

Final Practice Exam

Due No due date	Points 45	Questions 45
Available until Aug 14 at 6:59pm	Time Limit None	
Allowed Attempts Unlimited		

Instructions

- This final practice exam is for practice purposes only.
- There is no time limit and unlimited attempts.
- You will be able to see the correct answers only after the submission.
- Coverage:
 - Chapter 2: An Introduction to Linear Programming
 - Chapter 3: Sensitivity Analysis and Interpretations of Solution
 - Chapter 4: Applications in Marketing, Finance, and OM
 - Chapter 6: Distribution and Network Models
 - Chapter 7: Integer Linear Programming
 - Chapter 10: Inventory Models
 - Chapter 11: Waiting Line Models
 - Chapter 13: Decision Analysis

Take the Quiz Again

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	56 minutes	36 out of 45

Submitted Aug 14 at 1:14pm

Question 1

1 / 1 pts

A variable added to the left-hand side of a less-than-or-equal-to constraint to convert the constraint into an equality is a

☐ standard variable.

Correct!

- ☒ slack variable.
- ☐ surplus variable.
- ☐ nonnegative variable.

Question 2**1 / 1 pts**

Dorm Furnishings manufactures two types of desks. Requirements for each desk are given below.

	Standing Desk	Executive Desk	Available
Wood panels	3	4	36
Hardware assembly (hours)	5	4	40
Staining time (hours)	5	2	30

The profits for Standing and Executive desk are \$1000 and \$1100, respectively.

What is the constraint for staining time?

- ☐ $3S + 4E \leq 36$
- ☐ $5S + 4E \leq 40$
- ☒ $5S + 2E \leq 30$
- ☐ $1000S + 1100E$

Correct!

Question 3**1 / 1 pts**

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What is the constraint for wood panels?

Correct!

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☐ $5S + 4E \leq 40$

☐ $5S + 2E \leq 30$

☐ $1000S + 1100E$

Question 4**1 / 1 pts**

Which of the following special cases requires reformulation of the problem in order to obtain a solution?

Correct!
☒ infeasibility

☐ feasibility

☐ boundedness☐ slack**Question 5****1 / 1 pts**

The three assumptions necessary for a linear programming model to be appropriate include all of the following EXCEPT

☐ proportionality.☐ additivity.☐ divisibility.☒ normality.**Correct!****Question 6****0 / 1 pts**

Based on the per-unit increase in the right-hand side of the constraint, the dual price measures the

☐ increase in the value of the optimal solution.☒ decrease in the value of the optimal solution.☐ improvement in the value of the optimal solution.☐ change in the value of the optimal solution.**Not Answered****Correct Answer**

Question 7**1 / 1 pts**

The dual price for a \leq constraint will

- ☐ always be ≤ 0 .
- ☒ always be ≥ 0 .
- ☐ be ≤ 0 in a minimization problem and ≥ 0 in a maximization problem.
- ☐ always equal 0.

Correct!**Question 8****1 / 1 pts**

When the cost of a resource is sunk, then the dual price can be interpreted as the

- ☐
minimum amount the firm should be willing to pay for one additional unit of the resource.
- ☒
maximum amount the firm should be willing to pay for one additional unit of the resource.
- ☐
minimum amount the firm should be willing to pay for multiple additional units of the resource.
- ☐
maximum amount the firm should be willing to pay for multiple additional units of the resource.

Correct!

Question 9**1 / 1 pts**

The range of feasibility measures

☐

the right-hand-side values for which the objective function value will not change.

☐

the right-hand-side values for which the values of the decision variables will not change.

☒

the right-hand-side values for which the dual prices will not change.

☐

the total area of the feasible region.

Correct!**Question 10****1 / 1 pts**

An objective function reflects the relevant cost of labor hours used in production rather than treating them as a sunk cost. The correct interpretation of the dual price associated with the labor hours constraint is the

☒

maximum premium (say for overtime) over the normal price that the company would be willing to pay.

☐

upper limit on the total hourly wage the company would pay.

☐

reduction in hours that could be sustained before the solution would change.

Correct!



number of hours by which the right-hand side can change before there is a change in the solution point.

Question 11**1 / 1 pts**

A grocery store manager must decide how to best present a limited supply of popcorn and soda to its customers. Popcorn can be sold by itself for a profit of \$1.50 per tin. Soda can likewise be sold at a profit of \$2.50 per liter. To increase appeal to customers, one tin of popcorn and a liter of soda can be packaged together and sold for a profit of \$3.00 per bundle. The manager has at most 100 tins of popcorn and 150 liters of soda to make available each day. The manager has decided to stock at least 75 individual tins of popcorn per day (excluding popcorn bundled with soda). Demand for individual liters of soda is at most 140 liters per day (excluding soda bundled with popcorn). The manager wishes to determine how much of each product to stock each day.

What is the maximum daily profit that the grocery store can achieve?

Correct!☒ \$515☐ \$485☐ \$455☐ \$425**Question 12****1 / 1 pts**

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available each day. The manager has decided to stock at least 75 individual tins of popcorn per day (excluding popcorn bundled with soda). Demand for individual liters of soda is at most 140 liters per day (excluding soda bundled with popcorn). The manager wishes to determine how much of each product to stock each day.

Which of the following is the constraint that limits the amount of popcorn the store will use (both in bundles and sold separately) each day?

Correct!

☐ $P + B \geq 100$

☒ $P + B \leq 100$

☐ $P + B \geq 75$

☐ $P \leq 100$

Question 13

1 / 1 pts

The dual price for a constraint that compares funds used with funds available is 0.058. This means that

Correct!

☐ the cost of additional funds is 5.8%.

☒ if more funds can be obtained at a rate of 5.5%, some should be.

☐ no more funds are needed.

☐ the objective was to minimize.

Question 14

1 / 1 pts

In a production scheduling LP, the demand requirement constraint for a time period takes the form

- ☐ Beginning inventory + Production + Ending inventory \geq Demand.
- ☐ Beginning inventory – Production + Ending inventory = Demand.
- ☒ Beginning inventory + Production – Ending inventory = Demand.
- ☐ Beginning inventory – Production – Ending inventory \geq Demand.

Correct!

Question 15

1 / 1 pts

Blending problems occur frequently in which of the following industries?

- ☐ chemical
- ☐ petroleum
- ☐ food services
- ☒ All of these are correct.

Correct!

Question 16

1 / 1 pts

Arcs in a transshipment problem

- ☐ must connect every node to a transshipment node.

Correct!

- ☐ represent the cost of shipments.
- ☒ indicate the direction of the flow.
- ☐ represent the revenue from shipments.

Question 17**0 / 1 pts**

Which of the following is true regarding the linear programming formulation of a transportation problem?

- ☐ The objective function value is either 0 or 1.

Incorrect Answer

The number of variables is calculated as number of origins times number of destinations.

Correctly Answered

The number of constraints is calculated as number of origins times number of destinations.

- ☐ The constraints' left-hand-side coefficients are less than zero.

Question 18**0 / 1 pts**

Which of the following is a characteristic of assignment problems?

- ☐ The objective function value is either 0 or 1.

- ☐ The RHS of all constraints is less than 0.

Correct Answer

☐ The value of all decision variables is either 0 or 1.

You Answered

☒ The signs of constraints are always \leq .

Question 19

1 / 1 pts

A manufacturing firm has three plants and wants to find the most efficient means of meeting the requirements of its four customers. How many arcs will the network have?

☐ 4

☐ 7

☒ 12

☐ 15

Correct!

Question 20

1 / 1 pts

A firm has 4 plants that produce widgets. Plants A, B, and C can each produce 100 widgets per day. Plant D can produce 50 widgets per day. Each day, the widgets produced in the plants must be shipped to satisfy the demand of 3 customers. Customer 1 requires 75 units per day, customer 2 requires 100 units per day, and customer 3 requires 175 units per day. The shipping costs for each possible route are shown in the table below:

Shipping Costs per unit at Plant	Customer 1	Customer 2	Customer 3
A	\$25	\$35	\$15
B	\$20	\$30	\$40

C	\$40	\$35	\$20
D	\$15	\$20	\$25

The firm needs to satisfy all demand each day but would like to minimize the total costs.

The objective function for the firm's problem will have how many terms?

☐ 5

☐ 7

☐ 10

☒ 12

Correct!

Question 21

1 / 1 pts

In a transshipment problem, shipments

☐ cannot occur between two origin nodes.

☐ cannot occur between an origin node and a destination node.

☐ cannot occur between a transshipment node and a destination node.

☒ can occur between any two nodes.

Correct!

Question 22

1 / 1 pts

Assuming W_1 , W_2 , and W_3 are 0-1 integer variables, the constraint $W_1 + W_2 + W_3 \leq 1$ is often called a

Correct!

- ☐ multiple-choice constraint.
- ☒ mutually exclusive constraint.
- ☐ k out of n alternatives constraint.
- ☐ corequisite constraint.

Question 23

0 / 1 pts

In a problem, 1 corresponds to a yes decision and 0 to a no decision. If project X can be undertaken only if project Y is also undertaken, then the following constraint needs to be added to the formulation:

- ☐ $X + Y \leq 1$
- ☐ $X + Y = 1$
- ☐ $X \leq Y$
- ☒ $Y \leq X$

Correct Answer

You Answered

Question 24

1 / 1 pts

In a problem with 3 mutually exclusive alternatives, A, B, and C, the following constraint needs to be added to the formulation:

Correct!

☒ $A + B + C \leq 1$

☐ $A + B + C = 1$

☐ $A - B - C \leq 1$

☐ $A - B - C = 1$

Question 25**1 / 1 pts**

If the acceptance of project A is conditional on the acceptance of project B, and vice versa, the appropriate constraint to use is a

☐ multiple-choice constraint.☐ k out of n alternatives constraint.☐ mutually exclusive constraint.**Correct!**☒ corequisite constraint.**Question 26****1 / 1 pts**

The solution to the LP Relaxation of a maximization integer linear program provides a(n)

Correct!☒ upper bound for the value of the objective function.☐ lower bound for the value of the objective function.☐ upper bound for the value of the decision variables.

- ☐ lower bound for the value of the decision variables.

Question 27**1 / 1 pts**

In a problem, 1 corresponds to a yes decision and 0 to a no decision. If there are 4 projects under consideration (A, B, C, and D) and at most 2 can be chosen, then the following constraint needs to be added to the formulation:

☐ $A + B + C + D \leq 1$

☒ $A + B + C + D \leq 2$

☐ $A + B + C + D \leq 4$

☐ $A + B + C + D = 2$

Correct!**Question 28****0 / 1 pts**

A cell phone manufacturer is preparing its inventory and production schedule. A key element is installing a SIM card into each phone. Demand has been averaging 210 cards per week. Holding costs are \$0.01 per card per week, and reorder costs are estimated at \$10 per order.

The manufacturer does not want to be out of stock on more than 1% of their orders. There is a one-day delivery time. The standard deviation of demand is five cards per day. Assume a normal distribution of demand during lead time and a seven-day work week. What is the total variable weekly cost including safety stock cost?

☐ \$6.60

☐ \$7.50

Correct Answer

You Answered

☐ \$8.00☒ \$9.40**Question 29****1 / 1 pts**

Inventory position is the amount of inventory

☐ on hand in excess of expected demand.☐ on hand.☒ on hand plus the amount of inventory on order.☐ on hand minus the expected demand.**Correct!****Question 30****1 / 1 pts**

In the single-period inventory model with probabilistic demand,

☐ surplus items are not allowed to be carried in future inventory.☐ $c_o = c_u$.☒ probabilities are used to calculate expected losses.☐ all of these are correct.**Correct!**

Question 31**0 / 1 pts**

For the EOQ model, which of the following relationships is correct?

Correct Answer☐

As the order quantity increases, the number of orders placed annually decreases.

☐

As the order quantity increases, annual holding cost remains constant.

You Answered☒

As the order quantity increases, annual ordering cost increases.

☐

As the order quantity increases, average inventory remains constant.

Question 32**1 / 1 pts**

A firm that is presently using the economic order quantity model and is planning to switch to the economic production lot size model can expect

Correct!☒

the Q^* to increase.

☐

the maximum inventory level to increase.

☐

the order cycle to decrease.

☐

annual holding cost to be less than annual setup cost.

Question 33**1 / 1 pts**

The objective of the EOQ with quantity discounts model is to

Correct!

- ☐ determine the minimum order quantity required for the maximum discount.
- ☐ balance annual ordering and holding costs.
- ☐ minimize annual purchase cost.
- ☒ minimize the sum of annual carrying, holding, and purchase costs.

Question 34**0 / 1 pts**

The time to check in a guest at a New York City hotel follows the exponential distribution and has a mean of six minutes. What is the probability of a registration time between three and six minutes?

you Answered☒ 0.3935☐ 0.6321**Correct Answer**☐ 0.2386☐ 0.0988**Question 35****0 / 1 pts**

If arrivals occur according to the Poisson distribution every 20 minutes, then which of the following is true?

☐ $\lambda = 20$ arrivals per hour**Correct Answer**☐ $\lambda = 3$ arrivals per hour

You Answered

☒ $\lambda = 20$ arrivals per minute☐ $\lambda = 20$ arrivals per day

Question 36

1 / 1 pts

Operating characteristics formulas for the single-server queue do NOT require

Correct!

☒ $\lambda \geq \mu$.☐ Poisson distribution of arrivals.☐ an exponential distribution of service times.☐ an FCFS queue discipline.

Question 37

1 / 1 pts

The time to check in a guest at a New York City hotel follows the exponential distribution and has a mean of six minutes. What is the probability of a registration time shorter than six minutes?

Correct!

☐ 0.3935☒ 0.6321☐ 0.2386☐ 0.0988

Question 38**1 / 1 pts**

Single-booth ticket sales at a theater are an example of which of the following queuing models?

Correct!

- ☒ Single-server, Poisson service rate distribution, unlimited queue length
- ☐ Single-server, Poisson service rate distribution, limited queue length
- ☐ Single-server, constant service rate distribution, unlimited queue length
- ☐ Single-server, normal service rate distribution, unlimited queue length

Question 39**1 / 1 pts**

Which of the following queue disciplines is assumed by the waiting line models presented in the textbook?

Correct!

- ☒ First-come, first-served
- ☐ Last-in, first-out
- ☐ Shortest processing, time first
- ☐ First-in, last-out

Question 40**0 / 1 pts**

Which of the following approaches to decision making requires knowledge of the probabilities of the states of nature?

you Answered

☐ minimax regret

☒ maximin

Correct Answer

☐ expected value

☐ conservative

Question 41

1 / 1 pts

Decision tree probabilities are primarily used to

Correct!

☒

analyze more complex problems and to identify an optimal sequence of decisions.

☐

analyze less complex problems while identifying the optimal sequence of decisions.

☐

find overlooked choices to the problem.

☐

assign probabilities to events.

Question 42

1 / 1 pts

A decision tree

Correct!☐

presents all decision alternatives first and follows them with all states of nature.

☐

presents all states of nature first and follows them with all decision alternatives.

☐

alternates the decision alternatives and states of nature.

☒

arranges decision alternatives and states of nature in their natural chronological order.

Question 43**1 / 1 pts**

The options from which a decision maker chooses a course of action are

Correct!☒

called the decision alternatives.

☐

not under the control of the decision maker.

☐

the same as the states of nature.

☐

uncertain events determined by probability.

Question 44**1 / 1 pts**

Making a good decision

☐

requires probabilities for all states of nature.

Correct!

requires a clear understanding of decision alternatives, states of nature, and payoffs.



implies that a desirable outcome will occur.



implies that an undesirable outcome will occur.

Question 45**1 / 1 pts**

For a minimization problem, the conservative approach is often referred to as the

Correct!

minimax approach.



maximin approach.



maximax approach.



minimin approach.