

Final Examination Practice

Section-I

True /False Questions

(18 marks, one mark each)

- 1) Managers do not need to be familiar with the limitations, assumptions, and/or specific applicability of the quantitative analysis technique to use it for accurate decision making.
Answer: FALSE
- 2) Minimum EOL will always result in the same decision as maximum EMV.
Answer: True
- 3) Time-series models attempt to predict the future by using historical data.
Answer: TRUE
- 4) One purpose of regression is to predict the value of one variable based on the other variable.
Answer: TRUE
- 5) A goal of many waiting line problems is to help a firm find the ideal level of services that minimize the cost of waiting and the cost of providing the service.
Answer: TRUE
- 6) Resource restrictions are called constraints.
Answer: TRUE
- 7) The objective of a transportation problem solution is to schedule shipments from sources to destinations while minimizing total transportation and production costs.
Answer: TRUE
- 8) In using the stepping-stone method, the path can turn at any box or cell that is unoccupied.
Answer: FALSE
- 9) The economic order quantity helps one estimate the optimal number of units to purchase with each order.
Answer: TRUE
- 10) One of the assumptions of the basic EOQ model is that the receipt of inventory is instantaneous.
Answer: TRUE
- 11) There is no relationship between Safety Stock and reorder point.
Answer: FALSE
- 12) In a quantity discount model, the purchase cost or material cost must be included in the total cost calculation.
Answer: TRUE

- 13) One of the most significant benefits of PERT is that it forces the project manager to sit down and plan the project in great detail – and thus come to an understanding of relationships between the activities.
Answer: TRUE
- 14) CPM is a probabilistic analysis of managing a project.
Answer: FALSE
- 15) The variance of the project completion time is equal to the sum of the variances of all the activities.
Answer: FALSE
- 16) The longest time path through a PERT/CPM network is called the critical path.
Answer: TRUE
- 17) Simulation is very flexible. Thus, its solutions and inferences are usually transferable to other problems.
Answer: FALSE
- 18) One disadvantage of simulation is that it does not allow for "what-if?" types of questions.
Answer: FALSE

From the following chose the correct Answer with the choice given (18 marks, one mark each)

- 1) A(n) _____ is a representation of reality or a real-life situation.
A) objective
B) model
C) algorithm
D) None of the above
Answer: B
- 2) Which of the following is true about the expected value of perfect information?
A) It is the amount you would pay for any sample study.
B) It is calculated as EMV minus EOL.
C) It is calculated as expected value with perfect information minus maximum EMV.
D) It is the amount charged for marketing research.
Answer: C
- 3) Which of the following is a technique used to determine forecasting accuracy?
A) exponential smoothing
B) moving average
C) regression
D) mean absolute percent error (MAPE)
Answer: D

4) Which of the following equalities is correct?

- A) $SST = SSR + SSE$
- B) $SSR = SST + SSE$
- C) $SSE = SSR + SST$
- D) $SST = SSC + SSR$

Answer: A

5) In queuing analysis, total expected cost is the sum of expected _____ plus expected _____.

- A) service costs, arrival costs
- B) facility costs, calling costs
- C) calling cost, inventory costs
- D) service costs, waiting costs

Answer: D

6) Which of the following is not a part of every linear programming problem formulation?

- A) an objective function
- B) a set of constraints
- C) maximization or minimization of a linear function
- D) a redundant constraint

Answer: D

7) Table 9-2

To=>		1	2	3	Supply
From	A	<div><div>3</div><div>20</div></div>	<div><div>6</div><div>30</div></div>	<div><div>3</div><div></div></div>	50
	B	<div><div>4</div><div></div></div>	<div><div>4</div><div>40</div></div>	<div><div>3</div><div></div></div>	40
	C	<div><div>5</div><div></div></div>	<div><div>7</div><div>10</div></div>	<div><div>6</div><div>15</div></div>	25
Demand		20	80	15	

In Table 9-2, cell A3 should be selected to be filled in the next solution. If this was selected as the cell to be filled, and the next solution was found using the appropriate stepping-stone path, how many units would be assigned to this cell?

- A) 10
- B) 15
- C) 20
- D) 30

Answer: B

8) The two most common objectives for the assignment problem are the minimization of _____.

- A) uncertainty or inexperience
- B) total costs or inexperience
- C) total costs or total time
- D) total time or inexperience

Answer: C

- 9) In making inventory decisions, the purpose of the basic EOQ model is to
- A) minimize carrying costs.
 - B) minimize ordering costs.
 - C) minimize the sum of carrying costs and ordering costs.
 - D) minimize customer dissatisfaction.

Answer: C

- 10) Which of the following is not considered a significant inventory cost?
- A) cost of production labor
 - B) purchase cost
 - C) cost of carrying an item
 - D) cost of ordering

Answer: A

- 11) Which of the following is not an assumption for the basic EOQ model?
- A) Only an integer number of orders can be made each year.
 - B) Inventory receipt is instantaneous (all at once).
 - C) With orders placed at the correct time, there will be no shortages.
 - D) Demand is known.

Answer: A

- 12) The EOQ model without the instantaneous receipt assumption is commonly called the
- A) quantity discount model.
 - B) safety stock model.
 - C) planned shortage model.
 - D) production run model.

Answer: D

- 13) Sensitivity analysis of EOQ refers to
- A) the attitude of top management toward the use of the EOQ model.
 - B) analysis of how much the EOQ will change if different input values are used.
 - C) an assessment of the impact of obsolescence upon the EOQ.
 - D) a study of the impact of storing incompatible products in the same warehouse.

Answer: B

- 14) The annual demand for a product is 1,000 units. The company orders 200 units each time an order is placed. The lead-time is 6 days, and the company has determined that 20 units should be held as a safety stock. There are 250 working days per year. What is the reorder point?
- A) 20
 - B) 24
 - C) 44
 - D) 120

Answer: C

- 15) Given an activity's optimistic, most likely, and pessimistic time estimates of 2, 5, and 14 days respectively, compute the PERT expected activity time for this activity.
- A) 6
 - B) 7
 - C) 9
 - D) 5

Answer: A

- 16) Reducing the overall activity time is based on which of the following steps?
- A) crashing activities with the lowest overall crash cost
 - B) crashing activities with the lowest overall normal cost
 - C) crashing activities on the critical path based on lowest cost/week
 - D) crashing activities with the lowest cost/week.
- Answer: D
- 17) An alternative approach to project crashing is to use which of the following techniques?
- A) linear programming
 - B) nonlinear programming
 - C) Markov analysis
 - D) queuing theory
- Answer: A
- 18) The following is not an advantage of simulation:
- A) It allows for the study of *what-if* questions.
 - B) Each simulation model is unique.
 - C) It allows the study of interaction of components or variables to determine which are important.
 - D) It allows time compression.
- Answer: B

Section-II

Short Answering Questions

(8 marks, 4 Marks Each)

- 1) A small furniture manufacturer produces tables and chairs. Each product must go through three stages of the manufacturing process: assembly, finishing, and inspection. Each table requires 3 hours of assembly, 2 hours of finishing, and 1 hour of inspection. Each chair requires 2 hours of assembly, 2 hours of finishing, and 1 hour of inspection. The profit per table is \$120 while the profit per chair is \$80. Currently, each week there are 200 hours of assembly time available, 180 hours of finishing time, and 40 hours of inspection time. Linear programming is to be used to develop a production schedule. Define the variables as follows:

T = number of tables produced each week

C = number of chairs produced each week

For this linear programming problem, what are the objective function and its constraints?

Answer:

Objective function: Maximum profit = $120T + 80C$

Subject to:

$3T + 2C \leq 200$ for assembly

$2T + 2C \leq 180$ for finishing

$T + C \leq 40$ for inspection

$T \text{ and } C \geq 0$

- 2) Ahmed sells 3,600 electric motors each year. The cost of these is 200 SR each, and demand is constant throughout the year. The cost of placing an order is 40 SR, while the holding cost is 20 SR per unit per year. There are 360 working days per year and the lead-time is 5 days. If Ahmed orders 200 units each time he places an order, what would his total ordering cost be for the year?

Answer:

$$\text{Annual ordering cost} = \frac{D}{Q} C_o = \frac{3600}{200} (40) = 720 \text{ SR}$$

Section-III

Attempt any one of the following Essay Type Questions

(6 Marks)

1)

Barbara Bright is the purchasing agent for West Valve Company. West Valve sells industrial valves and fluid control devices. One of the most popular valves is the Western, which has an annual demand of 4,000 units. The cost of each valve is \$90, and the inventory carrying cost is estimated to be 10% of the cost of each valve. Barbara has made a study of the costs involved in placing an order for any of the valves that West Valve stocks, and she has concluded that the average ordering cost is \$25 per order. Furthermore, it takes about two weeks for an order to arrive from the supplier, and during this time the demand per week for West valves is approximately 80.

- Compute the EOQ.
- Compute the ROP.
- Compute the optimal number of orders per year.
- Compute the total annual cost for Western valves.

Answers:

a) $EOQ = \sqrt{2 \times 4000 \times 25 / 0.1 \times 90} = \sqrt{22222.22} = 149.07 \text{ units.}$

b) $d = 80 / 7 = 11.43$, $L = 14$
 $ROP = d \times L = 11.42857 \times 14 = 159.99 \sim 160 \text{ units.}$

c) $= D / Q$
 $= 4000 / 149.07$
 $= 26.83 \text{ order.}$

d) $\text{Annual holding costs} = (Q/2) \times I \times C = (149.07/2) \times 0.1 \times 90$
 $= \$ 670.82$
 $\text{Annual ordering costs} = (D/Q) \times C_o = (4000/149.07) \times 25$
 $= \$ 670.83$
 $\text{Total Annual Costs} = (Q/2) \times I \times C + (D/Q) \times C_o$
 $= \$ 1341.65$

OR

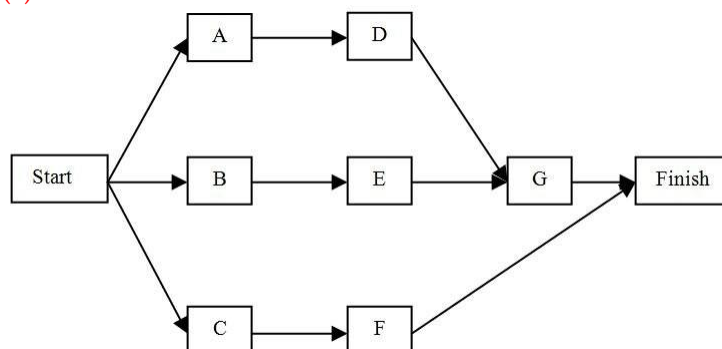
- 2) Development of a new deluxe version of a particular software product is being considered. The activities necessary for the completion of this are listed in the table below (Time in weeks).

Activity	Normal Time	Crash Time	Normal Cost	Crash Cost	Immediate Predecessor
A	4	3	2200	2600	--
B	2	1	2200	2800	--
C	3	3	500	500	--
D	8	4	2300	2600	A
E	6	3	900	1200	B
F	3	2	3000	4200	C
G	4	2	1400	2000	D, E

- (a) Draw the PERT network associated with the activities.
 (b) What is the project completion date?
 (c) What is the total cost required for completing this project on normal time?
 (d) If you wish to reduce the time required to complete this project by one week, which activity should be crashed, and how much will this increase the total cost?

Answers:

(a)



- (b) Project completion time = 16 weeks (Activities A-D-G)
 (c) Total cost = \$12,300
 (d) Crash D, one week at an additional cost of \$75