

## Operation Management exam questions

### 1) What are the "PROs" of leading strategy for capacity management?

- Lower impact of unforeseen events and underestimating demand, spare parts capacity, better delivery reliability
- Lower production costs, lower impact from overestimating demand, high plant utilization
- Lower impact of unforeseen events, high plant utilization better delivery reliability
- Outbound cash flow, higher impact from overestimating demand, higher production costs

	PROS	CONS
Leading	Always spare capacity for opportunities Faster response time Better delivery reliability Lower impact of uncertainty and unforeseen events Lower impact from underestimating demand: low risk of stock-out	Higher production unit cost Outbound cash flow: we anticipate the costs Higher impact from overestimating demand: too inventories
Lagging	High plant utilisation Low production cost Lower impact from overestimating demand	Longer response time Lower deliver reliability Higher impact from underestimating demand: high stock-out

### 2) What are the "PROs" of lagging strategy for capacity management?

- Lower impact from overestimating demand, low production costs and high plant utilization
- Lower impact of uncertainty and unforeseen events and low production costs
- Higher impact from understanding demand, longer response time and lower delivery reliability
- Lower impact from overestimating demand, spare part capacity and faster response time

### 3) Is for the leading strategy?

- Lower impact of unforeseen events and underestimating demand, spare parts capacity, better deliver reliability ← (PROS)
- Lower production costs, lower impact from overestimating demand, high plant utilization
- Lower impact of unforeseen events, high plant utilization, spare parts capacity, better delivery reliability
- Outbound cash flow, higher impact of overestimating demand, higher production costs ← (CONS)

### 4) What are the "CONS" of the leading strategy for capacity management?

- lower impact of unforeseen events and underestimating demand, spare parts capacity, better delivery reliability.
- lower production costs, lower impact from overestimating demand, high plant utilization.
- lower impact of unforeseen events, high plant utilization, better delivery reliability.
- outbound cash flow, higher impact from overestimating demand, higher production costs.

### 5) What are the benefits of small scale capacity increments compared to big scale increments?

- Financing availability
- Economies of scale
- Over utilization costs
- None of the answers

6) Esselunga, as per health guidelines, adopted an M/M/1 configuration for the waiting line outside the supermarket. How does the average throughput time of that system change when prioritizing over 65-year-old over other customers?

- It decreases
- It increases
- It depends on peak times
- It remains unchanged

7) During SMED

- Internal activities are moved to the beginning or to the end of setup procedure
- Products are batched in order to reduce setups
- External activities are moved to the beginning or to the end of setup procedure
- Setup activities are automatized

8) Which is the most probable decision you can find if a company decides to drive digital transformation through lean principles:

- IoT for making data available to operators for taking decision
- Supplier visibility on forecasts, orders and inventories in order to anticipate stock-outs
- Investments in real time scheduling
- Automations in order to exploit new technologies for increasing capacity

9) Investing in cross-trained employees supports company:

- Increase time-buffer for customers
- Making capacity more flexible
- Reducing demand variability
- Increase overall capacity

10) Considering a theme park service company, which of the following options could be considered an outcome of the company?

- Easy parking, lots of rides and fun time
- Good food and 18 rides used
- Food outlets, toilets and white knuckle rides
- Helpful staff, never a dull moment and enjoyable attractions (← THIS IS PART OF THE EXPERIENCE)

11) Lean Innovation concepts drive R&D teams to tackle wastes in order to

- Reduce time necessary to perform market research
- Reduce time devoted to product features not desired by customers
- Reduce time for finding new customers
- Execute many projects simultaneously

12) Considering an R&D department led by Lean Innovation concepts, which is the most probable context you can find?

- Function Pushing for perfect learning cycle, launching product on the market only when all the features are completed
- Function Pushing for fast learning cycle through many small iterative projects
- Function Pushing for fast learning cycle with very big teams in order to have more resources on the same projects
- Teams working at the same time on more projects in parallel

**13) Which is the most probable decision you can find if a company decide to drive digital transformation through lean principles:**

- Automations in order to exploit new technologies for increasing capacity
- HMI technologies in order to improve flexibility of operators
- **RFID technologies in order to track real time product status**
- Machine learning for planning in order to reduce number of setups

**14) According to KDAM (Key Decisional Area matrix), DHL transport services belongs to cluster**

- Service project
- **Service factory**
- DIY service
- Service Partnership

**15) In HQ case, on which performance does the choice of investing in a small number of big machines impact?**

- higher quality of design thanks to better setting of machines
- lower flexibility of plan thanks to lower number of required setups
- **higher speed (time) thanks to shorter cycle time**
- higher price thanks to low number of employees needed

**16) In the HQ case, which lever should you implement in order to improve flexibility performance?**

- Increase automation grade in order to produce faster
- Launch production of big batches in order to reduce setups
- **Split production capacity in larger number of machines**
- Increase capacity saturation

**17) In the HQ case, which are the most significant performance to compete in the new market ?**

- **Time (speed), flexibility ( product and plan), quality of design**
- Time(speed), price and flexibility(variety)
- Quality (conformity) and time (delivery reliability)
- Price and quality of design

**18) In the HQ case, which is the most significant performance to compete the consolidated market?**

- Time (speed)
- **Price**
- Quality (design)
- Quality (conformity)

**19) In the HQ case, which of the following is not consistent decision according to the consolidated market**

- Meeting the demand according to MTS logic
- Customer base made of few big customers
- **Incentives system based on quality conformance and delivery speed objectives**
- Work procedures strictly recommended

20) In the HQ case, which of the following is **not a consistent “structural choice”** according to the new market?

- Mono-impression moulding in order to ensure lower setup times.
- Increasing the production capacity in order to absorb demand variability.
- **Small number of big production machines in order to ensure machine saturation.**
- Low automation grade

21) In the HQ case, which lever should you implement in order to improve **cost performance**?

- Increase capacity in order to absorb variability through extra-capacity
- Split production capacity in many small machines
- **Launch production of big batches in order to reduce setups**
- Decrease automation grade

22) In the HQ case, why is it **good choice for the new market to have extra-capacity**?

- because it allows to overproduce and so to have stocks to absorb peaks of demand
- because it impacts on product quality and so on customer satisfaction
- **because it allows to absorb possible fluctuations in demand volume without using stocks**
- because it allows to exploit economies of scale

23) In the new market for HQ

- customers require a large variety of products so then after-sales service is required to assist clients.
- **customers require a large variety of products so then variety and flexibility performance play a key role.**
- customers require a small variety of products that are ordered in advance.
- customers require a small variety of products so the focus is on product flexibility.

24) Which of the following **sentences about the future state map is wrong**?

- The aim of the future state map is to reduce the overall process lead time of the company
- **Once you draw the current state map, you must find improvements area and then draw the future state map. It exists only one future state map for each current state**
- You need to define (1) material flow, (2) information flow and (3) timeline
- The aim of the future state map is to couple all production stages. If you are not able to do so, you can decouple stages with supermarket pull system

25) Choose the correct answer for **M/M/C system**

- **When system utilization increases for the same number of servers, the number of people waiting in queue increases**
- When system utilization increases for the same number of servers, the number of people waiting in queue decreases
- When system utilization increases for the same number of servers, the number of people waiting in queue remains the same
- When system utilization decreases for the same number of servers, the number of people waiting in queue increases

26) In a grocery store, there are 4 people waiting in line for the payment. There are 3 cash counters and the service rate of each cashier is 2 people every 10 minutes. The clients are served by the two cashiers following a FIFO approach in one single line. What is the queue configuration?

- MM4
- 3M/M/1
- MM3
- 3MM3

27) In a grocery, there are 5 people waiting in line for the payment. There are 2 cash counters, and the service rate of each cashier is 2 people every 10 minutes. The clients are served by the 2 cashiers following a FIFO approach in one single line. What is the queue configuration?

- 2 M/M/2
- 2 M/M/1
- M/M/5
- M/M/2

- Good food and 18 rides

28) In a store there are 5 people waiting in line for the payment. There are 2 cash counters and the service rate of each cashier is 2 people every 10 minutes. Each cashier has its own queue. What is the queue configuration?

- 2M/M/2
- 2M/M/1
- M/M/5
- M/M/2

29) What are the service product characteristics?

- Simultaneity, Customer participation, Homogeneity, Perishability
- Perishability, Intangibility, Time consuming, Homogeneity, Customer participation, high fixed cost
- Intangibility, Simultaneity, Heterogeneity, Customer Involvement in the service process, Perishability
- Simultaneity, Heterogeneity, Invisibility, Customer involvement in the service process, Perishability

30) In a service company, which benefits does centralization of back-office activities give ?

- Shorter lead-times
- Less volume variability
- Activities overlapping
- Greater Flexibility

31) You are a manager of a restaurant; if your service process(output) is affected by uncertainty, which lever do you invest in ?

- Reservation system
- Training
- Standardization of activities
- Increasing employees participation in process improvement

**32) Imagine that you have a production process where there are two parallel flows (press and cutter). What will you consider for drawing your timeline? (1 Point)**

-I will compute the overall time length of both paths, once passing through the press and once passing through the Cutter. I will consider the longest path for my timeline (in terms of stage, as well as of upstream and downstream supermarkets).

-I will consider for my timeline the longest CT for the two parallel stages while for the downstream supermarkets, the one with higher number of stocked piece.

-I will consider for my timeline the stage with the highest EPE.

-I will consider for my timeline the shortest CT for the two parallel stages while for the downstream supermarkets, the one with lower number of stocked piece.

**33) Shotter Spa produces pencil and works with 2 shifts (Ta=900 min/day). The average demand is 300 pencil/ day. There are two production stages, both fully dedicated and with availability of 100%: P1( CT= 30 sec/ pencil; CO= 5 min/ setup and P2( CT= 25 sec/pencil; CO=0 min/setup).**

**Which is the Minimum Batch size for the company?**

- MBS= 2 pencil/ batch

- MBS= 150 pencil/ batch

- MBS=unitary batch

- It depends on customers' requests

**34) When you introduce the "overbooking" and you need to estimate the protection level of full price customers, you have to first estimate the cost of underestimation and cost of overestimation. On what type of customers do you compute the marginal analysis?**

- Both the cost of overestimation and cost of underestimation are computed on no-show customers

- Both the cost of overestimation and cost of underestimation are computed on full price tickets customers

- The cost of overestimation is computed on full price tickets customers while the cost of underestimation is computed on discounted price tickets customers

- Both the cost of overestimation and cost of underestimation are computed on discounted price tickets customers

**35) Choose the only correct answer regarding the customer behaviour in a queuing system modelling.**

- Balking is when a customer already in queue gives up the service and goes away without being served

- Reneging is when a customer already in queue gives up the service and goes away without being served

- Reneging is when a customer decides not to enter a queue because it's already too long

- Rejecting is when a customer decides to exit the system because she doesn't respect acceptance requirements

**36) Choose the correct sentence:**

- The no-show phenomenon cannot be managed with the overbooking.

- The no-show phenomenon characterises only full price customers.

- The no-show phenomenon could characterise both full and discounted price customers.

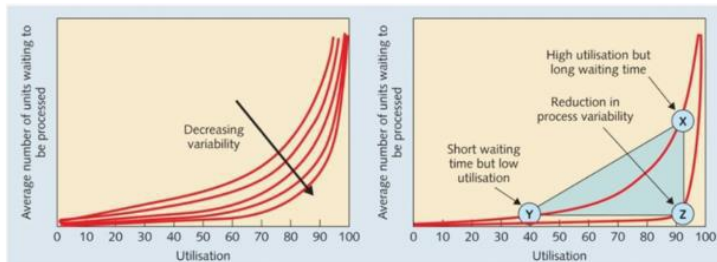
- The no-show phenomenon characterises only discounted price customers.

**Commented [MB1]:** no of set up = 150  
 $d/\#setup = 300/150 = 2$  pc/batch

**Commented [MB2R1]:**  $C/T [30;25] = 30$  sec/pencil  
 $C/O = 5$  min/setup  
 $A = 100\%$   
 SYSTEM - How many setups may we do per day?  
 $30/1 \cdot 60 + X \cdot 5 = 900$   
 $X = 150$   
 $D/setup = 300/150 = 2$  pencil/batch

**37) Choose the only correct answer**

- Cost of underestimation includes the lost revenue associated with reserving too few seats as discounted fare (underestimated demand)
- Cost of underestimation includes the cost of reserving too many seats at full fare (overestimated demand). As if the empty full-fare seat could have been sold at the discounted price
- **Cost of underestimation includes the lost revenue associated with reserving too few seats as full fare (underestimated demand)**

**38) Choose the one correct answer regarding the graph with X being the AS-IS situation**

- To move from X to Y, we want to reduce the average number of units in line, we should reduce the utilization rate by reducing the number of resources
- **Process variability results in simultaneous waiting and resources underutilization**
- In order to move from X to Z, we should reduce system variability by introducing more resources
- All the answers are correct

**39) Choose the one correct answer**

- **Protection level of full price tickets is necessary to avoid cannibalization from discounted price tickets to ensure profit maximization and cover all the seats available.**
- In order to maximize my revenues, it is more convenient to sell all tickets to low cost passengers as I am sure they will buy them all
- Protection level of discounted price tickets is necessary to avoid cannibalization from full price tickets
- Having fixed capacity of event's seats, we should start selling full price tickets to ensure profit maximization and cover all the seats available

**40) Which is the longest time in an operations system?**

- **Throughput time**
- Value adding time
- **Lead time**
- Not-value adding time
- Cycle time

**41) Which is the shortest time in an operations system?**

- lead time
- value adding time
- throughput time
- not value adding time

**Commented [MB3]:** The lead time is the time between the order of the customer to the delivery, the throughput time is the total time of the process (from when the product is in stock to when it is ready)

**42) Schnay company produces only standard products and has an EPE equal to -0,76 days. Which indication does the company take?**

- Schnay company is able to produce the whole volume but not the mix
- Schnay company needs SMED to reduce setup time
- Schnay company has not enough capacity to fulfil demand volume
- Schnay company is sure to reproduce both volume and mix required by customers

**43) Which characteristic belongs to a performance that is classified as Order Qualifier?**

- If company's performance improves, the company gains more order
- The performance defines the competitive advantage of the company
- If company's performance gets worse, the company loses order
- Company's quality performance is very good

**44) Which characteristic belongs to a performance that is classified as Order winner**

- Company's price performance is very good
- It is a company's base level offering
- The performance defines the competitive advantage of the company
- If company's performance gets better, the company orders remain unchanged

**45) Which characteristics belongs to a performance that is classified as Order-Loser?**

- company's quality performance is very good
- company is excluded as potential supplier by customer
- if company's performance improves, the company has a competitive advantage against competitors
- the performance defines the competitive advantage of the company

**46) In a multiple queueing system, which are the benefits of centralization of back-office activities?**

- Shortening of lead-time
- Increasing on flexibility
- Higher specialization
- Increasing customization

**Pros:**

- No interruptions (efficiency)
- Fast decrease along the experience curve
- Specialization of activities thanks to high volume • Lower manpower cost
- Possibility to follow personal attitudes
- Less volume variability

**Thanks to high volume:**

- o Economies of scale
- o Automation, with advantages in terms of cost and quality

**CONS**

- Possible gap with the Front-Office
- Activities overlapping
- Longer lead times
- Higher rigidity
- Inability to keep a product base approach, therefore switching to an activity based approach



47) In a single queueing system, which are the benefits comparing it with multiple queueing system?

- Shortening of lead-time
- Reduce the anxiety of customers waiting in line
- Higher specialization
- Increasing customization

48) Which characteristic belongs to a single queue with respect to multiple queue?

- More service diversification
- More variability in the system
- Balking actions are less frequent
- Less variability in the system

49) Which characteristic belongs to a professional service shop compared to mass service?

- More attention to quality
- Request of knowledge sharing
- Less attention to cost
- More product innovation

50) Which characteristic belongs to a professional service shop compared to mass service

- Attention to price
- Attention to customer specific requirements
- Attention to quantity
- Process innovation

51) In a bar, the barman is able to serve 2 people every 8 minutes. The arrival rate of clients has been estimated to be around 10 people every hour. Estimate the saturation of the barman.

- 0,5
- 0,2
- 1,5
- 0,67

$$\rho = \frac{\lambda}{\mu} \quad \lambda = 10 \text{ c/h} \quad \mu = 15 \text{ c/h} = 0,6\bar{6}$$

**Commented [MB4]:** 2 people every 8 minutes:  
60 min/8 min = 7,5 ; 7,5 \* 2 = 15  
15 customer in an hour

52) How would you define the Heuristic EMSR method EMSR (Expected Marginal Seat Revenue)?

- An iterative method used to set the right overbooking strategy by appropriately allocating the available capacity whenever there are more than two classes of customers. The computation starts from the cheapest class
- An iterative method used to maximize the profit by appropriately allocating the available capacity whenever there are more than two classes of customers. The computation starts from the most expensive class.
- An iterative method used to maximize the profit by appropriately allocating the available capacity whenever there are only three classes of customers. The computation starts from the most expensive class
- An iterative method used to maximize the profit by appropriately allocating the available capacity whenever there are only three classes of customers. The computation starts from the cheapest class

53) Usually, comparing SES company with a traditional company, SES company has

- Higher fixed cost and higher price
- Higher fixed cost and lower price
- Lower fixed cost and lower price
- Lower fixed cost and higher price

54) Lean organizations are characterized by

- Flat organization composed by many small teams, high level of power delegation to people
- Hierarchical organization composed by few large teams, low level of power delegation to team officers
- Flat organisation composed by few large teams, high level of power delegation to team officers
- Hierarchical organization composed by many large teams, low level of power delegation to people

55) Considering a production line, if you want to improve flexibility of planning, which lean technique do you execute?

- 5S
- Kanban
- SMED
- Value Stream Mapping

56) Consider a manufacturing company producing shirts and define which activity is value adding

- Perform a quality control on the colour of the shirts before delivering them to the customers
- Sew the buttons on the shirts
- Bring the toolkit to the right place
- Clean the stations

57) Considering a manufacturing company producing machine tools and define which activity is value adding:

- Test a product before sending it to the customer
- Inserting a ball shift on its shaft
- Bring electric motors from the warehouse to the place where machine tool is assembled
- Plan internal and external operators' activities for the next week

58) With Pre-Shop-Pool and workload control planning, the company:

- Reduces setups
- Controls the production and reduces necessity of manpower
- Reduces WIP and shop-floor time
- Immediately releases production orders to shorten lead time

59) When orders in Pre-Shop-Pool reach the upper limit, the company should:

- decrease order intake
- foster sales
- decrease capacity
- selling shorter delivery time to customer

60) In the service industry, the level of satisfaction of a customer has been defined

- By the experience
- As the difference between the expectation and the service price
- As the difference between perception and expectation
- By the experience of the outcome

61) How would you compute the variability?

- The difference between the average value and the actual value
- The difference between the average value and the forecasted value
- The difference between the average value and the forecasted value (si, era doppia)
- The difference between the actual value

62) How would you compute "uncertainty"?

- The difference between the average value and the actual value
- The difference between the average value and the forecasted value
- The difference between the actual value and the expected value
- None of the previous

63) The assembly stage of Ryccar Spa company process 5 variants of bikes and works 1350 min/day. Average demand is equal to 50 bikes/day. Assembly stage is fully dedicated, and its availability is 75%. Cycle time to assemble bikes is 18 min/bike. Assembly stage requires a setup every time the variant changes. Changeover time is equal to 35min/setup. Which of the following EPE for the assembly stage is the correct one?

- 1.16 days
- 0.38 days
- 1.45 days
- 0.79 days

64) Bendys Spa is a MTO company. Production process is made by 4 stages with the following EPE values: EPE(S1)=3.15 days; EPE(S2)=0.16 days; EPE(S3)=0; EPE(S4)=1.14 days. Which is the time period necessary to Bendys Spa to produce the whole mix and satisfy required by the customers?

- 3.15 days
- 1.14 days
- It depends on the amount of stocks and raw materials
- 1.1125 days

65) The impact of Heijunka box is of

- Creating continuous flows
- Reducing bullwhip effect
- Increase safety stocks
- Reducing setups

66) DECAF conditions analysis supports managers in

- Increase availability of a cell
- Defining optimal level of stocks
- Improving planning of production
- Understanding gap for creating continuous flow

**Commented [MB5]:**  $T_a = 1350$  min/day  
 $d = 50$  bikes/day  
 $C/T = 18$  min/ bike  
 setups = 5 times  
 $C/O = 35$  min/setup  
 Availability = 75%

$EPE \cdot T_p + T_s = T_a \cdot EPE$   
 $EPE = T_s / (T_a - T_p)$   
 $EPE = 5 \cdot 35 / (1350 - (18 \cdot 50 / 0,75))$  EPE = 1,16

**67) Which of these sets of characteristics represent the ideals for yield management?**

- Variable capacity, perishable inventory, low capacity-change costs, and product booked in advance
- Fixed capacity, perishable inventories, low capacity-change cost, and ability to segment markets
- Perishable inventory, high capacity-change costs, product sold after its use and fixed demand
- Fixed capacity, perishable inventory, high capacity-change costs, ability to segment market, fluctuating demand and products booked or sold in advance

**68) Which of the following system characteristics make YM Yield Management not useful?**

- Possibility to buy/book in advance the product/service
- Products are perishable
- System's variable capacity
- There are different types of customers (segment

**69) Which type of company can benefit from implementing yield management?**

- Only companies that provides a service to customer
- Companies belonging to specific industries that have fixed capacity and want to maximize their profit
- Any kind of companies able to segment the segment the market, that have fixed capacity and perishable inventory, high capacity change cost, uncertain demand and the possibility to sell/book product in advance
- Only service companies able to segment the segment the market, that have fixed capacity and perishable inventory, high capacity change cost, uncertain demand and the possibility to sell/book product in advance

**70) Inserting a last-minute ticket, a company adopting yield management**

- Increasing the protection level
- Decreasing the protection level
- Increasing both protection level and seats for discounted rate
- Not impacting on protection level

**71) For the Shouldice hospital, which are the drawbacks of opening a second clinic (even outside Canada)?**

- The difficulties of replicating the same concept, especially for what regards soft elements( bond among doctors and staff, relationship with patients, and the standard procedure of hernia surgery)
- The difficulties of replicating the same concept, especially for what regards hard elements( patients rooms, stairs, surgery rooms with U shape ...).
- The difficulties in guaranteeing the same duration and predictability of hernia surgeries.
- The difficulties in hiring new doctors and staff

**72) For the Shouldice hospital, which are the drawbacks of opening on Saturday ?**

- There are no drawbacks for this solution, and therefore is the one applied by Shouldice hospital
- Clients are not satisfied because the service provided is not exactly equal to the one provided during week
- Lower bond among doctors and staff, because there was the creation of two sub- groups ( one working only during weeks and one working also on Saturdays) and service provided on Saturdays not exactly equal to the one provided during week
- Not enough rooms available to guarantee 4 days of patients recovery, therefore the solution is not applicable

**73) Shouldice Hospital plays mainly on 2 levers to provide customers with such a high well-recognized value. Which are them? (PRICE IS NOT A LEVER)**

- High specialization (only one surgery) and high competences of its own employees
- High specialization and low price
- High competences of its own employees that enable Shouldice to deliver above- average quality
- Low price and competences of its own employees

**74) Shouldice Case represents a "best practice" of alignment between market and operations. How is its concept built?**

- The concept of Shouldice hospital is based on both outcome and experience provided to the patients
- Shouldice hospital built its concept on the outcome, namely the high success rate in the hernia surgery
- Shouldice hospital built its concept on the short and predictable time required to patients to recover from hernia surgery
- The concept of Shouldice hospital is based on the low price for hernia surgery compared to competitors

**75) Which managerial and organizational elements strengthen the concept of Shouldice?**

- Presentation on the surgery held by the medical staff to patients and the possibility for the patients to meet both employee and other patients in the canteen to share experience
- Making patients wait a long time before being accepted by the hospital (long queue) in order to make them aware of the value of the service provided
- Being able to provide the hernia surgery in the day hospital (short and predictable time)
- Frequent interviews to patients not satisfied by other hospitals in better defining operations

**76) Which structural elements strengthen the concept of Shouldice?**

- Surgery rooms with U shape which reinforce the teamwork concept among medical staff
- Double rooms for patients, meeting rooms (as tea room or Tv room) and meetings with employees and patients within the canteen
- Special stairs, designed ad hoc, which enable patients to recover fast from the hernia surgery.
- Double rooms for patients, meeting rooms (as tea room or TV room), special stairs, surgery rooms with U shape( as manufacturing cells)

**77) Shouldice hospital is facing an increase in demand that is not able to fulfil with the actual capacity. Which are the possible alternatives?**

- Having a mismatch between demand and capacity is done on purpose, so thus no alternatives are evaluated.
- Extending the doctors working hours or working on Saturdays with already existing staff or opening a second clinic (even outside Canada).
- Increasing the internal capacity (extending doctors working hours, opening on Saturdays, hiring new doctors), opening a second clinic (even outside Canada) or starting a collaboration with other clinics.
- Hiring new doctors and staff to increase the internal capacity of the hospital

78) ~~When introducing a priority of one customer typology over another, the throughput time of a system~~

- Increases only if non pre-emptive priority
- Increases only if pre-emptive priority
- **Remain unchanged**
- Increases regardless of priority type

79) ~~An apparel shop wants to determine by ym the number of dresses to be ordered for the next season collection. Consider that dresses ordered but not sold at the end of the season are all sold by lowering the price by 50% from 400 €/pc to 200 €/pc (the purchase costs 250 €/pc), which value is  $p(x < s)$ ?~~

- 0,33
- 0,67
- **0,5**
- 0,75

80) ~~For a local flight in Italy one can buy a 14-day advance purchase fare for only 49 euro; the regular full price for local flight is 60 euro. On average all type of passengers buy directly on the flight a brioche that costs 3 € and coffee for 2 €; choose the correct answer:~~

- $Co = 49 + 2 + 3 = 54$
- **$Co = 49$**
- $Co = 49 - 2 - 3 = 44$
- $Co = 49 - 2 + 3 = 50$

81) ~~For a local event, one can buy a 20-day advance ticket for only 50€. The regular full-fare price for the ticket is 70€. Participants of the events will be offered a buffet for 20€ per person, the dinner expenses are provided by a local sponsor~~

- **$Cu = 70 - 50 = 20$**
- $Cu = 70 - 50 - 20 = 0$
- $Cu = 70 - 50 + 20 = 40$
- $Cu = 70$

82) ~~For the passport control, Malpensa airport adopts a single queue configuration while Istanbul airport adopts multiple queue configuration. Considering the same number of servers, choose the correct answer.~~

- Malpensa's average throughput time is longer and no balking happens
- In either airports, no passenger enters and leaves without being served, but Istanbul's configuration scares passengers
- **Istanbul focuses more on improving customer perception while Malpensa focuses more on FCFS to try to reduce the overall waiting time.**
- Diversification of the service is more important for Malpensa than for Istanbul

83) ~~Sailor spa production process is made by 5 stages with the following epe:  $epe(s1) = 2,14$  days;  $epe(s2) = 0$  days;  $epe(s3) = 2,51$  days;  $epe(s4) = 1,42$  days;  $epe(s5) = 0,66$  days. Which is the frequency according to which sailor spa is able to produce the whole volume and mix required by the customer:~~

- **Every 2,51 days**
- Every 1,346 days
- It depends on the volume and mix required by the customer
- Every 0,66 days

Commented [MB6]: Max EPE in the system

84) Rank order clustering is a lean practice for:

- Reducing set-ups
- Identifying wastes
- Defining product families
- Creating the pull

85) Role of the “deliberate strategy” in the operations strategy of a company is:

- To exploit opportunities emerging from the field in turbulent environment
- To define a clear line to take many little good choices
- To reach the gap with premium class competitors
- To define investment in new technologies

86) Operations capabilities are classified as “externally supportive” if they

- hold the organization back
- are clearly the best industry
- redefine industry expectations
- are as good as competitors

87) Cargo spa produces glasses (d=1000 pieces/day) and it wants to have at maximum 5000 pieces/supermarket. With which frequency the supplier should deliver raw material

- Every 5 day
- Every 3,33 days
- Twice a day
- Twice per working week (week = 5 days)

88) Linus company works for 900 min/day and the daily demand of product family “a” is 2000. The packaging department is dedicated to the product family a and it is able to pack the product in 12 different colours. The cycle time of this stage is 20 sec while the time to change the colour of the packaging takes 4 minutes. The department is 100% available. Estimate the epe of the packaging:

- 0,206
- 0,052
- -0,403
- 1,234

Commented [MB7]:  $EPE \cdot T_p + T_s = EPE \cdot T_a$   
 $x \cdot 20 \cdot 2000 / 1 + 12 \cdot 4 \cdot 60 = 900 \cdot 60 \cdot x$

89) PDCA is a methodology for:

- adopting scientific approach in problem setting and problem solving
- reducing level of stocks in production department
- optimizing space occupied in assembly line
- reducing time for implementing new solutions

90) In a COVID testing clinic, a patient enters the waiting area then the testing area and then the payment area. How much is the probability of the system being empty knowing that the probabilities of each of the subsystems being empty are 0.1, 0.2, 0.3 respectively?

- $P = \max$  of all probabilities = 0.3
- $P = 0.1 + 0.2 + 0.3 = 0.6$
- $P = 0.1 \cdot 0.2 \cdot 0.3 = 0.006$
- $P = (0.1 + 0.2 + 0.3) / 3 = 0.2$

91) In a COVID-testing clinic, a patient enters the waiting area then the testing area then the payment area. Which is the average number of patients in the clinic knowing that the average number of people in each of the areas are 2, 3 and 4 respectively?

- max of all  $L_s=4$
- $L_s=2+3+4=9$
- $L_s=2*3*4=24$
- $L_s=(2+3+4)/3=3$

92) Calculate the revenues of an event knowing that it can hold up to 500 participants, Full price = 200 euros, Discounted price = 100 euros, PL = 240, and full price ticket holders get to have as a gift a gadget at the day of the event that costs 15 euros.

- $R=200X + (500-240)*100$
- $R=(200-15)*X + (500-240)*X$
- $R=200*240 + 100*(500-240)$
- $R=(200+15)*X + (500-240)*100$

93) knowing that the probability to sell a number of tickets for a gala dinner less than 190 equals to 80% and the demand is described by a normal distribution with mean 150 and  $Z=1.25$ , how much is the standard deviation?

- $\sigma=152$
- $\sigma=32$
- $\sigma=120$
- $\sigma=0.2$

Commented [MB8]:  $(190-150)/\sigma=1.25 \rightarrow \sigma=32$

94) "Station 1, 2 and 3 are part of the same line and they are decoupled by stocks, given the following data, indicate the correct answer:  $T_a=20$ h/day, Cycle time (station 1)=22 s/piece, Cycle time (station 2)=25 seconds/piece, Cycle time (Station 3)=24 s/piece, Availability 90% for station 1 and 100% for the others."

- The daily production capacity is 2880 pieces/day
- The daily production capacity is 3000 pieces/day
- The daily production capacity is 2945 pieces/day
- All the answers are wrong

95) In front of a theatre, 10 people are waiting for the hostess to be admitted to the show. In one minute she is able to check the ticket of the customer and admit him to the show. What is the distribution the best describes the service process in this situation?

- Normal
- Poisson
- Negative Exponential
- Standard Normal