Exam

Name_____

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

1) Some of the operations-related activities of TcheTche Café include designing meals and analyzing them for ingredient cost and labor requirements. 1) _____

2) The production process at TcheTche Café is limited to meal preparation and serving customers. 2) _____

3) All organizations, including service firms such as banks and hospitals, have a production function. 3) _____

4) Operations management is the set of activities that create value in the form of goods and services by transforming inputs into outputs. 4) _____

5) An example of a "hidden" production function is money transfers at banks. 5) _____

6) One reason to study operations management is to learn how people organize themselves for productive enterprise. 6) _____

7) The operations manager performs the management activities of planning, organizing, staffing, leading, and controlling of the OM function. 7) _____

8) "How much inventory of this item should we have?" is within the critical decision area of managing quality. 8) _____

9) In order to have a career in operations management, one must have a degree in statistics or quantitative methods. 9) _____

10) Customer interaction is often high for manufacturing processes, but low for services. 10) _____

11) Services are often difficult to standardize or automate. 11) _____

12) Manufacturing now constitutes the largest economic sector in postindustrial societies. 12) _____

13) The activities of the operations function are often very similar for both goods and services. 13) _____

14) Productivity is the total value of all inputs to the transformation process divided by the total value of the outputs produced. 14) _____

15) Measuring the impact of a capital acquisition on productivity is an example of multifactor productivity. 15) _____

16) A knowledge society is one that has migrated from work based on knowledge to one based on manual work. 16) _____

17) Ethical and social dilemmas arise because stakeholders of a business have conflicting perspectives. 17) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

18) At TcheTche Café, tasks that reflect operations or operations management include 18) _____
A) preparing employee schedules
B) analyzing meals for the cost of ingredients
C) testing meals (recipes)
D) designing meals
E) all of the above

19) An operations task performed at TcheTche Café is 19) _____
A) advertising changes in the restaurant menu
B) preparing employee schedules
C) borrowing funds to build a new restaurant
D) calculating restaurant profit and loss
E) all of the above

20) Operations management is applicable 20) _____
A) to the manufacturing sector exclusively
B) to all firms, whether manufacturing and service
C) mostly to the manufacturing sector
D) to services exclusively
E) mostly to the service sector

21) Which of the following are the primary functions of all organizations? 21) _____
A) operations, marketing, and human resources
B) marketing, human resources, and finance/accounting
C) research and development, finance/accounting, and purchasing
D) sales, quality control, and operations
E) marketing, operations, and finance/accounting

22) Budgeting, paying the bills, and collection of funds are activities associated with the 22) _____
A) control function
B) staffing function
C) management function
D) production/operations function
E) finance/accounting function

23) Which of the following would not be an operations function in a commercial bank? 23) _____
A) designing the layout of the facilities
B) maintenance
C) teller scheduling
D) advertising and promotion
E) security

24) The marketing function's main concern is with 24) _____
A) producing goods or providing services
B) securing monetary resources
C) building and maintaining a positive image
D) generating the demand for the organization's products or services
E) procuring materials, supplies, and equipment

25) Which of the following tasks within an Airline Company are related to Operations? 25) _____
A) International Monetary Exchange
B) crew scheduling
C) general ledger
D) pricing
E) advertising

26) Reasons to study Operations Management include 26) _____
A) studying why people organize themselves for productive enterprise
B) understanding what human resource managers do
C) knowing how goods and services are consumed
D) learning about a costly part of the enterprise
E) A and D

27) Reasons to study Operations Management include learning about 27) _____
A) what operations managers do
B) a costly part of the enterprise
C) why people organize themselves for productive enterprise
D) how goods and services are produced
E) all of the above

28) The five elements in the management process are 28) _____
A) plan, direct, update, lead, and supervise
B) plan, lead, organize, manage, and control
C) organize, plan, control, staff, and manage
D) plan, organize, staff, lead, and control
E) accounting/finance, marketing, operations, and management

29) Which of the following is not an element of the management process? 29) _____
A) controlling
B) staffing
C) pricing
D) leading
E) planning

30) An operations manager is not likely to be involved in 30) _____
A) maintenance schedules
B) the identification of customers' wants and needs
C) the quality of goods and services to satisfy customers' wants and needs
D) work scheduling to meet the due dates promised to customers
E) the design of goods and services to satisfy customers' wants and needs

31) All of the following decisions fall within the scope of operations management except for 31) _____
A) managing quality
B) financial analysis
C) design of goods and processes
D) process and capacity design
E) location of facilities

32) The Ten Critical Decisions of Operations Management include 32) _____
A) process and capacity design
B) managing quality
C) layout strategy
D) maintenance
E) all of the above

33) Which of the following is not one of The Ten Critical Decisions of Operations Management? 33) _____
A) process and capacity design
B) maintenance
C) mass customization
D) layout strategy
E) supply-chain management

34) The Ten Critical Decisions of Operations Management include 34) _____
A) process and capacity design
B) pricing
C) advertising
D) finance/accounting
E) all of the above

35) Which of the following are part of the Ten Critical Decisions of Operations Management? 35) _____
I. Design of goods and services
II. Managing Quality
III. Layout Strategy
IV. Marketing
V. Pricing of Goods and Services
A) II, III, V
B) I, II, V
C) I, II, IV
D) I, II, III
E) All of the above

36) The field of operations management is shaped by advances in which of the following fields? 36) _____
A) information technology
B) chemistry and physics
C) biology and anatomy
D) industrial engineering and management science
E) all of the above

37) Which of the following is the best example of a pure service? 37) _____
A) oil change
B) heart transplant
C) car sales
D) counseling
E) all of the above

38) Service companies comprise around what percentage of all Middle Eastern companies listed on the stock exchange? 38) _____
A) 40 percent B) 90 percent C) 55 percent D) 70 percent E) 12 percent

39) Typical differences between goods and services do not include 39) _____
A) knowledge content
B) cost per unit
C) timing of production and consumption
D) customer interaction
E) ability to inventory items

40) Which is not true regarding differences between goods and services? 40) _____
A) Goods tend to have higher customer interaction than services.
B) Services tend to be more knowledge-based than goods.
C) Services are generally produced and consumed simultaneously; tangible goods are not.
D) Services tend to have a more inconsistent product definition than goods.
E) None of the above is true.

41) Which of the following services is least likely to be unique, i.e., customized to a particular individual's needs? 41) _____
A) elementary education
B) legal services
C) dental care
D) hairdressing
E) computer consulting

42) Which of the following is not a typical service attribute? 42) _____
A) simultaneous production and consumption
B) intangible product
C) easy to store
D) difficult to resell
E) customer interaction is high

43) Which of the following statements contributing to the growth of services is true? 43) _____
A) In the Middle East there are fewer manufacturing companies than elsewhere in the world.
B) In the Middle East there are fewer service companies than elsewhere in the world.
C) Manufacturing still constitutes the largest economic sector in postindustrial societies
D) In the Middle East, service companies comprise around 30 percent of all listed companies in the stock exchanges.
E) All of the above are true.

44) Which of the following attributes is most typical of a service? 44) _____
A) mass production
B) tangible
C) easy to automate
D) consistency
E) production and consumption occur simultaneously

45) Which of the following is a similarity between goods and services? 45) _____
A) application of operations management
B) consistency
C) automation
D) mass production
E) all of the above

46) Current trends in operations management include all of the following except 46) _____
A) empowered employees
B) mass customization
C) supply chain separation
D) just-in-time performance
E) rapid product development

47) Illiteracy and poor diets have been known to cost countries up to what percent of their productivity? 47) _____
A) 50 percent B) 5 percent C) 10 percent D) 2 percent E) 20 percent

48) Which of the following statements about trends in operations management is false? 48) _____
A) Job specialization is giving way to empowered employees.
B) Mass customization is a response to cater for the individual needs of customers.
C) Environmentally-sensitive production is giving way to low-cost focus.
D) Rapid product development is partly the result of shorter product cycles.
E) Local or national focus is giving way to global focus.

49) A foundry produces circular utility access hatches (manhole covers). If 120 covers are produced in a 10-hour shift, the productivity of the line is 49) _____
A) 2 covers/hr
B) 1.2 covers/hr
C) 1200 covers/hr
D) 12 covers/hr
E) none of the above

50) A foundry produces circular utility access hatches (manhole covers). Currently, 120 covers are produced in a 10-hour shift. If labor productivity can be increased by 20 percent, it would then be 50) _____
A) 240 valves/hr
B) 1200 covers/hr
C) 14.4 covers/hr
D) 24 covers/hr
E) none of the above

51) Doha Valves produces cast bronze valves on an assembly line. If 1600 valves are produced in an 8-hour shift, the productivity of the line is 51) _____
A) 20 valves/hr
B) 200 valves/hr
C) 40 valves/hr
D) 1600 valves/hr
E) 80 valves/hr

52) Doha Valves produces cast bronze valves on an assembly line, currently producing 1600 valves each 8-hour shift. If the productivity is increased by 10 percent, it would then be 52) _____
A) 880 valves/hr
B) 200 valves/hr
C) 220 valves/hr
D) 180 valves/hr
E) 1760 valves/hr

53) Doha Valves produces cast bronze valves on an assembly line, currently producing 1600 valves per shift. If the production is increased to 2000 valves per shift, labor productivity will increase by 53) _____
A) 20 percent B) 50 percent C) 40 percent D) 10 percent E) 25 percent

54) The Alexandria Box plant produces 500 cypress packing boxes in two 10-hour shifts. What is the productivity of the plant? 54) _____
A) 25 boxes/hr
B) 5000 boxes/hr
C) 50 boxes/hr
D) none of the above
E) not enough data to determine productivity

55) The Alexandria Box plant works two 8-hour shifts each day. In the past, 500 cypress packing boxes were produced by the end of each day. The use of new technology has enabled them to increase productivity by 30 percent. Productivity is now approximately 55) _____
A) 81.25 boxes/hr
B) 300 boxes/hr
C) 32.5 boxes/hr
D) 40.6 boxes/hr
E) 62.5 boxes/hr

56) The Alexandria Box plant produces 500 cypress packing boxes in two 10-hour shifts. Due to higher demand, they have decided to operate three 8-hour shifts instead. They are now able to produce 600 boxes per day. What has happened to production? 56) _____
A) It has increased by 50 sets/shift.
B) It has decreased by 8.3 percent.
C) It has decreased by 9.1 percent.
D) It has increased by 20 percent.
E) It has increased by 37.5 sets/hr.

57) Productivity measurement is complicated by 57) _____
A) the fact that precise units of measure are often unavailable
B) the competition's output
C) the workforce size
D) the type of equipment used
E) stable quality

58) The total of all outputs produced by the transformation process divided by the total of the inputs is 58) _____
A) defined only for manufacturing firms
B) utilization
C) greater in manufacturing than in services
D) multifactor productivity
E) none of the above

59) Which of the following inputs has the greatest potential to increase productivity? 59) _____
A) management
B) labor
C) capital
D) globalization
E) none of the above

60) Productivity can be improved by 60) _____
A) decreasing outputs while holding inputs steady
B) increasing inputs while holding outputs steady
C) decreasing inputs while holding outputs steady
D) increasing inputs and outputs in the same proportion
E) none of the above

61) Which of the following nets the largest productivity improvement? 61) _____
A) increase both output and input by 5 percent
B) increase output 10 percent, decrease input 3 percent
C) decrease input 10 percent, increase output 3 percent
D) increase output 15 percent
E) decrease input 15 percent

62) The largest contributor to productivity increases is _____, estimated to be responsible for _____ of the annual increase. 62) _____
A) labor; two-thirds
B) technology; over one-half
C) management; over one-half
D) capital; 90 percent
E) Mr. Hassan; one-half

63) Which of the following is not true when explaining why productivity tends to be lower in the service sector than in the manufacturing sector? 63) _____
A) Services are often difficult to evaluate for quality.
B) Services are difficult to automate.
C) Services are typically labor-intensive.
D) Services are often an intellectual task performed by professionals.
E) Service operations are typically capital intensive.

64) Three commonly used productivity variables are 64) _____
A) quality, external elements, and precise units of measure
B) labor, capital, and management
C) quality, efficiency, and low cost
D) education, diet, and social overhead
E) technology, raw materials, and labor

65) The service sector has lower productivity improvements than the manufacturing sector because 65) _____
A) service sector productivity is hard to measure
B) the service sector uses less skilled labor than manufacturing
C) services usually are labor-intensive
D) the quality of output is lower in services than manufacturing
E) none of the above

66) Firm A operates 10 hours each day, producing 100 parts/hour. If productivity were increased 20 percent, how many hours would the plant have to work to produce 1000 parts? 66) _____
A) between 6 and 8 hours
B) between 8 and 9 hours
C) between 9 and 10 hours
D) less than 2 hours
E) between 2 and 6 hours

67) A cleaning company uses 10 mls each of chemicals A, B and C for each house it cleans. After some quality complaints, the company has decided to increase its use of chemical A by an additional 10 mls for each house. By what percent has productivity (houses per pound of chemical) fallen? 67) _____
A) 10 percent B) 0 percent C) 33 percent D) 25 percent E) 15 percent

68) A cleaning company uses US$10 of chemicals, US$40 of labor, and US$5 of misc. expenses for each house it cleans. After some quality complaints, the company has decided to increase its use of chemicals by 50 percent. By what percent has multifactor productivity fallen? 68) _____
A) 0 percent
B) 50 percent
C) 25 percent
D) 8.3 percent
E) none of the above or unable to determine

69) Among the ethical and social challenges facing operations managers are 69) _____
A) maintaining a clean environment
B) honoring stakeholder commitments
C) providing a safe workplace
D) efficiently developing and producing safe quality products
E) all of the above

70) Which of the following is not among the ethical and social challenges facing operations managers? 70) _____
A) providing a safe workplace
B) honoring stakeholder commitments
C) increasing executive pay
D) efficiently developing and producing safe quality products
E) maintaining a clean environment

71) A business's stakeholders, whose conflicting perspectives cause ethical and social dilemmas, include 71) _____
A) suppliers
B) employees
C) the community
D) owners
E) all of the above

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

72) Starbucks stopped requiring signatures on credit-card purchases under $25 in an attempt to reduce _____. 72) _____

73) _____ is the set of activities that transforms inputs into goods and services. 73) _____

74) Marketing, production, and _____ are the three functions that all organizations must perform to create goods and services. 74) _____

75) "Should we make or buy this component?" is an issue in the _____ critical decision area. 75) _____

76) When a tangible product is not included in a service, such as with counseling, it is called a _____. 76) _____

77) _____ is the ability of the organization to be flexible enough to cater to the individual whims of consumers. 77) _____

78) _____ is the operations management trend that moves more decision making to the individual worker. 78) _____

79) _____ is the total of all outputs produced by the transformation process divided by the total of the inputs. 79) _____

80) Productivity is the ratio of _____ to _____. Using this relationship, productivity can be improved by _____ or _____. 80) _____

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

81) Identify three or more operations-related tasks carried out by TcheTche Café.

82) Identify two operations-related tasks carried out by TcheTche Café. Match each to its area of the Ten Critical Decisions.

83) Define operations management. Will your definition accommodate both manufacturing and service operations?

84) Operations managers should be well versed in what disciplines in order to make good decisions?

85) Why are services typically more difficult to standardize, automate, and make efficient?

86) How do services differ from goods? Identify five ways.

87) Services are often knowledge-based. Provide two examples, and explain why they are knowledge-based.

88) Why are organizations changing from batch (large) shipments to just-in-time (JIT) shipments?

89) Why are organizations becoming more global?

90) Identify the three productivity variables used in the text.

91) What is a knowledge society?

92) Why are operations managers faced with ethical and social challenges?

93) What are some of the ethical and social challenges faced by operations managers?

94) What are some of the new trends in operations management?

95) In what way can production be more environmentally sensitive?

96) As the administrative manager in a law office, you have been asked to develop a system for evaluating the productivity of the 15 lawyers in the office. What difficulties are you going to have in doing this, and how are you going to overcome them?

97) Suha works part-time producing ornaments for resale at local markets, fairs and bazaars. She currently works 8 hours per day to produce 16 ornaments.
   a. What is her productivity?
   b. She thinks that by redesigning the ornaments and switching from use of a wood glue to a hot-glue gun she can increase her total production to 20 ornaments per day. What is her new productivity?
   c. What is her percentage increase in productivity?

98) A firm cleans chemical tank cars in the Muscat area. With standard equipment, the firm typically cleaned 70 chemical tank cars per month. They utilized 10 gallons of solvent, and two employees worked 20 days per month, 8 hours a day. The company decided to switch to a larger cleaning machine. Last April, they cleaned 60 tank cars in only 15 days. They utilized 12 gallons of solvent, and the two employees worked 6 hours a day.
   a. What was their raw material and their labor productivity with the standard equipment?
   b. What is their raw material and their labor productivity with the larger machine?
   c. What is the change in each productivity measure?

99) The Alexandria Box plant produces wooden packing boxes to be used in the local seafood industry. Current operations allow the company to make 500 boxes per day, in two 8-hour shifts (250 boxes per shift). The company has introduced some small changes in equipment, and conducted appropriate job training, so that production levels have risen to 300 boxes per shift. These changes did not require any change in the amount of capital spending or energy use. What is the firm's new labor productivity?

100) Ahmed's Ceramics spent $4000 on a new kiln last year in the belief that it would cut energy usage 25 percent over the old kiln. This kiln is an oven that turns "greenware" into finished pottery. Ahmed is concerned that the new kiln requires extra labor hours for its operation. Ahmed wants to check the energy savings of the new oven, and also to look over other measures of their productivity to see if the change really was beneficial. Ahmed has the following data to work with:

	Last Year	This Year
Production (finished units)	4000	4000
Greenware (pounds)	5000	5000
Labor (hrs)	350	375
Capital ($)	15000	19000
Energy (kWh)	3000	2600

Were the modifications beneficial?

101) Asfour Manufacturing has implemented several programs to improve its productivity. They have asked you to evaluate the firm's productivity by comparing this year's performance with last year's. The following data are available:

	Last Year	This Year
Output	10,500 units	12,100 units
Labor Hours	12,000	13,200
Utilities	$7,600	$8,250
Capital	$83,000	$88,000

Has Asfour Manufacturing improved its productivity during the past year?

102) Rami grows cucumbers in his 100 by 100 foot garden. He then sells the crop at the local farmers' market. Two summers ago, he was able to produce and sell 1200 pounds of cucumbers. Last summer, he tried a new fertilizer that promised a 50 percent increase in yield. He harvested 1900 pounds. Did the fertilizer live up to its promise?

103) The Mediterranean Shoe Company produces children's shoes. Current operations allow the company to make 500 pair of shoes per day, in two 8-hour shifts (250 pairs per shift). The company has introduced some moderate changes in equipment, and conducted appropriate job training, so that production levels have risen to 300 pairs per shift. Labor costs average US$10 per hour for each of the 5 full-time workers on each shift. Capital costs were previously US$3,000 per day, and rose to US$3,200 per day with the equipment modifications. Energy costs were unchanged by the modifications, at US$400 per day. What is the firm's multifactor productivity before and after the changes?

104) Gibson Products produces cast bronze valves for use in offshore oil platforms. Currently, Gibson produces 1600 valves per day. The 20 workers at Gibson work from 7 a.m. until 4 p.m., with 30 minutes off for lunch and a 15 minute break during the morning work session and another at the afternoon work session. Gibson is in a competitive industry, and needs to increase productivity to stay competitive. They feel that a 20 percent increase is needed.

Gibson's management believes that the 20 percent increase will not be possible without a change in working conditions, so they change work hours. The new schedule calls on workers to work from 7:30 a.m. until 4:30 p.m., during which workers can take one hour off at any time of their choosing. Obviously, the number of paid hours is the same as before, but production increases, perhaps because workers are given a bit more control over their workday. After this change, valve production increased to 1800 units per day.

a. Calculate labor productivity for the initial situation
b. Calculate labor productivity for the hypothetical 20 percent increase
c. What is the productivity after the change in work rules?
d. Write a short paragraph analyzing these results.

105) A local university is considering changes to its class structure in an effort to increase professor productivity. The old schedule had each professor teaching 5 classes per week, with each class meeting an hour per day on Sunday, Tuesday, and Thursday. Each class contained 20 students. The new schedule has each professor teaching only 3 classes, but each class meets daily for an hour. New classes contain 50 students.
   a. Calculate the labor productivity for the initial situation (students/hour).
   b. Calculate the labor productivity for the schedule change (students/hour).
   c. Are there any ethical considerations that should be accounted for?
   d. Suppose that each teacher also is required to have 2 hours of Office Hours each day he/she taught class. Is the schedule change a productivity increase?

106) A grocery chain is considering the installation of a set of 4 self-checkout lanes. The new self-checkout lane setup will replace 2 old cashier lanes that were staffed by a cashier and bagger on each lane. One cashier mans all 4 self-checkouts (answering questions, checking for un-scanned items, taking coupons, etc). Checkout on the new lanes takes 2 minutes (customers bag their own orders) while checkout with the old lanes took only 45 seconds. In addition the electricity costs for both setups are US$.05 per checkout while bagging (material) costs are US$.1 per checkout with the old system and US$.15 for the new system. The new lanes also require $100 in capital costs. Assume that the lanes are always in use for 8 hours per day (1 shift) and that a worker makes US$10/hour.
   a. How many checkouts did the old system provide in a shift?
   b. How many checkouts does the new system provide?
   c. What is the multifactor productivity for each system?

107) A swimming pool company has 100,000 labor hours available per summer and with a labor productivity of 5 pools per 6,000 hours.
   a. How many pools can the company install this summer?
   b. Suppose the multifactor productivity was one pool per $25,000. How much should the company expect to spend this summer constructing the pools?

108) An industrial plant needs to make 100,000 parts per month to meet demand. Each month contains 20 working days, each of which allows for 3 separate 8 hour shifts.
   a. If a worker can produce 10 parts/hour, how many workers are needed on each shift?
   b. If each shift has 100 workers, what is the productivity of an individual worker?
   c. If material costs are US$10/part, capital costs are US$100,000 and labor costs are US$10/hour, what is the multifactor productivity of the plant from part A?

109) The local fast food store experienced the following number of customers on the night shift:

Hour	Customers
12 AM	23
1 AM	20
2 AM	15
3 AM	5
4 AM	2
5 AM	1

If the store was staffed by two workers, what was the average productivity per worker, in customers/hour?

110) Noury Production is a small firm focused on the assembly and sale of custom computers. The firm is facing stiff competition from low-priced alternatives, and is looking at various solutions to remain competitive and profitable. Current financials for the firm are shown in the table below. In the first option, marketing will increase sales by 50 percent. The next option is Vendor (Supplier) changes, which would result in a decrease of 10 percent in the cost of inputs. Finally there is an OM option, which would reduce production costs 25 percent. Which of the options would you recommend to the firm if it can only pursue one option? In addition, comment on the feasibility of each option.

Business Function	Current Value
Cost of Inputs	US$50,000
Production Costs	US$25,000
Revenue	US$80,000

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

111) Trade zones and agreements, such as the GCC, aim to phase out trade and tariff barriers among member countries. 111) _____

112) The World Trade Organization has helped to significantly reduce tariffs around the world. 112) _____

113) Many business processes are being outsourced to take advantage of national differences in labor costs. 113) _____

114) The GCC seeks to phase out all trade and tariff barriers between the GCC countries and Algeria. 114) _____

115) One reason for global operations is to gain improvements in the supply chain. 115) _____

116) One reason to globalize is to learn to improve operations. 116) _____

117) To attract and retain global talent, and to expand a product's life cycle, are both reasons to globalize. 117) _____

118) A product will always be in the same stage of its product life cycle regardless of the country. 118) _____

119) The World Trade Organization helps provide governments and industries around the world with protection from firms that engage in unethical conduct. 119) _____

120) Emaar's development of the Burj Khalifa is an example of a company obtaining a competitive advantage through product differentiation/innovation. 120) _____

121) An organization's strategy is its purpose or rationale for its existence. 121) _____

122) Operations strategies are implemented in the same way in all types of organizations. 122) _____

123) Experience differentiation is an extension of product differentiation, accomplished by using people's five senses to create an experience rather than simply providing a service. 123) _____

124) An organization's ability to generate unique advantages over competitors is central to a successful strategy implementation. 124) _____

125) Low-cost leadership is the ability to distinguish the offerings of the organization in any way that the customer perceives as adding value. 125) _____

126) Most services are tangible; this factor determines how the ten decisions of operations management are handled differently for goods than for services. 126) _____

127) The relative importance of each of the ten operations decisions depends on the ratio of goods and services in an organization. 127) _____

128) Decisions that involve what is to be made and what is to be purchased fall under the heading of supply-chain management. 128) _____

129) Manufacturing organizations have ten strategic OM decisions, while service organizations have only eight. 129) _____

130) Errors made within the location decision area may overwhelm efficiencies in other areas. 130) _____

131) Southwest Airlines' core competence is operations. 131) _____

132) *Key success factors* and *core competencies* are synonyms. 132) _____

133) SWOT analysis identifies those activities that make a difference between having and not having a competitive advantage. 133) _____

134) For the greatest chance of success, an organization's operations management strategy must support the company's strategy. 134) _____

135) Key Success Factors are those activities that are key to achieving competitive advantage. 135) _____

136) A multinational corporation has extensive international business involvements. 136) _____

137) The multidomestic OM strategy maximizes local responsiveness while achieving a significant cost advantage. 137) _____

138) Firms using the global strategy can be thought of as "world companies." 138) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

139) Examples of response to the global environment include 139) _____

A) Boeing's worldwide sales and production
B) A Chinese manufacturer, Haier, opening plants in the United States
C) Ford's partnerships with Volvo and Mazda
D) Benneton's flexibility in design, production, and distribution
E) all of the above

140) Cost cutting in international operations can take place because of 140) _____
A) lower indirect labor costs
B) lower wage scales
C) lower taxes and tariffs
D) less stringent regulations
E) all of the above

141) Which of the following did the authors not suggest as a reason for globalizing operations? 141) _____
A) stockholder approval ratings
B) improve the supply chain
C) reduce costs
D) attract new markets
E) None of the above were suggested.

142) Which of the following represent reasons for globalizing operations? 142) _____
A) to attract and retain global talent
B) to gain improvements in the supply chain
C) to expand a product's life cycle
D) to improve operations
E) all of the above

143) Which of the following does not represent reasons for globalizing operations? 143) _____
A) attract and retain global talent
B) improve supply chain
C) reduce responsiveness
D) reduce costs
E) None of the above are valid reasons for globalizing operations.

144) With reference to cultural and ethical issues, the World Trade Organization has 144) _____
A) played little role in addressing cultural and ethical issues among nations
B) succeeded in providing equal protection of intellectual property among nations
C) made progress in providing equal protection of intellectual property among nations
D) eliminated slave labor and child labor
E) phased out all trade and tariff barriers between the United States and the Arab world

145) Which of the following is true about business strategies? 145) _____
A) Well defined missions make strategy development much easier.
B) An organization should stick with its strategy for the life of the business.
C) Strategies are formulated independently of SWOT analysis.
D) Organizational strategies depend on operations strategies.
E) All firms within an industry will adopt the same strategy.

146) Which of the following activities takes place once the mission has been developed? 146) _____
A) The firm develops alternative or back-up missions in case the original mission fails.
B) The functional areas develop their functional area strategies.
C) The ten OM decision areas are prioritized.
D) Operational tactics are developed.
E) The functional areas develop their supporting missions.

147) Which of the following statements about organizational missions is false? 147) _____
A) They reflect a company's purpose.
B) They indicate what a company intends to contribute to society.
C) They define a company's reason for existence.
D) They provide guidance for functional area missions.
E) They are formulated after strategies are known.

148) The impact of strategies on the general direction and basic character of a company is 148) _____
A) long range
B) minimal
C) medium range
D) temporal
E) short range

149) The fundamental purpose of an organization's mission statement is to 149) _____
A) generate good public relations for the organization
B) define the functional areas required by the organization
C) define the organization's purpose in society
D) define the operational structure of the organization
E) create a good human relations climate in the organization

150) Which of the following is true? 150) _____
A) Functional area missions are merged to become the organizational mission.
B) Functional strategies are shaped by corporate strategy.
C) Corporate mission is shaped by functional strategies.
D) External conditions are shaped by corporate mission.
E) Corporate strategy is shaped by functional strategies.

151) _____ and _____ are to differentiation competitive advantages as _____ and _____ are to response competitive advantages. (*See figure 2.3 in the textbook) 151) _____
A) Product; quality; maintenance; scheduling
B) Quality; maintenance; inventory; scheduling
C) Product; supply chain; layout; quality
D) Human resources; layout; scheduling; maintenance
E) Product; quality; location; process

152) Which of the following is least likely to be a cost leadership competitive advantage? 152) _____
A) effective capacity use
B) low overhead
C) mass production
D) inventory management
E) broad product line

153) According to the authors, which of the following strategic concepts allow firms to achieve their missions? 153) _____
A) differentiation, cost leadership, and quick response
B) productivity, efficiency, and quality leadership
C) differentiation, quality leadership, and quick response
D) distinctive competency, cost leadership, and experience
E) differentiation, distinctive competency, quality leadership, and capacity

154) A firm can effectively use its operations function to yield competitive advantage through all of the following except 154) _____
A) customization of the product
B) constant innovation of new products
C) speed of delivery
D) setting equipment utilization goals below the industry average
E) maintaining a variety of product options

155) Which of the following has progressed the furthest along its product life cycle? 155) _____
A) Twitter
B) iPhone
C) iPods
D) drive-thru restaurants
E) Xbox 360

156) Which of the following has made the least progress along its product life cycle? 156) _____
A) drive-thru restaurants
B) Boeing 787
C) Twitter
D) iPods
E) Xbox 360

157) The ability of an organization to produce goods or services that have some uniqueness in their characteristics is 157) _____
A) time-based competition
B) competing on differentiation
C) mass production
D) competing on productivity
E) competing on flexibility

158) A strategy is 158) _____
A) a simulation used to test various product line options
B) an action plan to achieve the mission
C) a set of opportunities in the marketplace
D) a broad statement of purpose
E) a plan for cost reduction

159) Which of the following statements best characterizes delivery reliability? 159) _____
A) a company that has a computerized delivery scheduling system
B) a company that always delivers on the same day of the week
C) a company that delivers faster than its competitors
D) a company that always delivers at the promised time
E) a company that delivers more frequently than its competitors

160) Which of the following is an example of competing on the basis of differentiation? 160) _____
A) A firm's products are introduced into the market faster than its competitors' products are.
B) A firm offers more reliable products than its competitors do.
C) A firm advertises more than its competitors do.
D) A firm's distribution network routinely delivers its product on time.
E) A firm manufactures its product with less raw material waste than its competitors do.

161) The ability of an organization to produce services that, by utilizing the consumer's five senses, have some uniqueness in their characteristics is 161) _____
A) mass production
B) flexible response
C) time-based competition
D) experience differentiation
E) differentiation

162) Which of the following best describes "experience differentiation"? 162) _____
A) complements physical elements with visual and sound elements
B) uses people's five senses to enhance the service
C) consumers may become active participants in the product or service
D) immerses consumers in the delivery of a service
E) All of the above are elements of experience differentiation.

163) Experience differentiation 163) _____
A) uses only the consumer's senses of vision and sound
B) isolates the consumer from the delivery of a service
C) is the same as product differentiation, but applied in the service sector
D) keeps consumers from becoming active participants in the service
E) is an extension of product differentiation in the service sector

164) Which of the following is the best example of competing on low-cost leadership? 164) _____
A) A firm produces its product with less raw material waste than its competitors.
B) A firm's research and development department generates many ideas for new products.
C) A firm advertises more than its competitors.
D) A firm offers more reliable products than its competitors.
E) A firm's products are introduced into the market faster than its competitors' products.

165) Which of the following is an example of competing on quick response? 165) _____
A) A firm's products are introduced into the market faster than its competitors' products.
B) A firm advertises more than its competitors.
C) A firm offers more reliable products than its competitors.
D) A firm produces its product with less raw material waste than its competitors.
E) A firm's research and development department generates many ideas for new products.

166) Costs, quality, and human resource decisions interact strongly with the _____ decision. 166) _____
A) goods and service design
B) process and capacity design
C) supply chain management
D) layout design
E) All of the above are correct.

167) Which of the following influences layout design? 167) _____
A) technology decisions
B) personnel levels
C) inventory requirements
D) capacity needs
E) All of the above influence layout decisions.

168) Response-based competitive advantage can be 168) _____
A) quick response
B) reliable response
C) flexible response
D) all of the above
E) none of the above

169) Which of the following is not an operations strategic decision? 169) _____
A) quality
B) price
C) inventory
D) maintenance
E) layout design

170) Which of the following OM strategic decisions pertains to sensible location of processes and materials in relation to each other? 170) _____
A) inventory
B) supply chain management
C) goods and service design
D) layout design
E) scheduling

171) Which of these organizations is most likely to have quality standards that are relatively subjective? 171) _____
A) Rubicon
B) University of Jordan
C) Alnasr Automobiles
D) Aramex
E) Maktoob

172) Which of the following will more likely locate near their customers? 172) _____
A) a medical clinic
B) an automobile manufacturer
C) an insurance company headquarters
D) an aluminum manufacturer
E) All of the above will tend to locate near their customers.

173) Which of the following statements concerning the operations management decision is relevant to services? 173) _____
A) The customer is not involved in most of the process.
B) There are many objective quality standards.
C) The work force's technical skills are very important.
D) Labor standards vary depending on customer requirements.
E) Ability to inventory may allow the leveling of the output rates.

174) Which of these organizations is likely to have the most important inventory decisions? 174) _____
A) a law firm
B) a lobbying agency
C) a marketing research firm
D) a management consulting firm
E) an aluminum manufacturer

175) Before establishing and implementing strategy, a resources view would ensure that which of the following resources are available: 175) _____
A) physical
B) financial
C) technological
D) human
E) all of the above

176) Porter's Five Forces Model is used to evaluate competition based on which five aspects? 176) _____
A) research and development, cost, legal regulations, suppliers, customers
B) potential entrants, customers, suppliers, legal regulations, and cost
C) immediate rivals, Potential entrants, customers, suppliers, and substitute products
D) immediate rivals, potential entrants, cost, substitute products, and legal regulations
E) none of the above

177) Porter's Five Forces Model contains which of the following? 177) _____
A) customers
B) potential entrants
C) immediate rivals
D) suppliers
E) all of the above

178) Value-chain analysis is used to identify activities that represent, or can develop into, the core competencies of a business. Who introduced this concept? 178) _____
A) Toyota
B) Ford
C) Porter
D) Smith
E) none of the above

179) Value-chain analysis can be used to determine if a business is adding unique value in which of the following areas? 179) _____
A) human resources
B) process innovation
C) product research
D) quality management
E) all of the above

180) Which of the following is not part of value-chain analysis? 180) _____
A) supply-chain management
B) product research
C) quality management
D) human resources
E) marketing

181) Which of the following environmental factors has not been a factor in Microsoft's changing strategy? 181) _____
A) security issues
B) Google
C) faster processors
D) the Internet
E) none of the above

182) Standardization is an appropriate strategy in which stage of the product life cycle? 182) _____
A) maturity
B) introduction
C) retirement
D) growth
E) decline

183) Cost minimization is an appropriate strategy in which stage of the product life cycle? 183) _____
A) decline
B) maturity
C) introduction
D) retirement
E) growth

184) The stage in the product life cycle at which it is a poor time to change quality is 184) _____
A) introduction
B) decline
C) growth
D) incubation
E) maturity

185) Which of the following changes does not result in strategy changes? 185) _____
A) change in the company's financial situation
B) change in job scheduling techniques
C) a company's adoption of new technology
D) change in the product life cycle
E) change in the competitive environment

186) Which of the following statements is most correct? 186) _____
A) KSFs are often sufficient, but not necessary for competitive advantage.
B) KSFs are both necessary and sufficient for competitive advantage.
C) KSFs are often necessary, but not sufficient for competitive advantage.
D) KSFs are neither necessary nor sufficient for competitive advantage.
E) None of the above statements is correct.

187) Given the position of the iPod in the growth stage of its life cycle, which of the following OM strategies/issues should the makers of iPods be least concerned with at the current time? 187) _____
A) enhancing distribution
B) forecasting
C) product and process reliability
D) increasing capacity
E) cost cutting

188) Which of these organizations is likely to have the most complex inventory decisions? 188) _____
A) a computer manufacturing company
B) a marketing research firm
C) a stock brokerage firm
D) a high school
E) a management consulting firm

189) The three steps of the operations manager's job, in order, are: 189) _____
A) develop the strategy, establish the organizational structure, find the right staff
B) establish the organizational structure, find the right staff, develop the strategy
C) find the right staff, establish the organizational structure, develop the strategy
D) find the right staff, develop the strategy, establish the organizational structure
E) develop the strategy, find the right staff, establish the organizational structure

190) When developing the operations strategy for a new manufacturing organization, one of the most important considerations is that it 190) _____
A) utilizes an equal balance of labor and automation
B) utilizes as much automation as possible
C) supports the overall competitive strategy of the company
D) requires minimal capital investment
E) none of the above

191) Which of the international operations strategies involves high cost reductions and high local responsiveness? 191) _____
A) international strategy
B) global strategy
C) transnational strategy
D) multidomestic strategy
E) none of the above

192) Which of the international operations strategies involves low cost reductions and low local responsiveness? 192) _____
A) international strategy
B) global strategy
C) transnational strategy
D) multidomestic strategy
E) none of the above

193) Which of the international operations strategies uses import/export or licensing of existing products? 193) _____
A) international strategy
B) global strategy
C) transnational strategy
D) multidomestic strategy
E) none of the above

194) Which of the international operations strategies uses the existing domestic model globally? 194) _____
A) international strategy
B) global strategy
C) transnational strategy
D) multidomestic strategy
E) none of the above

195) The acronym MNC stands for 195) _____
A) Multinational Corporation
B) Mexican National Committee (for international trade)
C) Maytag-Nestlé Corporation
D) Maquiladora Negates Competition
E) none of the above

196) Aramex and Al Zamil Group are two firms that have benefited from the use of 196) _____
A) the multinational corporation strategy
B) the transnational strategy option
C) the maquiladora system in Europe
D) the global strategy option
E) the multidomestic strategy option

197) Which of the following are examples of transnational firms? 197) _____
A) Emaar
B) Jordan Cement
C) Aramex
D) Al-Jazeera News Network
E) All of the above are transnationals.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

198) _____ and _____ are two issues where significant cultural differences are large and progress toward global uniformity has been slow. 198) _____

199) An organization that has worked to achieve global uniformity in cultural and ethical issues such as bribery, child labor, and environmental regulations is _____. 199) _____

200) In goods-producing organizations, _____, _____, and _____ may be inventoried. 200) _____

201) Strategy is not static, but dynamic because of changes in the _____ and _____. 201) _____

202) _____ is the stage in product life cycle at which it is a poor time to change quality. 202) _____

203) The _____ is how an organization expects to achieve its missions and goals. 203) _____

204) The creation of a unique advantage over competitors is called a _____. 204) _____

205) Service organizations can immerse the consumer in the service, or have the consumer become a participant in the service, as they practice _____. 205) _____

206) Competitive advantage in operations can be achieved by _____, _____, and/or _____. 206) _____

207) A(n) _____ is a firm that has extensive involvement in international business, owning or controlling facilities in more than one country. 207) _____

208) The _____ strategy utilizes a standardized product across countries. 208) _____

209) The _____ strategy uses exports and licenses to penetrate globally. 209) _____

210) The _____ strategy uses subsidiaries, franchises, or joint ventures with substantial independence. 210) _____

211) The _____ strategy describes a condition in which material, people, and ideas cross or transgress national boundaries. 211) _____

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

212) How can global operations improve the supply chain?

213) How do global operations attract new markets?

214) State two examples of cultural and ethical issues that face operations managers in a global environment.

215) What is the difference between a firm's mission and its strategy?

216) Since the early 1990s, residents in a number of developing countries have overcome culture, religious, ethnic, and political productivity barriers. These disappearing barriers coupled with simultaneous advances in technology, reliable shipping, and cheap communication have all led to the growth of what three things?

217) Provide an example of an organization that achieves competitive advantage through experience differentiation. Explain.

218) With regard to the scheduling decision, how are goods-producing organizations different from service companies? Discuss.

219) How do goods and services differ with regard to handling the quality decision?

220) What is the difference between goods and services in terms of their location selection?

221) Define *core competencies*.

222) For what type of organization might the location decision area be the least important of its ten decision areas? For what type of organization might the location decision be the most important of the ten decision areas? Discuss; augment your response with examples.

223) What is SWOT analysis? List its four elements and describe its purpose.

224) Are strategies static or dynamic? What are the forces that lead to this result?

225) Identify and explain the four basic global operations strategies. Give an example of a company using each strategy.

226) Nike is the world's largest athletic brand. Its innovative and broad product line helps drive sales, however a large majority of those sales are in the footwear business. Most of Nike's goods are produced overseas in low-cost factories and then imported to the final market. Nike currently has many of the top U.S. athletes under contract (Michael Jordan, Tiger Woods) but international sales are still small in emerging markets. However, many competitors have attempted to copy Nike's business model (high-value branded products manufactured at low-cost), including Adidas and Reebok, while many retailers have attempted to pass on the low-cost pressure of retail consumers. Perform a SWOT analysis for Nike.

227) Starbucks is one of the best known coffeehouse chains in the world. Each store sells a variety of innovative products to complement the array of coffee choices available. However, 75 percent of current stores are located in the United States and the expensive nature of the coffee leaves Starbucks vulnerable to changes in consumer spending behavior (such as recessions). Recently Starbucks has begun initiatives to sell its specialty coffee beans for home use, presenting a chance for a large increase in revenue and diversification. However, Starbucks faces fierce competition seeking a piece of its lucrative market share and the threat of consumer behavior changes, given its reputation rides on a singular product. Perform a SWOT analysis for Starbucks.

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

228) One phase of a large project is scheduling. 228) _____

229) A project organization works best for an organization when the project resides in only one of its functional areas. 229) _____

230) By their very nature, projects have a limited lifetime, and that sets project management apart from the management of more traditional activities. 230) _____

231) One responsibility of a project manager is to make sure that the project meets its quality goals. 231) _____

232) Work breakdown structure is a useful tool in project management because it addresses the timing of individual work elements. 232) _____

233) There are many institutes that provide guidelines and ethical codes to try to establish standards for project managers to follow, for example the Project Management Institute. 233) _____

234) Ethical issues which can arise in projects include gifts from contractors, pressure to mask delays with false status reports, and pressure to compromise project quality for cost or time savings. 234) _____

235) Gantt charts give a timeline for each of a project's activities, but do not adequately show the interrelationships of activities. 235) _____

236) PERT, but not CPM, has the ability to consider the precedence relationships in a project. 236) _____

237) The shortest of all paths through the network is the critical path. 237) _____

238) The fundamental difference between PERT and CPM is that PERT uses the beta distribution for crashing projects while CPM uses cost estimates. 238) _____

239) The ES of an activity that has only one predecessor is simply the EF of that predecessor. 239) _____

240) Slack is the amount of time an activity can be delayed without delaying the entire project. 240) _____

241) Every network has at least one critical path. 241) _____

242) The critical path can be determined by use of either the "forward pass" or the "backward pass." 242) _____

243) The PERT pessimistic time estimate is an estimate of the minimum time an activity will require. 243) _____

244) The standard deviation of project duration is the average of the standard deviation of all activities on the critical path. 244) _____

245) In PERT analysis, the identification of the critical path can be incorrect if a noncritical activity takes substantially more than its expected time. 245) _____

246) Shortening the project's duration by deleting unnecessary activities is called "project crashing." 246) _____

247) In project management, crashing an activity must consider the impact on all paths in the network. 247) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

248) The phases of project management are 248) _____
A) planning, programming, and budgeting
B) GANTT, CPM, and PERT
C) planning, organizing, staffing, leading, and controlling
D) planning, scheduling, and controlling
E) different for manufacturing projects than for service projects

249) Which of the following is not one of the three phases of project management? 249) _____
A) scheduling
B) planning
C) controlling
D) All of the above are project management phases.
E) Both A and C are not project management phases.

250) A project organization 250) _____
A) is effective for companies with multiple large projects
B) is appropriate only in construction firms
C) often fails when the project cuts across organizational lines
D) is formed to ensure that programs (projects) get proper management and attention
E) A and D are both true

251) Which of the following statements regarding project management is false? 251) _____
A) A project organization works best for a project that is temporary but critical to the organization.
B) Gantt charts give a timeline for each of a project's activities, but do not adequately show the interrelationships of activities.
C) Gantt charts and PERT/CPM are never used together.
D) Project organization works well when the work contains simple, independent tasks.
E) None of the above is true.

252) A code of ethics especially for project managers 252) _____
A) has been formulated by the World Trade Organization
B) does not exist at this time
C) has been formulated by every government in the Arab region
D) is inappropriate, since everyone should use the same guidance on ethical issues
E) has been established by the Project Management Institute

253) Ethical issues that may arise in projects large and small include 253) _____
A) exaggerated expense reports
B) compromised safety or health standards to save time or reduce costs
C) gifts from contractors
D) pressure to mask delays with false status reports
E) all of the above

254) The project organization works best when which of the following conditions are satisfied? 254) _____
I. Work can be defined with a specific goal and deadline.
II. The job is typical and familiar to the existing organization.
III. The work contains interrelated tasks requiring specialized skills
IV. The project is temporary but unimportant to long-term organizational success
V. The project cuts across organizational lines.
A) I, II, III, V
B) None of the above conditions need to be satisfied
C) I, II, III, IV, V
D) I, III, IV, V
E) I, III, V

255) A project organization that becomes permanent is often referred to as a _____. 255) _____
A) matrix organization
B) normal organization
C) fixed project organization
D) standard organization
E) none of the above

256) WBS stands for which of the following project management tools? 256) _____
A) Work Break Schedule
B) Work Breakdown Schedule
C) Work Breakdown Structure
D) Work Breakdown Status
E) None of the above

257) From Figure 3.3, match the following steps in Microsoft's development of Windows 7 to their respective WBS level. 257) _____

Step	Level
Develop Windows 7 OS	?
System Testing	?
Compatible with Windows XP	?
Develop GUI's	?
Module Testing	?

A) Level 1, Level 2, Level 4, Level 3, Level 3
B) Level 0, Level 2, Level 2, Level 3, Level 3
C) Level 1, Level 2, Level 3, Level 4, Level 5
D) Level 0, Level 1, Level 2, Level 3, Level 4
E) None of the above patterns is correct.

258) Which of the following statements regarding Gantt charts is true? 258) _____
A) Gantt charts use the four standard spines of Methods, Materials, Manpower, and Machinery.
B) Gantt charts give a timeline and precedence relationships for each activity of a project.
C) Gantt charts are visual devices that show the duration of activities in a project.
D) Gantt charts are expensive.
E) All of the above are true.

259) The main difference between PERT and CPM is that 259) _____
A) PERT ignores activity costs
B) PERT is more accurate than CPM
C) CRM assumes activity durations can vary
D) PERT assumes that activity durations are known
E) None of the above are true

260) A project manager is interested in crashing a project with variable activity times. Which of the following tools should he/she employ? 260) _____
A) CPM
B) PERT
C) PERT, CPM, or a Gantt chart are fine
D) either PERT or CPM
E) Gantt Chart

261) The difference between AON and AOA networks is that 261) _____
A) both are acceptable in practice, however Microsoft Project uses AON
B) AOA networks sometimes require dummy nodes
C) in AON nodes designate activities, in AOA arrows designate activities
D) nodes consume no resources or time in AOA networks
E) All of the above are true.

262) Which of the following statements regarding critical paths is true? 262) _____
A) The duration of the critical path is the average duration of all paths in the project network.
B) The shortest of all paths through the network is the critical path.
C) On a specific project, there can be multiple critical paths, all with exactly the same duration.
D) Every network has only one critical path.
E) Some activities on the critical path may have slack.

263) Which of the following statements regarding CPM is true? 263) _____
A) Some networks have no critical path.
B) The critical path is the shortest of all paths through the network.
C) The critical path is that set of activities that has positive slack.
D) All activities on the critical path have their LS equal their predecessor's EF.
E) All of the above are false.

264) A simple CPM network has three activities, A, B, and C. A is an immediate predecessor of B and of C. B is an immediate predecessor of C. The activity durations are A=4, B=3, C=8. 264) _____
A) The critical path is A-B-C, duration 13.5
B) The critical path is A-B-C, duration 15.
C) The critical path is A-C, duration 12.
D) The critical path cannot be determined without knowing PERT expected activity times.
E) The network has no critical path.

265) A simple CPM network has three activities, D, E, and F. D is an immediate predecessor of E and of F. E is an immediate predecessor of F. The activity durations are D=4, E=3, F=8. 265) _____
A) The critical path is D-F, duration 12.
B) The critical path is D-E-F, duration 15.
C) Slack at D is 3 units.
D) Slack at E is 3 units.
E) Both A and C are true.

266) A simple CPM network has five activities, A, B, C, D, and E. A is an immediate predecessor of C and of D. B is also an immediate predecessor of C and of D. C and D are both immediate predecessors of E. 266) _____
A) There are five paths in this network.
B) There are four paths in this network.
C) There are two paths in this network.
D) There are 25 paths through this network.
E) None of these statements is true.

267) Activity D on a CPM network has predecessors B and C, and has successor F. D has duration 6. B's earliest finish is 18, while C's is 20. F's late start is 26. Which of the following is true? 267) _____
A) B is a critical activity.
B) D has no slack but is not critical.
C) D is critical, and has zero slack.
D) C is completed before B.
E) All of the above are true.

268) Which of the following statements regarding CPM networks is true? 268) _____
A) There can be multiple critical paths on the same project, all with different durations.
B) The early finish of an activity is the latest early start of all preceding activities.
C) If a specific project has multiple critical paths, all of them will have the same duration.
D) The late start of an activity is its late finish plus its duration.
E) All of the above are true.

269) Activity R on a CPM network has predecessors M and N, and has successor S. R has duration 5. N's late finish is 18, while M's is 20. S's late start is 14. Which of the following is true? 269) _____

A) N is a critical activity.
B) The last start time of S is impossible.
C) R has no slack but is not critical.
D) R is critical and has zero slack.
E) S is a critical activity.

270) Which of the following statements concerning CPM activities is false? 270) _____

A) The early start of an activity is the latest early finish of all preceding activities.
B) The late finish of an activity is the earliest late start of all preceding activities.
C) The early finish of an activity is the early start of that activity plus its duration.
D) The late finish is the earliest of the late start times of all successor activities.
E) The late start of an activity is its late finish less its duration.

271) The time an activity will take assuming very unfavorable conditions is 271) _____

A) the pessimistic time
B) the activity variance
C) exactly twice as long as the expected time
D) the minimum time
E) the optimistic time

272) The critical path for the network activities shown below is _____ with duration _____. 272) _____

Activity	Duration	Immediate Predecessors
A	4	- - -
B	2	A
C	7	- -
D	4	A
E	5	B,C,D

A) C-E; 12
B) A-B-E; 11
C) A-B-C-D-E; 22
D) A-B-D; 10
E) A-D-E; 13

273) The critical path for the network activities shown below is _____ with duration _____. 273) _____

Activity	Duration	Immediate Predecessors
A	2	- -
B	4	- -
C	6	A,B
D	1	A,B
E	2	B,C,D

A) A-C-E; 10
B) B-E; 6
C) B-C-E; 12
D) A-D-E; 5
E) B-D-E; 7

274) The _____ distribution is used by PERT analysis to calculate expected activity times and variances. 274) _____

A) Binomial B) Alpha C) Beta D) Normal E) Gaussian

275) The expected activity time in PERT analysis is calculated as 275) _____

A) the simple average of the optimistic, pessimistic, and most likely times
B) the sum of the activity variances, divided by six
C) the weighted average of a, m, and b, with m weighted 4 times as heavily as a and b
D) the sum of the optimistic, pessimistic, and most likely times
E) the sum of the optimistic, pessimistic, and most likely times, divided by six

276) The critical path for the network activities shown below is _____ with duration _____. 276) _____

Activity	Duration	Immediate Predecessors
A	10	- - -
B	8	- - -
C	2	A
D	4	A
E	5	B,C, D

A) A-B-C-D-E; 29
B) A-C; 12
C) A-D-E; 19
D) B-E; 13
E) none of the above

277) Which of the following statements regarding PERT times is true? 277) _____

A) Most likely time estimate is an estimate of the maximum time an activity will require.
B) The optimistic time estimate is an estimate of the maximum time an activity will require.
C) The probable time estimate is calculated as t = (a + 4m + b).
D) Pessimistic time estimate is an estimate of the minimum time an activity will require.
E) The optimistic time estimate is an estimate of the minimum time an activity will require.

278) Which of the following statements regarding PERT times is true? 278) _____
A) The optimistic time estimate is an estimate of the maximum time an activity will require.
B) Expected time is an estimate of the time an activity will require if everything goes as planned.
C) Pessimistic time estimate is an estimate of the minimum time an activity will require.
D) The probable time estimate is calculated as t = (a + 4m + b)/6.
E) Most likely time estimate is an estimate of the maximum time an activity will require.

279) The Beta distribution is used in project management to 279) _____
A) calculate the probability that a project will be completed within its budget
B) calculate pessimistic and optimistic activity times
C) determine which activity should be crashed
D) calculate slack on activities not on the critical path
E) none of the above

280) The Beta distribution is used in project management to 280) _____
A) calculate the probability that a project will be completed within its budget
B) calculate slack for activities on the critical path
C) calculate expected activity times
D) determine which activity should be crashed
E) none of the above

281) In a PERT network, non-critical activities that have little slack need to be monitored closely 281) _____
A) because slack is undesirable and needs to be eliminated
B) because they have a high risk of not being completed
C) because PERT treats all activities as equally important
D) because they are causing the entire project to be delayed
E) because near-critical paths could become critical paths with small delays in these activities

282) Which of the following statements regarding PERT analysis is true? 282) _____
A) Only critical activities contribute to the project variance.
B) Project standard deviation is the sum of all critical activity standard deviations.
C) Project variance is the sum of all activity variances.
D) Each activity has two estimates of its duration.
E) None of the above is true.

283) A project being analyzed by PERT has 60 activities, 13 of which are on the critical path. If the estimated time along the critical path is 214 days with a project variance of 100, the probability that the project will take 224 days or more to complete is 283) _____
A) 0.8413 B) 2.14 C) near zero D) 0.0126 E) 0.1587

284) An activity on a PERT network has these time estimates: optimistic = 2, most likely = 5, and pessimistic = 10. Its expected time is 284) _____
A) 5.67
B) 5.33
C) 5
D) 17
E) none of these

285) An activity on a PERT network has these time estimates: optimistic = 1, most likely = 2, and pessimistic = 5. Its expected time is 285) _____

A) 2.67
B) 8
C) 2
D) 2.33
E) none of these

286) An activity on a PERT network has these time estimates: optimistic = 2, most likely = 3, and pessimistic = 8. Its expected time and variance (if it is a critical activity) are 286) _____

A) 4.33; 6
B) 3.67; 1
C) 4.33; 1
D) 3.67; 6
E) none of these

287) A local project being analyzed by PERT has 42 activities, 13 of which are on the critical path. If the estimated time along the critical path is 105 days with a project variance of 25, the probability that the project will be completed in 95 days or less is 287) _____

A) -0.4 B) 0.9772 C) 4.2 D) 0.3444 E) 0.0228

288) A project being analyzed by PERT has 38 activities, 16 of which are on the critical path. If the estimated time along the critical path is 90 days with a project variance of 25, the probability that the project will be completed in 88 days or less is 288) _____

A) 0.9772 B) 18 C) 0.3446 D) 0.0228 E) 0.6554

289) A PERT project has 45 activities, 19 of which are on the critical path. The estimated time for the critical path is 120 days. The sum of all activity variances is 64, while the sum of variances along the critical path is 36. The probability that the project can be completed between days 108 and 120 is 289) _____

A) 0.0227 B) 0.9773 C) 0.1058 D) 0.4773 E) -2.00

290) A contractor's project being analyzed by PERT has an estimated time for the critical path of 120 days. The sum of all activity variances is 81; the sum of variances along the critical path is 64. The probability that the project will take 130 or more days to complete is 290) _____

A) 0.8943 B) 0.1335 C) 0.8512 D) 1.29 E) 0.1057

291) Analysis of a PERT problem shows the estimated time for the critical path to be 108 days with a variance of 64. There is a .90 probability that the project will be completed before approximately day _____. 291) _____

A) 115 B) 109 C) 108 D) 118 E) 98

292) A project whose critical path has an estimated time of 120 days with a variance of 100 has a 20 percent chance that the project will be completed before day (rounded to nearest day) 292) _____

A) 120 B) 220 C) 124 D) 98 E) 112

293) A project whose critical path has an estimated time of 820 days with a variance of 225 has a 20 percent chance that the project will be completed before day (rounded to nearest day) 293) _____

A) 807 B) 833 C) 1009 D) 631 E) 689

294) Contract requirements state that a project must be completed within 180 working days, or it will incur penalties for late completion. Analysis of the activity network reveals an estimated project time of 145 working days with a project variance of 400. What is the probability that the project will be completed before the late-payment deadline? 294) _____

A) 0.4599
B) near 1.0000, or almost certain
C) 0.9599
D) 0.0401
E) 0.8056

295) Which of these statements regarding time-cost tradeoffs in CPM networks is true? 295) _____

A) Crashing shortens the project duration by assigning more resources to one or more of the critical tasks.
B) Activities not on the critical path can never be on the critical path, even after crashing.
C) Crashing a project often reduces the length of long-duration, but noncritical, activities.
D) Crashing is not possible unless there are multiple critical paths.
E) None of the above is true.

296) Which of the following statements regarding time-cost tradeoffs in CPM networks is false? 296) _____

A) Activities not on the critical path can become critical after crashing takes place.
B) Project crashing shortens project duration by assigning more resources to critical tasks.
C) Crashing must consider the impact of crashing an activity on all paths in the network.
D) Crashing sometimes has the reverse result of lengthening the project duration.
E) All of the above are false.

297) If an activity whose normal duration is 13 days can be shortened to 10 days for an added cost of US$1,500, the crash cost per period is 297) _____

A) US$750
B) US$13,000
C) US$500
D) US$1,500
E) US$15,000

298) Two critical path activities are candidates for crashing on a CPM network. Activity details are in the table below. To cut one day from the project's duration, activity _____ should be crashed first, adding _____ to project cost. 298) _____

Activity	Normal Time	Normal Cost	Crash Duration	Crash Cost
One	8 days	US$6,000	6 days	US$6,800
Two	10 days	US$4,000	9 days	US$5,000

A) Two; US$1,000
B) One; US$400
C) Two; US$5,000
D) One; US$6,800
E) One or two should be crashed; US$1,400

299) If an activity whose normal duration is 15 days can be shortened to 10 days for an added cost of US$2,000, the crash cost per period is 299) _____

A) US$400
B) US$10,000
C) US$30,000
D) US$20,000
E) US$2,000

300) A network has been crashed to the point where all activities are critical. Additional crashing 300) _____

A) is impossible
B) is unnecessary
C) can be done, but all critical tasks must be reduced in duration
D) is prohibitively expensive
E) may require crashing multiple tasks simultaneously

301) Two critical path activities are candidates for crashing on a CPM network. Activity details are in the table below. To cut one day from the project's duration, activity should be crashed first, adding to project cost. 301) _____

Activity	Normal Time	Normal Cost	Crash Duration	Crash Cost
B	4 days	US$6,000	3 days	US$8,000
C	6 days	US$4,000	4 days	US$6,000

A) C; US$6,000
B) C; US$2,000
C) B; US$2,000
D) B; US$8,000
E) C; US$1,000

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

302) _____ is an organization formed to ensure that programs (projects) receive the proper management and attention. 302) _____

303) _____ divides a project into more and more detailed components. 303) _____

304) The _____ has established a code of ethics especially for project managers. 304) _____

305) _____ is a network technique using only one time factor per activity that enables managers to schedule, monitor, and control large and complex projects. 305) _____

306) A diagram of all activities and the precedence relationships that exist between these activities in a project is a(n) _____. 306) _____

307) The _____ is the computed longest time path(s) through a network. 307) _____

308) The network analysis method that allows activity times to vary is _____. 308) _____

309) _____ is the amount of time an individual activity in a network can be delayed without delaying the entire project. 309) _____

310) The _____ distribution is appropriate for calculating expected activity times and activity variances in PERT networks. 310) _____

311) _____ is decreasing activity time in a network to reduce time on the critical path so total completion time is reduced. 311) _____

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

312) What are the three phases of a project? Describe each in a sentence or two.

313) Identify the responsibilities of project managers.

314) What is a project organization?

315) Describe some of the challenges faced in the construction of the new 11-story building at Arnold Palmer Hospital in Orlando, Florida (see Case Study and Video).

316) What are some of the ethical issues faced by project managers? Which of these are likely to occur before a project begins, which are likely to occur while the project is underway, and which may occur after a project is complete? Illustrate any one of these from recent news.

317) Identify and describe briefly each of the purposes of project scheduling.

318) What is the objective of critical path analysis?

319) Explain why the critical path is the longest, not the shortest, path through a network.

320) Define slack.

321) Identify, in order, the six steps basic to both PERT and CPM.

322) What is the basic difference between PERT and CPM?

323) PERT calculations typically include the duration variance of each activity. What is the purpose of this calculation—what's the role of variances in PERT analysis?

324) Describe the differences between a Gantt chart and a PERT/CPM network.

325) Briefly discuss what is meant by critical path analysis. What are critical path activities and why are they important?

326) What are the earliest activity start time and latest activity start time, and how are they computed?

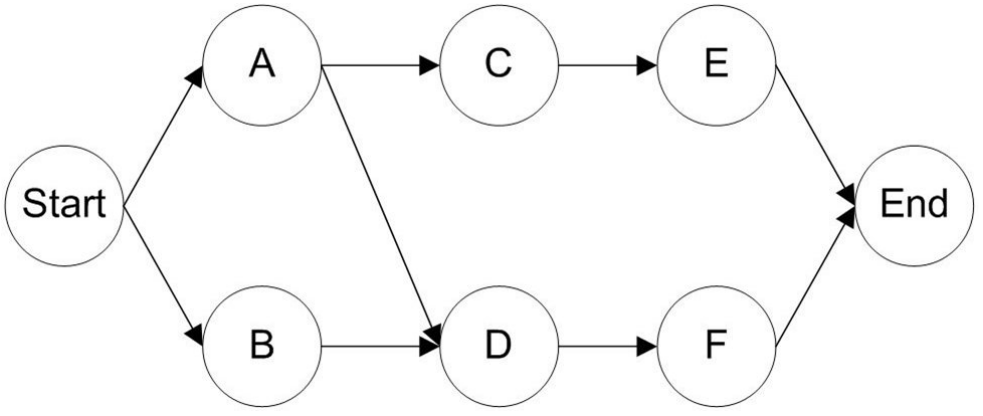
327) How is the expected completion time of a project activity, and of a PERT project, computed?

328) Describe in words how to calculate a project's standard deviation. What assumption allows that calculation to be accurate?

329) Briefly describe the concept of cost/time trade-off and how it is used.

330) What are the advantages of using PERT and CPM?

331) Consider the network pictured below.
   a. Enumerate all paths through this network.
   b. Calculate the critical path for the network.
   c. What is the minimum duration of the project?
   d. How much slack exists at each activity?

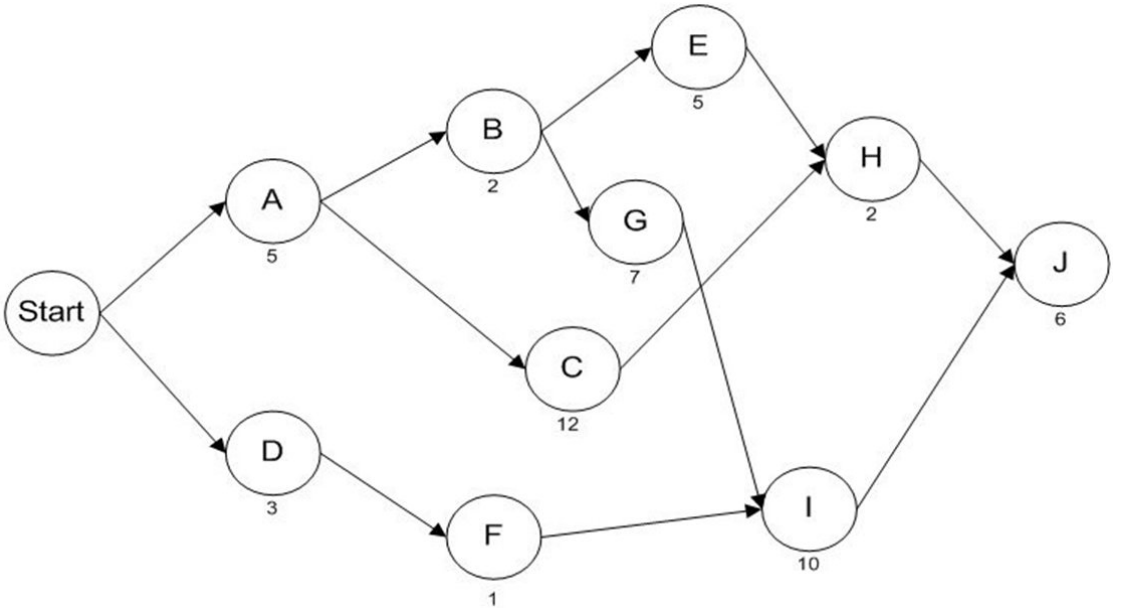


332) A network consists of the activities in the following list. Times are given in weeks.

Activity	Preceding	Time
A	--	8
B	--	3
C	A	7
D	A, B	3
E	C	4

   a. Draw the network diagram.
   b. Calculate the ES, EF, LS, LF, and Slack for each activity.
   c. What is project completion time?

333) The network below represents a project being analyzed by Critical Path Methods. Activity durations are A = 5, B = 2, C = 12, D = 3, E = 5, F = 1, G = 7, H = 2, I = 10, and J = 6.



a. What task must be on the critical path, regardless of activity durations?
b. What is the duration of path A-B-E-H-J?
c. What is the critical path of this network?
d. What is the length of the critical path?
e. What is slack time at activity H?
f. What is the Late Finish of activity H?
g. If activity C were delayed by two time units, what would happen to the project duration?

334) A network consists of the following list. Times are given in weeks.

Activity	Preceding	Duration
A	--	9
B	A	2
C	A	12
D	A	5
E	B	6
F	B	8
G	C, F	3
H	D	2
I	H	8
J	G, I	6
K	E, J	2

a. Draw the network diagram.
b. Which activities form the critical path?
c. How much slack exists at activities A and F?
d. What is the duration of the critical path?

335) A partially solved PERT problem is detailed in the table below. Times are given in weeks.

Activity	Preceding	Optimistic Time	Probable Time	Pessimistic Time	Expected Time	Variance
A	--	7	9	14		1.361
B	A	2	2	8		0
C	A	8	12	16		0
D	A	3	5	10		1.361
E	B	4	6	8		0
F	B	6	8	10		0
G	C, F	2	3	4		0
H	D	2	2	8		1.000
I	H	6	8	16		2.778
J	G, I	4	6	14		2.778
K	E, J	2	2	5		0.250

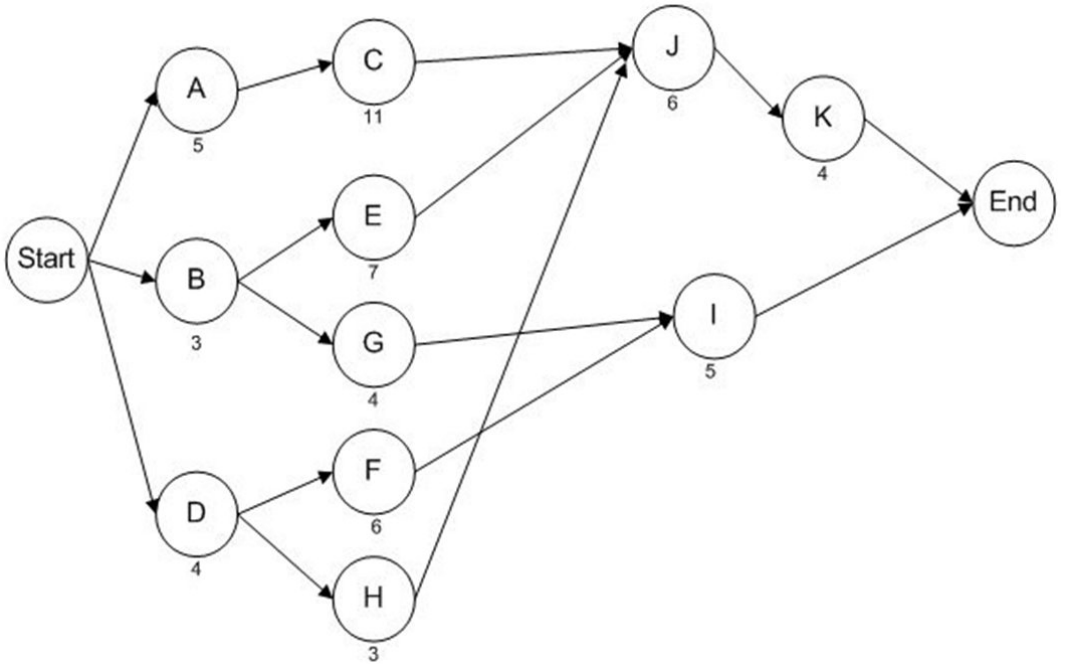
a. Calculate the expected time for each activity. Enter these values in the appropriate column in the table above.
b. Which activities form the critical path?
c. What is the estimated time of the critical path?
d. What are the project variance and the project standard deviation?
e. What is the probability of completion of the project after week 40?

336) Consider the network described in the table below.

Activity	Immediate Predecessor(s)	Pessimistic	Probable	Optimistic
J	--	15	10	8
K	--	9	8	7
L	J	10	6	5
M	J	3	3	3
N	K,M	9	5	1
O	K,M	10	7	4
P	L,N	10	8	3

a. Calculate the expected duration of each activity.
b. Calculate the expected duration and variance of the critical path.
c. Calculate the probability that the project will be completed in fewer than 30 time units.

337) The network below represents a project being analyzed by Critical Path Methods. Activity durations are indicated on the network.



a. Identify the activities on the critical path.
b. What is the duration of the critical path?
c. Calculate the amount of slack time at activity H.
d. If activity I were delayed by ten time units, what would be the impact on the project duration?

338) Three critical path activities are candidates for crashing on a CPM network. Activity details are in the table below.

Activity	Normal Time	Normal Cost	Crash Duration	Crash Cost
X	8 days	US$6,000	6 days	US$8,000
Y	3 days	US$1,800	2 days	US$2,400
Z	12 days	US$5,000	9 days	US$7,700

a. What is the crash cost per unit time for each of the three activities?
b. Which activity should be crashed first to cut one day from the project's duration; how much is added to project cost?
c. Which activity should be the next activity crashed to cut a second day from the project's duration; how much is added to project cost?

339) Three critical path activities are candidates for crashing on a CPM network. Activity details are in the table below.

Activity	Normal Time	Normal Cost	Crash Duration	Crash Cost
A	9 days	US$8,000	7 days	US$12,000
B	5 days	US$2,000	3 days	US$10,000
C	12 days	US$9,000	11 days	US$12,000

a. What is the crash cost per unit time for activity A?
b. What is the crash cost per unit time for activity B?
c. Which activity should be crashed first to cut one day from the project's duration; how much is added to project cost?
d. Which activity should be the next activity crashed to cut a second day from the project's duration; how much is added to project cost?
e. Assuming no other paths become critical, how much can this project be shortened at what total added cost?

340) A network consists of the following list. Times are given in weeks.

Activity	Preceding	Optimistic	Probable	Pessimistic
A	--	5	11	14
B	-	3	3	9
C	--	6	10	14
D	A, B	3	5	7
E	B	4	6	11
F	C	6	8	13
G	D, E	2	4	6
H	F	3	3	9

a. Draw the network diagram.
b. Calculate the expected duration and variance of each activity.
c. Calculate the expected duration and variance of the critical path.
d. Calculate the probability that the project will be completed in less than 28 weeks.

341) Draw the AOA and AON networks for the following project and calculate the minimum project duration.

Activity	Duration (days)	Immediate Predecessors
A	10	---
B	8	---
C	2	A
D	4	A
E	5	B,C, D

342) Given the project within the table below calculate
   a. The critical path
   b. The minimum project duration
   c. The amount of slack for each activity

Activity	Duration (hours)	Immediate Predecessors
A	4	None
B	3	None
C	10	None
D	7	B,C
E	1	D
F	1	E
G	5	A,F

343) Hashem's Bike Shop is behind on a custom bike and needs to crash 8 hours of time from the 8-step project. Given the project table below calculate the crash cost for 8 hours of time-savings. Suppose Hashem calls the customer and asks for a project extension, reducing the amount of time he needs to crash. Calculate both the maximum time-savings available on a US$25 crash budget and the cost to crash four hours of savings.

Activity	Normal Duration (hours)	Normal Cost (US$)	Crash Duration (hours)	Crash Cost (S)	Immediate Predecessors
A	2	10	2	0	None
B	3	15	2	23	A
C	5	25	4	30	B
D	3	20	1	24	C
E	6	30	4	45	C
F	1	5	1	0	C,E
G	7	35	6	50	F
H	10	50	7	80	D,G

344) Given the critical path below, calculate the following
   a. The crash cost per unit time savings for each activity.
   b. The maximum total crash time savings and cost.
   c. The maximum total time-savings with a US$3000 budget.

Activity	Normal Time	Normal Cost	Crash Duration	Crash Cost
A	8 days	US$8,000	7 days	US$12,000
B	5 days	US$2,000	3 days	US$10,000
C	10 days	US$9,000	9 days	US$12,000

345) Consider the network presented in the following table. Calculate

a. All possible paths
b. The critical path
c. The slack available at any non-critical points
d. The minimum project duration

Task	Duration (Days)	Immediate Predecessors
A	5	None
B	3	A
C	4	A
D	2	C
E	1	B,D

Answer Key
Testname: UNTITLED1

1) TRUE
2) FALSE
3) TRUE
4) TRUE
5) TRUE
6) TRUE
7) TRUE
8) FALSE
9) FALSE
10) FALSE
11) TRUE
12) FALSE
13) TRUE
14) FALSE
15) FALSE
16) FALSE
17) TRUE
18) E
19) B
20) B
21) E
22) E
23) D
24) D
25) B
26) E
27) E
28) D
29) C
30) B
31) B
32) E
33) C
34) A
35) D
36) E
37) D
38) D
39) B
40) A
41) A
42) C
43) A
44) E
45) A
46) C
47) E
48) C
49) D
50) C

51) B
52) C
53) E
54) A
55) C
56) D
57) A
58) D
59) A
60) C
61) E
62) C
63) E
64) B
65) C
66) B
67) D
68) D
69) E
70) C
71) E
72) transaction time (or service time)
73) Operations management
74) finance/accounting
75) supply chain management
76) pure service
77) Mass customization
78) Empowered employees
79) Multifactor productivity
80) outputs; inputs; reducing inputs while holding outputs constant; increasing outputs while holding inputs constant
81) Providing custom meals; designing, testing, and costing meals; acquiring, receiving , and storing supplies; recruiting and training employees; preparing employee schedules; designing efficient restaurant layouts.
82) Providing custom meals—design of goods and services; designing, testing, and costing meals—design of goods and services; acquiring, receiving , and storing supplies—supply- chain management; recruiting and training employees —human resources , job design and work measurement; preparing employee schedules—intermediate and short-term scheduling; designing efficient restaurant layouts—layout strategy.
83) Operations management can be defined as the management of all activities directly related to the creation of goods and/or services through the transformation of inputs into outputs. Yes.
84) Management science, industrial engineering, information technology, and often one of the biological or physical sciences.
85) Services typically require customer interaction, which makes it difficult to standardize, automate, and make efficient.
86) Pick from the following: a service is usually intangible; it is often produced and consumed simultaneously; often unique; it involves high customer interaction; product definition is inconsistent; often knowledge-based; and frequently dispersed.
87) Answer will vary, but the textbook used educational, medical, and legal services.
88) Organizations are switching to JIT shipments because inventory requires a large financial investment, and impedes the responsiveness to changes in the marketplace.
89) Organizations are becoming more global with the decline in the cost of communication and transportation. Additionally, resources—capital, material, talent, and labor—are also becoming more global.
90) The three common variables are labor, capital, and management.

91) A knowledge society is one in which much of the labor force has migrated from manual work to work based on knowledge.
92) Businesses have diverse stakeholders, which include owners, employees, lenders, and distributors. These stakeholders hold conflicting perspectives.
93) Efficiently developing and producing safe quality products; sourcing ethically sound ingredients and materials; paying fair prices to farmers in developing countries; maintaining a sustainable environment; providing a safe workplace; honoring stakeholder commitments.
94) Ethics, globalization, rapid product development, environmental sensitivity, mass customization, empowered employees, supply-chain partnering, just-in-time-performance.
95) By designing products and packaging that minimize resource use, are biodegradable, can be recycled, and are generally environmentally friendly and sustainable.
96) Productivity measures for a law office are difficult. Simple criteria, like number of cases processed, fail to consider complexity of the case. Even counting wins is difficult, as many cases are settled with some sort of compromise. External elements such as the quality of the opposing counsel and the tenacity of the opposition also make counting look rather silly.

    Categories of cases can help—(i.e., uncontested resolutions, no personal injury auto case, etc.) However, many firms end up counting hours billed. This in turns leads to other problems, as noted by the number of false billing cases.
97) a. 16 ornaments/8 hours = 2 ornaments/hour
    b. 20 ornaments/8 hours = 2.5 ornaments/hour
    c. Change in productivity = 0.5 ornaments/hour; percent change = 0.5/2= 25 percent
98)

Resource	Standard Equipment	Larger Machine	Percent Change
Solvent	$\frac{70}{10}$= 7	$\frac{60}{12}$= 5	$\frac{5 - 7}{7}$= 28.57 percent
Labor	$\frac{70}{320}$=0.22	$\frac{60}{180}$=.33	$\frac{33-22}{22}$=50 percent

99) 600 boxes per day/16 hours = 37.5 boxes per hour
100) The energy modifications did not generate the expected energy savings; also, labor and capital productivity decreased.

Resource	Last Year	This Year	Change	Pct. Change
Labor	4000/350 = 11.43	4000/375 = 10.67	-0.76	-6.7 percent
Capital	4000/15000 = 0.27	4000/19000 = .21	-0.060	-22.2 percent
Energy	4000/3000 = 1.33	4000/2600 = 1.54	0.21	15.4 percent

101) Productivity improved in all three categories this year; utilities showed the greatest increase, and labor the least.

Resource	Last Year	This Year	Change	Pct. Change
Labor	10500/12000 = 0.88	12100/13200 = 0.9	-0.04	4.8 percent
Capital	10500/7600 = 1.38	12100/8250 = 1.47	-0.09	6.2 percent
Energy	10500/83000 = 0.13	12100/88000 = 0.14	0.01	7.69 percent

102) Since the productivity gain was 58.3 percent, not 50 percent, the fertilizer was at least as good as advertised.

Two Summers ago	Last Summer	Change
1200/10,000 = .12 1bs/sq. ft	1900/10,000 = .19 lbs/sq. ft	(.19 - .12)/.12 = 58.3 percent

103) MFP before: 500 pairs/($10 × 5 × 16 + $3000 + $400) = 500/4200 = 0.119 pairs/dollar
MFP after: 600 pairs/($10 × 5 × 16 + $3200 + $400) = 600/4400 = 0.136 pairs/dollar

104) (a) Workers are active for eight hours per day; labor productivity is 10 valves/hour
(b) If Productivity rises by 20 percent, to 12 valves/hour; output would be 12 × 8 × 20 = 1920
(c) New productivity is 1800/(20 × 8) = 11.25 valves/hour
(d) Gibson did not gain the desired 20 percent increase in productivity, but they did gain over 11 percent, without extra equipment or energy, and without increasing the labor cost.

105) (a) Professors teach 100 students in 15 hours or 6.67 students/hour.
(b) Professors teach 150 students in 15 hours or 10 students/hour.
(c) Responses should focus on honoring stakeholder commitment and can include students per professor ratio, class sizes, quality of education, etc.
(d) Initial productivity is 100 students in 21 hours or 4.76 students/hour. New productivity is 150 students in 25 hours or 6 students/hour, an increase or 1.24 students/hour.

106) (a) 2 lanes * 8 hours * 3600 seconds/hour * 1checkout/45 seconds = 1280 checkouts
(b) 4 lanes * 8 hours * 60 minutes/hour * 1checkout/2min = 960 checkouts
(c) Cost for the old system 4 workers * 8 hours * $10/hour + $.1 * 1280 + $.05 * 1280= $512. Cost for the new system 1 worker * 8 hours * $10/hour + $.15 * 960 + $.05*960 + $100 =$372. Multifactor productivity for old system = 1280 checkouts / $512 = 2.5 checkouts/$. Multifactor productivity for new system = 960 checkouts / $372 = 2.6 checkouts/$.

107) (a) 100,000 hours * 5 pools/6000 hours = 83.33 or 83 pools
(b) 83 pools * $25,000/pool = $2,075,000

108) (a) 100,000 parts * 1 hour/10 parts * 1 shift/8 hours * 1 worker/60 shifts = 20.83 = 21 workers
(b) 100,000 parts/(60 shifts/worker * 100 workers * 8 hours/shift) = 2.08 parts/hour
(c) 100,000 parts/($10/part * 100,000 parts + $100,000 + 21 workers * 60 shifts/worker * 8 hours/shift * $10/hour) = .083 parts/$1

109) (23 + 20 + 15 + 5 + 2 + 1) customers/(2 workers * 6 hours/worker) = 5.5 customers/hour

110) Marketing would increase sales to $120,000 ($80,000 * 1.5) but increase cost of inputs and production costs to $112,500 (($50,000+$25,000) * 1.5). This would net an additional $2500 of profit ($120,000 - $112,500 - current profit of $5000). Vendor (Supplier) Changes would decrease cost of inputs to $45,000 ($50,000 * .9), resulting in $5,000 of additional profit (savings) ($50,000 - $45,000). Finally, the OM option would save $6250 ($25,000 - $25,000 * .75), resulting in an additional $6250 of profit. Thus the OM option is the most profitable. Comments on feasibility should center on the near impossibility of increasing revenue by 50 percent, while noting the other two options are difficult but not impossible.
111) TRUE
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146) E
147) E
148) A
149) C
150) B
151) A
152) E
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154) D
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167) E
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171) B
172) A
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174) E
175) E
176) C
177) E
178) C
179) E
180) E
181) E
182) A
183) A
184) E
185) B
186) C
187) E
188) A
189) A
190) C
191) C
192) A
193) A
194) D
195) A
196) D
197) D
198) Bribery; protection of intellectual property
199) the World Trade Organization
200) raw materials; work-in-process; finished goods
201) organization; environment
202) Maturity
203) strategy

204) competitive advantage
205) experience differentiation
206) differentiation; low cost; response
207) MNC or multinational corporation
208) global
209) international
210) multidomestic
211) transnational
212) The supply chain can often be improved by locating facilities in countries where unique resources exist.
213) Since international operations require local interaction with customers, suppliers, and other competitive businesses, international firms inevitably learn about unique opportunities for new products and services.
214) Student responses will vary, but there are several issues on which there are wide differences from country to country, culture to culture. Among those listed in the text are bribery, child labor, slave labor, and intellectual property rights. Students may bring forward from an earlier chapter issues such as environmental regulation or safe work environment, and may raise issues such as product safety.
215) A firm's mission is its purpose or rationale for an organization's existence, whereas a firm's strategy is how it expects to achieve its mission and goals.
216) 1. World trade.
    2. Global capital markets.
    3. International movement of people.
217) Answers will vary, but Aramex and Tche Tche are illustrated in the text. Competing on experience differentiation implies providing uniqueness to your service offering through immersion of the consumer into the service, with visual or sound elements to turn the service into an experience.
218) Goods-producing companies: the ability to inventory may allow leveling the output rates; service companies: primarily concerned with meeting the customer's immediate schedule.
219) There are many objective quality standards for goods, whereas there are many subjective quality standards for services.
220) Manufacturers of goods may need to be located close to raw materials, or labor force. Services, on the other hand, typically are located close to the customer.
221) A set of skills, talents, and activities that a firm does particularly well.
222) The relationship between the organization and its suppliers or its customers is key. If that relationship is very weak (as in no transportation costs, or customers can reach the firm from any location), location diminishes in importance. If that relationship is strong (uniqueness of site, high transportation costs, customers will not travel far) location increases in importance. "Least" examples: Telemarketing firm, tax help-line, Internet sales. "Most" examples: gold mine, oil well, ski resort.
223) The four elements of SWOT are strengths, weaknesses, opportunities, and threats. Its purpose is to maximize opportunities and minimize threats in the environment, while maximizing the advantages of the organization's strengths and minimizing the weaknesses.
224) Strategies should be dynamic because of changes within the organization and changes in the environment.
225) The multidomestic strategy decentralizes operating decisions to each country to enhance local responsiveness. The primary example from the textbook is Tche Tche or Emaar. The global strategy centralizes operating decisions, with headquarters coordinating the standardization and learning between facilities.The international strategy uses exports and licenses to penetrate the global markets. Students may cite Tazaj. The transnational strategy exploits the economies of scale and learning, as well as pressure for responsiveness, by recognizing that core competence does not reside in just the "home" country, but can exist anywhere in the organization. Examples from the textbook include Al-Marai.

226) Strengths- Innovative products, athletes under contract
Weakness- Much of revenue is from footwear, eroding market share could cost Nike its profitability
Opportunities- Sales can be increased in emerging markets using well-known athletes, broad product line can be expanded into high profit sectors (jewelry, sunglasses, golf, etc)
Threats- International business makes Nike vulnerable to currency changes, low-cost pressure from retailers can decrease profit per item, competition could erode existing market share. Athletes' personal lives could weaken Nike's reputation.

227) Strengths- High profit specialty coffee, well known brand image
Weakness- Most stores located in U.S., most profits come from coffee (both are lack of diversification)
Opportunities- Emerging market in coffee beans for home use, chance for global expansion
Threats- Intense competition, consumer behavior changes (less spending during a recession on its luxury coffee, change in beverage preferences)

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273) C
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278) D
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282) A
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286) B
287) E
288) C
289) D
290) E
291) D
292) E
293) A
294) C
295) A
296) D
297) C
298) B
299) A
300) E
301) E
302) Project organization
303) Work breakdown structure or WBS
304) Project Management Institute
305) Critical path method or CPM
306) network
307) critical path
308) PERT or Program Evaluation and Review Technique
309) Slack time
310) Beta
311) Crashing
312) The three phases are planning, scheduling, and controlling. Planning includes goal setting, defining the project, and team organization. Scheduling relates people, money, and supplies to specific activities and relates activities to each other. Controlling is where the firm monitors resources, costs, quality, and budgets. It also revises or changes plans and shifts resources to meet time and cost demands.

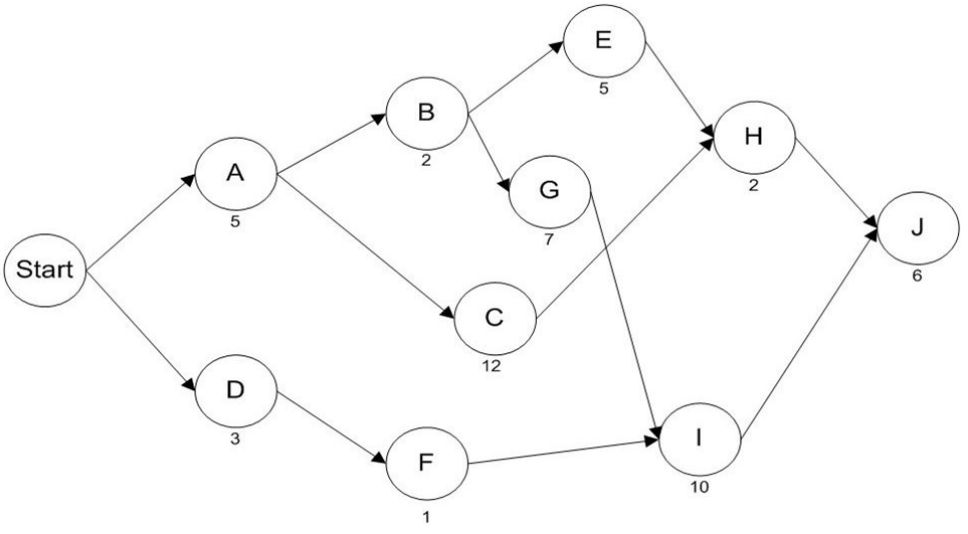
313) Project managers are directly responsible for making sure that (1) all necessary activities are finished in proper sequence and on time; (2) the project comes in within budget; (3) the project meets its quality goals; and (4) the people assigned to the project receive the motivation, direction, and information needed to do their jobs.
314) A project organization is a form of management so that people and other resources are pooled for a limited amount of time to complete a specific goal or project.
315) Prior to beginning actual construction, regulatory and funding issues added, as they do with most projects, substantial time to the overall project. Cities have zoning and parking issues, the EPA has drainage and waste issues, and regulatory authorities have their own requirements, as do issuers of bonds.
316) A project manager can be exposed to a wide variety of ethical issues. These include, but are not limited to, gifts from contractors, pressure to mask delays with false status reports, falsifying (exaggerating) expense reports, and compromising quality with substandard materials or practices to save either time or money. Those who report on completed projects might not be truthful about the project's success.
317) Project scheduling shows the relationship of each activity to others and to the whole project. It identifies the precedence relationship among activities. It encourages the setting of realistic time and cost estimates for each activity. It helps make better use of people, money, and material resources by identifying critical bottlenecks in the project.
318) Critical path analysis determines the longest path through a network of activities. This longest path is the key to making the schedule that provides for completing all activities in the shortest time. Critical path analysis identifies those activities critical to timely completion of all activities so they can receive management focus.
319) Critical path is that set of activities in a project network that controls the duration of the entire project. The controlling element to completion of all activities is the longest path; any shorter path will not allow for all activities to be completed.
320) Slack is the amount of time an activity can be delayed without delaying the entire project, assuming its preceding activities are completed as early as possible.
321) i. Define the project and prepare the WBS.
ii. Develop the relationships among the activities.
iii. Draw the network connecting all of the activities.
iv. Assign the time and/or cost estimates to each activity.
v. Compute the critical path—the longest time path through the network.
vi. Use the network to help plan, schedule, monitor, and control the project.
322) The basic difference between PERT and CPM is that PERT requires three time estimates of activity completion time, whereas CPM uses only a single estimate.
323) The activity variances influence the probability of project completion. Specifically, the sum of the variances of the critical tasks equals the variance of the project. Further, large variances on noncritical tasks need to be monitored. Such an activity might have an actual completion time so large that the task becomes a critical task.
324) The differences between a Gantt chart and a PERT/CPM network are mainly that PERT/CPM has the ability to consider precedence relationships and interdependence of activities.
325) The critical path consists of those tasks that determine the overall project completion time (or that will delay the completion of the project if they are delayed); these must be managed most closely to ensure timely completion of the project. Critical path analysis is the determination of which task elements are on, or likely to be on, the critical path (the longest path through the network).
326) The earliest start time is the earliest time at which an activity may start and still satisfy all precedence requirements. The latest start time is the latest time at which an activity may start and still satisfy both precedence requirements and the overall project completion time.
327) The expected completion time of a project activity uses the Beta distribution; expected time is the weighted average of optimistic, most likely, and pessimistic time estimates. Expected completion of a PERT project is the sum of the expected times for individual activities that are on the critical path.
328) Add the variances of the activities on the critical path and then take the square root. We can do this because we assume that the activities are independent.

329) Cost/time trade-off is fundamentally PERT with additional information provided that enables one to monitor and control project cost and to study possible cost/time trade-offs. This can be done by making a budget for the entire project using the activity cost estimates and by monitoring the budget as the project takes place. Using this approach, we can determine the extent to which a project is incurring a cost overrun or a cost underrun. In addition, we can use the same technique to determine the extent to which a project is ahead of schedule or behind schedule.

330) The advantages include its usefulness for scheduling and controlling large projects, its straightforward concept, its graphical displays of relationships between activities, its critical path and slack time analysis, its ability to document processes, its wide range of applicability, and its usefulness in monitoring schedules and costs.

331) (a) Possible paths are P-S (length 22), P-R-T (length 28), and Q-T (length 21). (b) The longest of these, P-R-T, is the critical path, at (c) 28 time units. (d) There is no slack at P, R, or T since these are critical tasks. S has 6 units slack, since the path it is on totals only 22 units, compared to the critical path length of 28. Q has 7 units of slack since it is on a 21 length path, 7 less than the maximum.

332) (a)



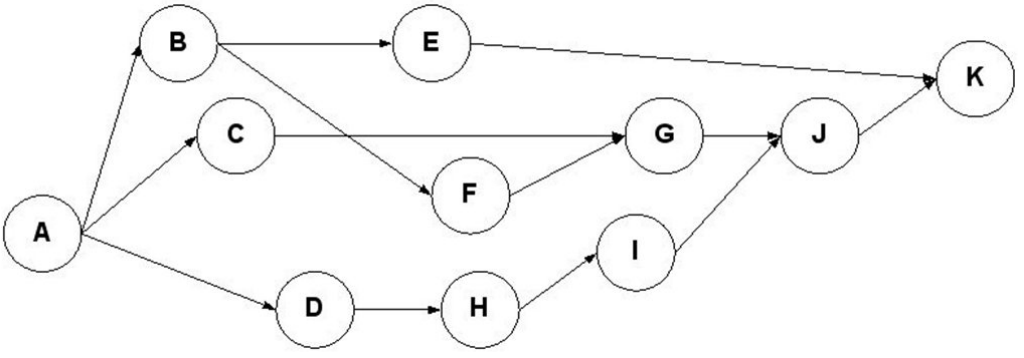
(b,c)

Results					
Task	Early Start	Early Finish	Late Start	Late Finish	Slack
A	0	8	0	8	0
B	0	3	7	10	7
C	8	15	8	15	0
D	8	11	10	13	2
E	15	19	15	19	0
F	11	17	13	19	2
	Project	19			

333) (a) J; (b) 20; (c) A-B-G-I-J; (d) 30; (e) 5; (f) 24; (g) no impact.

Results					
Task	Early Start	Early Finish	Late Start	Late Finish	Slack
A	0	5	0	5	0
B	5	7	5	7	0
C	5	17	10	22	5
D	0	3	10	13	10
E	7	12	17	22	10
F	3	4	13	14	10
G	7	14	7	14	0
H	17	19	22	24	5
I	14	24	14	24	0
J	24	30	24	30	0
	Project	30			

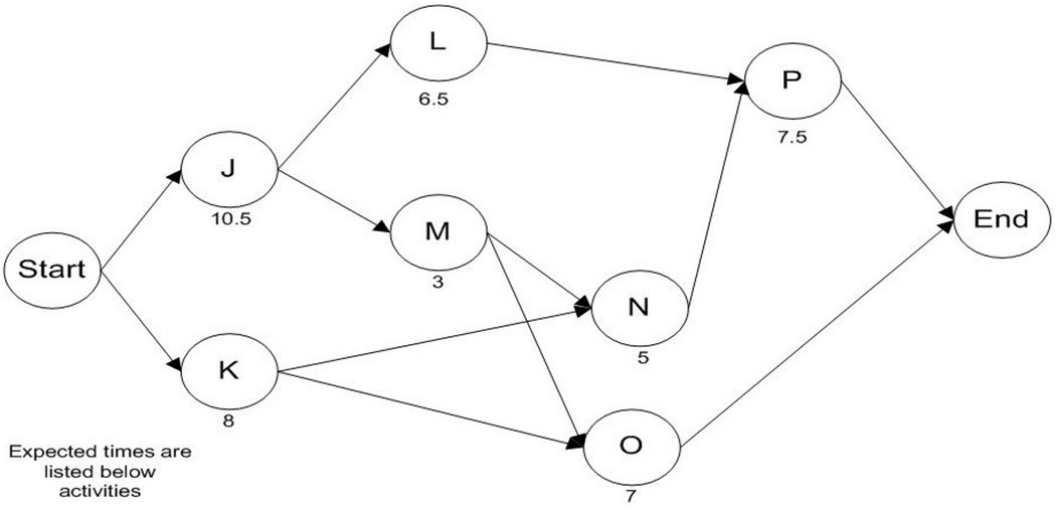
334) (a) Network diagram



(b) paths A-D-H-I-J-K and A-C-G-J-K are critical; (c) A has no slack; F has 2 units (d) 32 weeks

335) (a) A = 9.5, B = 3, C = 12, D = 5.5, E = 6, F = 8, G = 3, H = 3, I = 9, J = 7, K = 2.5
(b) A-D-H-I-J-K; (c) 36.5; (d) 9.53, 3.09; (e) 0.13.

336) (a) See table below. (b) Tasks J - M - N - P are critical. The sum of their expected durations is 26.00; the sum of their variances is 4.50. (c) The standard deviation along the path is = 2.12; the probability that Duration < 30 is the probability that z < (30 - 26.00)/2.12 = 1.89. The associated normal curve area is 0.97062.



Task	Early Start	Early Finish	Late Start	Late Finish	Slack	Mean	Variance
J	0	10.5	0	10.5	0	10.5	1.361111
K	0	8	5.5	13.5	5.5	8	
L	10.5	17	19.5	26	9	6.5	
M	10.5	13.5	10.5	13.5	0	3	0
N	13.5	18.5	13.5	18.5	0	5	1.777778
O	13.5	20.5	19	26	5.5	7	
P	18.5	26	18.5	26	0	7.5	1.361111
	Project	26				Project	4.5
						Std.dev	2.12132

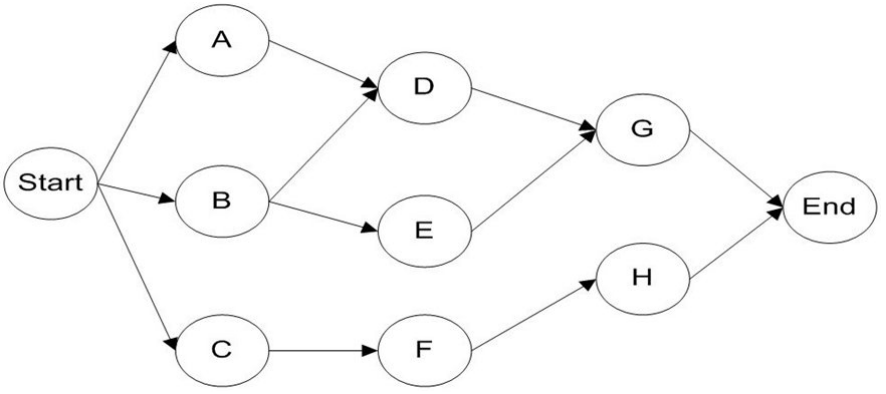
337) (a) Critical activities are A-C-J-K; (b) The critical path is 26 time units; (c) Slack at H is 9 units; (d) I has 11 units slack--a ten unit delay would have no impact on the project.

Task	Early Start	Early Finish	Late Start	Late Finish	Slack
A	0	5	0	5	0
B	0	3	6	9	6
C	5	16	5	16	0
D	0	4	9	13	9
E	3	10	9	16	6
F	4	10	15	21	11
G	3	7	17	21	14
H	4	7	13	16	9
I	10	15	21	26	11
J	16	22	16	22	0
K	22	26	22	26	0
	Project	26			

338) (a) crash cost X = US$1,000 per day; crash cost Y = US$600 per day ; crash cost Z = US$900 per day
(b) select Y, adding US$600; (c) select Z, adding US$900

339) (a) US$2,000; (b) US$4,000; (c) A, US$2,000; (d) A again, US$2,000 additional; (e) 5 days, US$15,000.

340) (a)

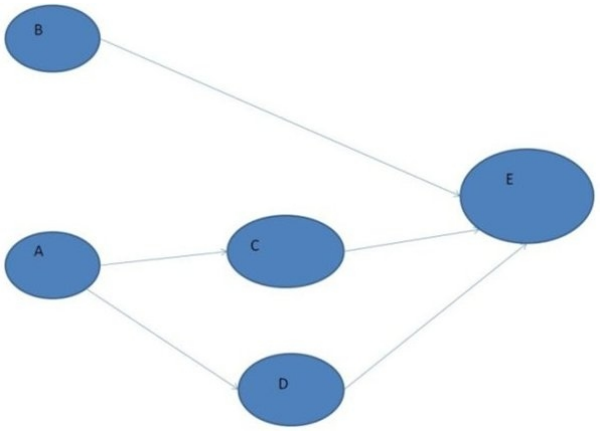


(b,c)

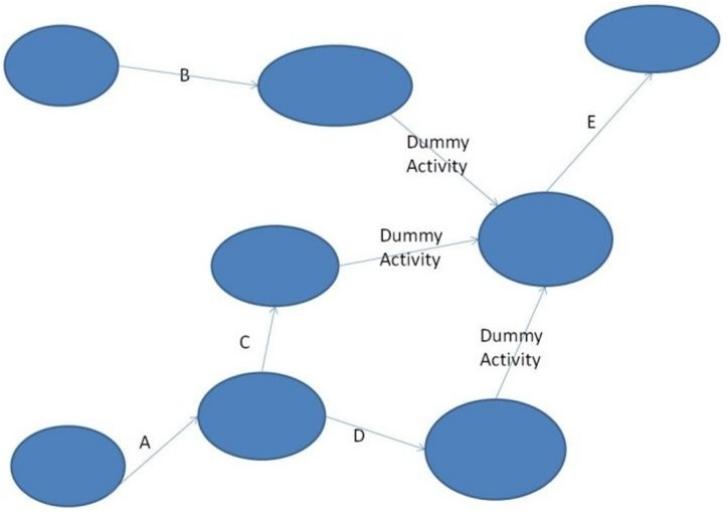
Task	Expected time	Variance	Std. dev.	Slack	Variance
A	10.5	2.25	1.5	3	
B	4	1	1	8	
C	10	1.778	1.333	0	1.778
D	5	0.444	0.667	3	
E	6.5	1.361	1.167	8	
F	8.5	1.361	1.167	0	1.361
G	4	0.444	0.667	3	
H	4	1	1	0	1
Project	22.5			Project	4.139
				Std. dev.	2.034

(d) z = (28 - 22.5)/2.03 = 2.71, (P < =28) = .997

341) AON

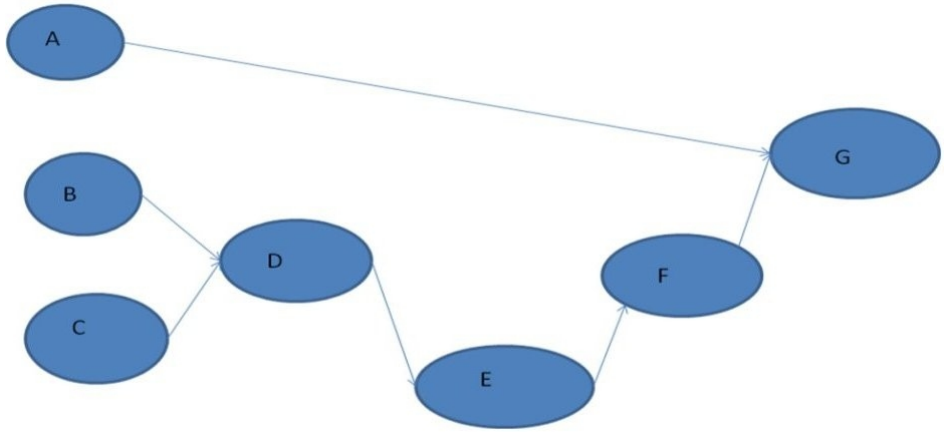


AOA



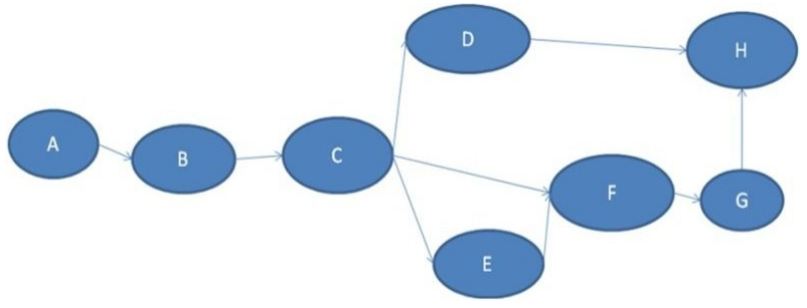
Minimum duration is the longest of the three paths, ADE, or a total of 19 days.

342)



(A) The critical path is CDEFG
(B) Minimum duration is (10 + 7 + 1 + 1 + 5) or 24 hours
(C) CDEFG have no slack since on the critical path. BDEFG takes 17 hours, so B has 7 hours of slack. AG takes 9 hours, so A has 15 hours of slack.

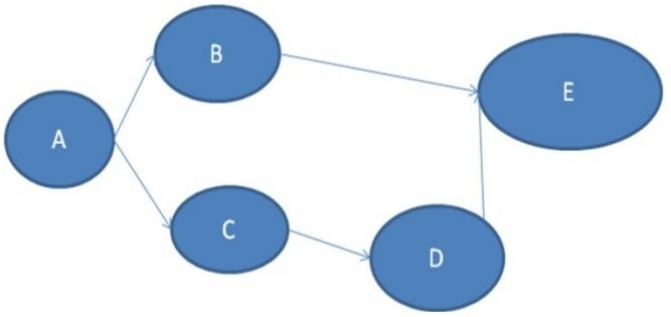
343)



The critical path is ABCEFGH with a time of 34 hours. The cost per crash hour for these activities are 8(B), 5(C), 2(D), 7.5(E), 15(G), 10(H). C will be crashed first for a savings of 1 hour. Next E will be crashed for a savings of 2 hours. Then B can be crashed for a savings of 1 hour. Next H will be crashed for a savings of 3 hours, netting 7 hours total at a cost of (5 + 15 + 8 + 30) US$58. Only 1 more hour is needed, so G will be crashed for an additional 15 dollars, netting 8 hours saved at a cost of 58 + 15 = US$73. D was not crashed because it does not lie on the critical path after any amount of crashing (E always > D). With US$25 only C and E can be crashed, saving 3 hours of time and spending US$20. A fractional component of B could be crashed (5/8) of an hour to spend the entire US$25, however most students should interpret this question as only whole-hour increments. The cost to crash four hours would be C + E + B crashing = US$28.

344) (A) A saves 1 day for US$4000/day, B saves 2 days for US$4000/day, C saves 1 day at US$3000/day.
(B) Max time savings is A + B + C = 4 days for a total of US$15,000
(C) 1 day could be crashed from C. This means maximum savings is 1 day.

345)



(A) Two paths are possible, ACDE and ABE.
(B) The critical path is ACDE
(C) The slack available at point B is Duration (ACDE) – Duration (ABE) = 3 days. All other points have no slack because they are on the critical path.
(D) The minimum project duration is the length of the critical path ACDE which is = 12 days