that must be done faster than anticipated. The completion date has been _____.

   imposed

   Imposed deadlines are another reason for accelerating project completion. For example, without consulting the architect a politician makes a public statement that a new building will be available in two years.

37. Intense global competition and rapid technological advances combine to create a(n) _____-imposed project duration date.

   market

   Intense global competition and rapid technological advances have made speed a competitive advantage. To succeed, companies have to spot new opportunities, launch project teams, and bring new products or services to the marketplace in a flash.

38.　There are fewer options available for reducing project time if you are _____ than if you can spend more than your original budget.

resource constrained

Managers have several effective methods for crashing specific project activities when resources are not constrained. A project manager has fewer options for accelerating project completion when additional resources are either not available or the budget is severely constrained.

39.　Sometimes very high _____ costs are recognized before a project begins and reducing these costs through shorter project duration becomes a high priority.

overhead

Sometimes very high overhead costs are recognized before the project begins. In these cases it is prudent to examine the direct costs of shortening the critical path versus the overhead cost savings.

40.　The _____ project cost is the sum of the indirect and direct costs.

total

The total cost for each duration is the sum of the indirect and direct costs.

41.　Overhead costs such as supervision, administration, consultants, and interest are examples of _____ project costs.

indirect

Indirect costs generally represent overhead costs such as supervision, administration, consultants, and interest. Indirect costs cannot be associated with any particular work package or activity.

42. Costs such as labor, materials, equipment, or contractors are examples of _____ project costs.

<u>direct</u>

Direct costs commonly represent labor, materials, equipment, and sometimes subcontractors. Direct costs are assigned directly to a work package and activity.

43. Direct costs are assignable directly to a particular _____.

<u>work package</u>

Direct costs commonly represent labor, materials, equipment, and sometimes subcontractors. Direct costs are assigned directly to a work package and activity.

44. Because direct costs are assumed to be developed from normal methods and in a normal amount of time, any reduction in activity time should _____ the cost of the activity.

<u>increase</u>

Because direct costs are assumed to be developed from normal methods and time, any reduction in activity time should add to or increase the costs of the activity.

45. In order to shorten the duration of a project the project manager should limit the choices of activities to just those which are on the _____.

critical path

After the crash cost per unit has been calculated and the maximum units each activity can be reduced are known, it can be determined which activity or activities need to be crashed to reduce the project duration one time unit. In order to reduce project duration, activities must be crashed on the critical path.

46. The _____ time for an activity represents low-costs, realistic, efficient methods for completing the activity under typical conditions.

normal

Normal time assumes low-cost, efficient methods to complete the activity.

47. Reducing the duration of an activity is called _____.

crashing

Shortening an activity is called crashing.

48. The direct cost for completing an activity as early as possible is called its _____ cost.

crash

The direct cost for completing an activity in its crash time is called crash cost. Both normal and crash times and costs are collected from personnel most familiar with completing the activity.

49. An activity's _____ is calculated by dividing the rise by the run.

slope

Cost Slope = Rise/Run.

50. When project managers know an activity's _____, they are able to compare which critical activities to shorten.

slope or crash cost per unit

When project managers know an activity's slope, they are able to compare which critical activities to shorten. The less steep the cost slope of an activity, the less it costs to shorten one time period; a steeper slope means it will cost more to shorten one time unit.

51. The less steep the cost slope of an activity, the _____ it costs to shorten one time period.

less

When project managers know an activity's slope, they are able to compare which critical activities to shorten. The less steep the cost slope of an activity, the less it costs to shorten one time period; a steeper slope means it will cost more to shorten one time unit.

52. When considering whether to move the project to its optimum cost-time position, the manager should also consider _____.

risk

Should the project owner or project manager go for the optimum cost-time? The answer is, "It depends." Risk must be considered.

53. An activity's normal time and cost are 5 and $40, respectively. Its estimated crash time and cost are 4 and $70, respectively. This activity's crash cost per time unit is _____.

$30

Crash cost per time unit equals the cost slope. Cost slope equals rise/run; therefore, (crash cost - normal cost)/(normal time - crash time) or ($70 - $40)/(5 - 4) = $30.

54. When you schedule _____, you avoid the additional costs of coordination and communication when new people are added.

overtime

The easiest way to add more labor to a project is not to add more people, but to schedule overtime.

55. According to _____ law, adding more manpower to a late software project makes it later.

Brooks'

Brooks' law: Adding manpower to a late software project makes it later.

56. As a project's duration is reduced, indirect costs are _____.

reduced

Indirect costs vary with time. That is, any reduction in time should result in a reduction of indirect costs.

57.   _____ is the rearranging of the project network logic so that critical activities are done in parallel rather than sequentially.

Fast-tracking

Fast-tracking makes it possible to rearrange the logic of the project network so that critical activities are done in parallel (concurrently) rather than sequentially.

58.   Creation of the _____ graph keeps the importance of indirect costs in the forefront of decision making.

Project Cost-Duration

The Project Cost-Duration Graph is valuable to compare any proposed alternative or change with the optimum cost and time. More importantly, the creation of such a graph keeps the importance of indirect costs in the forefront of decision making.

59.   One way of reducing project costs is identifying tasks that _____ can do themselves.

customers

When cost is an issue instead of time, project managers may be able to identify tasks that the customers can do themselves.

60.   There are more options available for reducing project time if you are not resource constrained.

TRUE

There are more options available for reducing project time if you are not resource constrained than if you cannot spend more than your original budget.

61. An activity must be crashed on each critical path in order to reduce project duration.

    TRUE

    In order to reduce project duration each critical path must be crashed.

62. Managers have several effective methods for crashing specific project activities when resources are not constrained.

    TRUE

    Managers have several effective methods for crashing specific project activities when resources are not constrained. These include adding more resources, scheduling overtime, outsourcing project work, establishing a core project team and do it twice.

63. Indirect costs generally represent overhead costs such as supervision, administration, consultants, and interest.

    TRUE

    Indirect costs generally represent overhead costs such as supervision, administration, consultants, and interest. Indirect costs cannot be associated with any particular work package or activity.

64. The total cost for each time unit of a project is the sum of labor, materials, and equipment.

    FALSE

    Direct costs commonly represent labor, materials, equipment, and sometimes subcontractors. Total cost is the sum of direct and indirect costs.

65.   Direct costs are so named because they can be assigned directly to a work package and activity.

TRUE

Direct costs are assigned directly to a work package and activity, hence the term. The ideal assumption is that direct costs for an activity time represent normal costs, which typically mean low-cost, efficient methods for a normal time.

66.   Because direct costs are assumed to be developed from "normal" methods and in a "normal" amount of time, any reduction in activity time should add to the costs of the activity.

TRUE

When project durations are imposed, direct costs may no longer represent low-cost, efficient methods. Costs for the imposed duration date will be higher than for a project duration developed from ideal normal times for activities.

67.   Total cost for specific project durations is computed and then compared with the benefits of reducing project time, before the project begins or while it is in progress.

TRUE

Project duration may need to be reduced before the project starts, but it can also be reduced during the project. For example, five months into a project you realize that you are already three weeks behind the drop-dead date for the project.

68. Incentive contracts can make the reduction of project time rewarding—usually for both the project contractor and owner.

TRUE

Incentive contracts can make reduction of project time rewarding—usually for both the project contractor and owner. The contractor gets paid more for completing the job sooner and the owner gets the project completed faster than originally planned.

69. Shortening an activity's duration is termed crashing.

TRUE

Crashing is a term that has emerged in the project management lexicon for shortening the duration of an activity of project beyond when it can normally be done.

70. When adding resources, there are limits as to how much speed can be gained.

TRUE

Doubling the size of the workforce will not necessarily reduce completion time by half. The relationship would be correct only when tasks can be partitioned so minimal communication is needed between workers, as in harvesting a crop by hand or repaving a highway.

71. Brooks' law states that adding manpower to a software project helps keep it on schedule.

FALSE

Brooks' law states that adding manpower to a software project makes the project later. Not only is more time needed to coordinate and manage a larger team; there is the additional delay of training the new people and getting them up to speed on the project.

72. The cost slope of an activity is calculated by dividing the run by the rise.

FALSE

Cost Slope = Rise/Run.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Remember
Larson - Chapter 09 #72
Learning Objective: Constructing a Project Cost-Duration Graph
Level of Difficulty: 1 Easy

73. If indirect costs are a significant percentage of total project costs, reductions in project time can represent very real savings.

TRUE

When reducing project duration, if the savings for indirect costs are more than the increase in direct costs, there will be overall cost savings.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Larson - Chapter 09 #73
Learning Objective: Project Cost-Duration Graph
Level of Difficulty: 2 Medium

74. The higher the cost slope of an activity the lower the cost to reduce its duration.

FALSE

A steeper slope means it will cost more to shorten one time unit.

AACSB: Reflective Thinking
Accessibility: Keyboard Navigation
Blooms: Understand
Larson - Chapter 09 #74
Learning Objective: Constructing a Project Cost-Duration Graph
Level of Difficulty: 2 Medium

75. When crashing an activity, you always crash to its crash point.

FALSE

Crashing an activity increases direct costs. Just because you can, it may not be necessary to crash an activity to its crash point. One example of this would be if activities on other critical paths have already reached their crash point.

76. Crashing a more expensive activity may be wise if fewer inherent risks are involved.

    TRUE

    Crashing a more expensive activity may be wise if fewer inherent risks are involved.

77. Crashing frequently results in overallocation of resources.

    TRUE

    Crashing frequently results in overallocation of resources. The resources required to accelerate a cheaper activity may suddenly not be available.

78. Crashing can negatively impact the morale and motivation of the project team.

    TRUE

    The impact of crashing would have on the morale and motivation of the project team needs to be assessed. If the least-cost method repeatedly signals a subgroup to accelerate progress, fatigue and resentment may set in.

79. When reducing project duration, there will always be an optimum cost-time point where the total cost of the project is less than it was when the project was initially planned under normal conditions.

FALSE

When reducing project duration, if the savings for indirect costs are more than the increase in direct costs, there will be overall cost savings. However, if the savings for indirect cost are not enough to compensate for the increase in direct costs, the reduction in project duration will be more expensive.

80. The accuracy of crash times and costs is frequently rough at best, when compared with normal time and cost.

TRUE

Some estimators feel very uncomfortable providing crash times. Regardless of the comfort level, the accuracy of crash times and costs is frequently rough at best, when compared with normal time and cost.

81. One of the advantages of using a Project Cost-Duration Graph is that it keeps the importance of indirect costs in the forefront of decision making.

TRUE

The creation of such a graph keeps the importance of indirect costs in the forefront of decision making.

82. Identify and briefly describe three out of the six reasons given in the text for attempting to reduce the duration of a project.

Answer will vary

Feedback: (1) Imposed durations made by top management; (2) Market demands created by competition and rapid technology advances; (3) Incentive contracts that pay for early project completion; (4) Recovery of unforeseen project delays; (5) To reduce project costs by reducing charges created by high overhead costs; (6) To reassign key resources to other projects.

83. Why should a project manager be cautious when adding resources to reduce project duration?

Answer will vary

Feedback: There are limits as to how much speed can be gained by adding staff. Doubling the size of the workforce will not necessarily reduce completion time by half. Additional workers increase the communication requirements to coordinate efforts.

84. The easiest way to add more labor to a project is not to add more people, but to schedule overtime. What are the disadvantages of scheduling overtime?

Answer will vary

Feedback: First, hourly workers are typically paid at least time and a half for overtime, increasing project costs. Sustained overtime work by salaried employees may incur intangible costs such as divorce, burnout, and turnover. It is also an oversimplification to assume that, over an extended period of time, a person is as productive during his or her eleventh hour at work as during his or her third hour of work.

85. Why is the project duration with the lowest direct costs seldom the optimum duration for a project?

Answer will vary

Feedback: Indirect costs, those accumulating each day, will at some point outweigh the reduction in direct costs leading to an increase in total costs. The Project Cost-Duration graph is a model that demonstrates this.

86. Given an equal level of risk and the need to reduce overall project duration, why would you <u>NOT</u> select the activity with the least slope, in the entire project network, to crash first?

Answer will vary

Feedback: If it is not on the critical path crashing it will not reduce project duration.

87. What is crashing? Include a discussion of crash time and crash cost.

Answer will vary

Feedback: Crashing is shortening an activity's duration. Crash time is the shortest realistic time that an activity can be completed in. Crash costs are the total costs associated with the crash time.

88. How would you calculate an activity's slope and what does it represent?

Answer will vary

Feedback: An activity's slope is the cost per unit of time to reduce its duration. It is calculated by dividing the rise by the run.

89. Given that an activity's normal time and cost are 10 days and $400, respectively, and its crash time and cost are 5 days and $800, respectively, what is the activity's slope?

Answer will vary

Feedback: Crash cost per time unit equals the cost slope. Cost slope equals rise/run; therefore, (crash cost - normal cost)/(normal time - crash time) = ($800 - $400)/(10 - 5) = $80 per day.

90. What does it mean to say that a project network is *sensitive* and why is that important to a project manager who needs to reduce the duration of his or her project?

Answer will vary

Feedback: A network is sensitive if it has several critical or near-critical paths. This is important because any delays on the critical path will delay the project. If a PM is reducing project duration, and the project is already sensitive, crashing could make it even more sensitive and the likelihood that the project will be delayed would rise.

91.   How is the optimum cost-time point determined? What are the conditions that must exist for one to be present at a project duration other than the duration originally created under normal conditions?

Answer will vary

Feedback: The optimum cost-time point is the point in the project when total costs (direct costs + indirect costs) are the least. As a project duration is reduced, direct costs increase and indirect costs will decrease each time unit. The savings from indirect costs must be larger than the increase in direct costs in order for an optimum cost-point to be present at a duration other than the duration originally created under normal conditions.

AACSB: Analytic
Blooms: Analyze
Larson - Chapter 09 #91
Learning Objective: Constructing a Project Cost-Duration Graph
Level of Difficulty: 3 Hard

92.   When do you know you have crashed project activities enough? In other words, when you are crashing a project, how do you know you are finished?

Answer will vary

Feedback: When crashing, you will crash on all critical paths until all activities on at least one critical path have reached its crash point.

AACSB: Analytic
Blooms: Analyze
Larson - Chapter 09 #92
Learning Objective: Constructing a Project Cost-Duration Graph
Level of Difficulty: 3 Hard

93.   The cost-time crashing method relies on choosing the cheapest method for reducing the duration of the project. What are other factors that should be assessed beyond simply cost?

Answer will vary

Feedback: The inherent risks involved in crashing particular activities need to be considered, the timing of activities need to be considered, resource overallocation caused by crashing needs to be analyzed, and the impact crashing would have on the morale of the team needs to be taken into account.

AACSB: Reflective Thinking
Blooms: Understand
Larson - Chapter 09 #93
Learning Objective: Practical Considerations
Level of Difficulty: 3 Hard

94.   What if cost, not time, is the issue? What are some options available to project managers? Identify and briefly describe three.

Answer will vary

Feedback: Reduce project scope, have owner take on more responsibility, outsourcing, and brainstorm cost savings options.

Chapter 9 Summary

Category	# of Questions
AACSB: Analytic	10
AACSB: Reflective Thinking	84
Accessibility: Keyboard Navigation	57
Blooms: Analyze	3
Blooms: Apply	8
Blooms: Remember	8
Blooms: Understand	75
Larson - Chapter 09	94
Learning Objective: Constructing a Project Cost-Duration Graph	33
Learning Objective: Options for Accelerating Project Completion	15
Learning Objective: Options When Resources Are Not Constrained	1
Learning Objective: Practical Considerations	13
Learning Objective: Project Cost-Duration Graph	14
Learning Objective: Rationale for Reducing Project Duration	13
Learning Objective: Resource Allocation Methods	1
Learning Objective: What if Cost Not Time is the Issue?	4
Level of Difficulty: 1 Easy	39
Level of Difficulty: 2 Medium	47
Level of Difficulty: 3 Hard	8