


OPERATIONS MANAGEMENT QUESTIONS 36 POINTS

4. What are the "PROs" of leading strategy for capacity management?

(1 punto)

- ☐ 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. Lean Innovation concepts drive R&D teams to tackle wastes in order to 

(1 punto)

- ☐ 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

6. What are the benefits of small scale capacity increments compared to big scale increments?

(1 punto)

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

7. 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 ?

(1 punto)

- ☐ it decreases
- ☐ it increases
- ☐ it depends on peak times
- ☐ it remains unchanged

8. Which structural elements strengthen the concept of Shouldice?

(1 punto)

- ☐ 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).

9. In the HQ case, which lever should you implement in order to improve flexibility performance?

(1 punto)

- ☐ 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.

10. During SMED:

(1 punto)

- ☐ 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

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

(1 punto)

- ☐ 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.

12. Choose the only correct answer regarding the customer behavior in a queuing system modeling. (1 punto)

- ☐ 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

13. Which characteristic belongs to a single queue with respect to multiple queue? (1 punto)

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

14. Investing in cross-trained employees supports company:  (1 punto)


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

15. What are the "PROs" of lagging strategy for capacity management? (1 punto)

- ☐ 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 underestimating demand, longer response time and lower delivery reliability
- ☐ Lower impact from overestimating demand, spare part capacity and faster response time

16. Considering a theme park service company, which of the following options could be considered an outcome of the company? (1 punto)

- ☐ 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

17. For the Shuldice hospital, which are the drawbacks of opening a second clinic (even outside Canada)? 
(1 punto)

- ☐ 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, surgerys rooms with U shape...).
- ☐ The difficulties in guaranteeing the same duration and predictability of hernia surgeries.
- ☐ The difficulties in hiring new doctors and staff.

18. Which is the most probable decision you can find if a company decide to drive digital transformation through lean principles:
(1 punto)

- ☐ 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.

19. According to KDAM (Key Decisional Area matrix), DHL transport services belongs to cluster 
(1 punto)

- ☐ Service project
- ☐ Service factory
- ☐ DIY service
- ☐ Service partnership

20. In the HQ case, which are the most significant performance to compete the new market?
(1 punto)

- ☐ 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

21. Which of the following sentences about the future state map is wrong?
(1 punto)

- ☐ 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.

22. 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?
(1 punto)


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

23. What are the service product characteristics? 
(1 punto)

- ☐ 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

24. In a service company, which benefits does centralization of back-office activities give?
(1 punto)

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

25. You are a manager of a restaurant; if your service process (output) is affected by uncertainty, which lever do you invest in?  (1 punto)

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

26. Shotter Spa produces pencil and works with 2 shifts ($T_a=900$ min/day). The average demand is 300 pencil/day. There are two production stages, both fully dedicated and with availability of 100%: P1 (CT= 30sec/pencil; CO=5 min/setup) and P2 (CT= 25sec/pencil; CO=0 min/setup). Which is the Minimum Batch size for the company? (2 punti)

- ☐ MBS= 2 pencil/batch
- ☐ MBS= 150 pencil/batch
- ☐ MBS= unitary batch
- ☐ It depends on customers' requests

27. Choose the one correct answer (1 punto)

- ☐ Protection level of full price tickets is necessary to avoid cannibalization from discounted price tickets
- ☐ 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

28. Which is the longest time in an operations system? (1 punto)

- ☐ Throughput time
- ☐ Value adding time
- ☐ Lead Time
- ☐ Not-value adding time

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

- ☐ 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 fulfill demand volume
- ☐ Schnay company is sure to produce both volume and mix required by customers

30. Which characteristic belongs to a performance that is classified as Order Qualifier?
(1 punto)

- ☐ 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

31. 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.
(1 punto)

- ☐ 0.5
- ☐ 0.2
- ☐ 1.5
- ☐ 0.67

32. In the HQ case, which of the following is not a consistent "structural choice" according to the new market?
(1 punto)

- ☐ 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

33. How would you define the Heuristic EMSR method?
(1 punto)

- ☐ 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.

34. For the Shuldice hospital, which are the drawbacks of opening on Saturday?
(1 punto)

- ☐ There are no drawbacks for this solution, and therefore is the one applied by Shuldice 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.

35. Usually, comparing SES company with a traditional company, SES company has
(1 punto)


- ☐ higher fixed cost and higher price
- ☐ higher fixed cost and lower price
- ☐ lower fixed cost and lower price
- ☐ lower fixed cost and higher price

36. Lean organizations are characterized by
(1 punto)

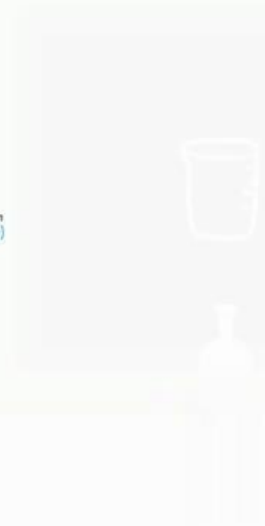
- ☐ flat organisation composed by many small teams, high level of power delegation to people
- ☐ hierarchical organisation composed by few large teams, low level of power delegation to team officers
- ☐ flat organisation composed by few large teams, high level of power delegation to team officers
- ☐ hierarchical organisation composed by many large teams, low level of power delegation to people

37. Consider a manufacturing company producing shirts and define which activity is value adding. (1 punto)

- ☐ 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

38. With Pre-Shop-Pool and workload control planning, the company:  (1 punto)

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



Lean organizations are characterized by:

Hierarchical organization composed by few large teams, low level of power delegation to team officers.

Flat organization composed by many small teams, high level of power delegation to people.

Flat organization 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.

In the HQ case, which are the most significant performance to compete the new market?

Quality (conformity) and time (Delivery reliability).

Time (speed), flexibility (product and plan), quality of design.

Price and quality of design.

Time (speed), price and flexibility (variety).

Choose the only correct answer regarding the customer behavior in a queuing system modeling.
Reneging is when a customer already in queue gives up the service and goes away without being served.

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

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

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

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.

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.

Automations in order to exploit new technologies for increasing capacity.

Investments in real time scheduling.

Supplier visibility on forecasts, orders and inventories in order to anticipate stockouts.

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

Perform a quality control on the color 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.

In the HQ case, which level should you implement in order to improve flexibility performance?

Increase capacity saturation.

Split production capacity in larger number of machines.

Launch production of big batches in order to reduce setups.

Increase automation grade in order to produce faster.

Shotter SpA produces pencil and works with 2 shifts ($T_a=900$ min/day). The average 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 = unitary batch.

MBS = 2 pencil/batch.

MBS = 150 pencil/batch.

It depends on customers' requests.

What are the “PROs” of lagging strategy for capacity management?

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, low production costs and high plant utilization.
Lower impact from overestimating demand, spare part capacity and faster response time.

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.

Which structural elements strengthen the concept of Shouldice?

Double rooms for patients, meeting rooms (as tea room or TV room), special stairs, surgery rooms with U-shape (as manufacturing cells).
Surgery rooms with U-shape which reinforce the teamwork concepts 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.

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

Helpful staff, never a dull moment and enjoyable attractions.
Good food and 18 rides used.
Food outlets, toilets and white knuckle rides.
Easy parking, lots of rides and fun time.

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

The difficulties of replicating the same concepts, specially 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, surgeries rooms with U-shape...)

The difficulties in guaranteeing the same duration and predictability of hernia surgeries.

The difficulties in hiring new doctors and staff.

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 and Saturdays not exactly equal to the one provided during week.

Not enough rooms available to guarantee 4 days of patients recovery, therefor the solution is not applicable.

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.

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.

- a. 0.5
- b. 0.2
- c. 1.5
- d. 0.67

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

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

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.

Which is the longest time in an operations system?

Throughput time.
Value adding time.
Lead time.
Not-value adding time.

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.

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.

What are the benefits of small scale increments?

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

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

- Shorter lead-teams
- Less volume variability
- Activities overlapping.
- Greater flexibility

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

How would you define the Heuristic EMSR method?

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.

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 more than two classes of customers. The computation starts from the most expensive class.

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.

Investing in cross-trained employees supports company:

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

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.

What are the “PROs” of leading strategy for capacity management?

- Lower impact of unforeseen events and underestimating demand, spare parts, capacity, better delivery and 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.

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.

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 is sure to produce both volume and mix required by customers.
- Schnay company has not enough capacity to fulfill demand volume.
- Schnay company needs SMED to reduce setup time.

According to KDAM (key decisional area matrix), DHL transport services belongs to cluster:

Service project.
Service factory.
DIY service
Service partnership.

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

Reduces setups.
Reduces WIP and Shop-floor time.
Controls the production and reduces necessity of manpower.
Immediately releases production orders to shorten lead-time.
Choose the one correct answer:

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

In the HQ case, which of the following is not a consistent "structural choice" according to the new market?

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

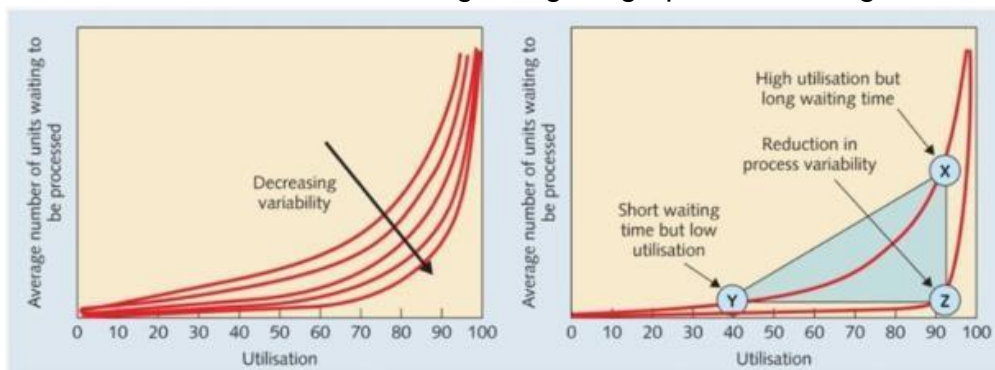
Which of the following sentences about the future state map is wrong?

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.
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.
The aim of the future state map is to reduce the overall process lead time of the company.
You need to define (1) material flow, (2) information flow and (3) timeline.

Esame 03.07.2020

Queue

- In a store there are 5 people waiting in line for the payment. There are 2 cash counters and the service 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
- Chose 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
- 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. Estimated the saturation of the barman.

- 0.5
 - 0.2
 - 1.5
 - 0.67

$$\rho = \frac{\lambda}{\mu} \quad \lambda = 10 \text{ c/h} \quad \mu = 15 \text{ c/h} = 0,6\bar{6}$$
 - 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
 - Choose only one correct answer regarding the customer behaviour in a queuing system modelling
 - Rejecting is when a customer already in the queue gives up the service and goes away without being served
 - Balking is when a customer already in queue gives up the service and goes away without being served

- c. Reneging is when a customer already in queue gives up the service and goes away without being served
- d. Reneging is when a customer decides not to enter a queue because it is already too long

	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

OS

1. With Pre-Shop-Pool and workload planning, the company :
 - a. Reduces WIP and Shop-Floor time
 - b. Controls the production and reduces necessity operators
 - c. Reduces setups
 - d. Immediately releases production orders to shorten lead-time
2. What are the PROs for the leading strategy?
 - a. Lower impact of unforeseen events and underestimating demand, spare parts capacity, better deliver reliability
 - b. Lower production costs, lower impact from overestimating demand, high plant utilization
 - c. Lower impact of unforeseen events, high plant utilization, spare parts capacity, better delivery reliability
 - d. Outbound cash flow, higher impact of overestimating demand, higher production costs
3. In the service industry, the level of satisfaction of a customer has been defined
 - a. By the experience
 - b. As the difference between the expectation and the service price
 - c. As the difference between perception and expectation
 - d. By the experience of the outcome
4. What are the service product characteristics?
 - a. Simultaneity, customer participation, homogeneity, perishability
 - b. Perishability, intangibility, time consuming, homogeneity, customer participation
 - c. Intangibility, simultaneity, heterogeneity, customer involvement in the service process, perishability
 - d. Simultaneity, heterogeneity, invisibility, customer involvement in the service process, perishability
5. How would you compute the variability?
 - a. The difference between the average value and the actual value
 - b. The difference between the average value and the forecasted value
 - c. The difference between the average value and the forecasted value (sì, era doppia)
 - d. The difference between the actual value and the forecasted value
6. Investing in cross-trained employees supports company to
 - a. Reduce demand variability
 - b. Make capacity more flexible
 - c. Increase time-buffer for customers
 - d. Increase overall capacity
7. Which characteristic belongs to a professional service shop compared to professional service?
 - a. More attention to quality
 - b. Request of knowledge sharing
 - c. Less attention to cost
 - d. More product innovation
8. You are a manager of a restaurant; if your service process (output) is affected by variability, which lever do you invest in?

- a. Reservation system
 - b. Promotion
 - c. Standardization of activities
 - d. Increase customer participation in the process
9. Which characteristic belongs to a performance that is classified as Order Qualifier?
- a. Company's quality performance is very good
 - b. If company's performance improves, the company gains more orders
 - c. If company's performance gets worse, the company loses orders
 - d. The performance defines the competitive advantage of the company

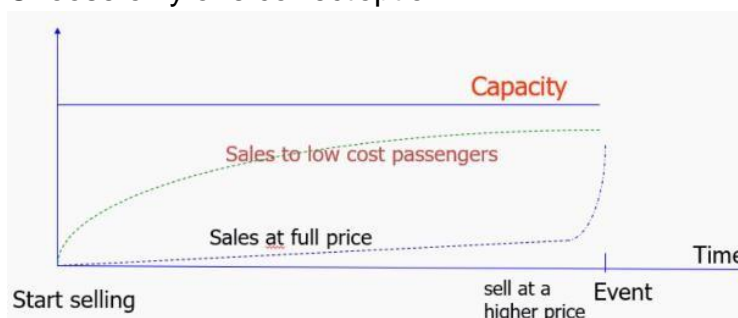
Lean

1. 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 35 min/setup. Which of the following EPE for the assembly stage is the correct one?
 - a. 1.16 days
 - b. 0.38 days
 - c. 1.45 days
 - d. 0.79 days
2. Which is the most probable decision you can find if a company decides to drive digital transformation through lean principles?
 - a. Automations in order to exploit new technologies for increasing capacity
 - b. HMI technologies in order to increase flexibility of operators
 - c. RFID technologies in order to track real time product status
3. Consider a manufacturing company producing machine tools and define which activity is value adding:
 - a. Test a product before sending it to the customer
 - b. Inserting a ball shift on its shaft
 - c. Bring electric motors from the warehouse to the place where machine tool is assembled
 - d. Plan internal and external operators' activities for the next week
4. During SMED
 - a. Setup activities are automatized
 - b. Internal activities are moved to the begin or to the end of setup procedure
 - c. External activities are moved to the begin or to the end of setup procedure
 - d. Products are batched in order to reduce setups
5. Shotter Spa produces pencils and works with 2 shifts ($T_a=900$ min/day). The average demand is 300 pencil/day. There are 2 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 of the company?
 - a. MBS= 2 pencil/batch
 - b. MBS= 150 pencil/batch
 - c. MBS= unitary batch
 - d. MBS= 230 pencil/batch
6. Considering an R&D department led by Lean Innovation concepts, which is the most probable context you can find?
 - a. Function Pushing for perfect learning cycle, launching product on the market only when all the features are completed
 - b. Function Pushing for fast learning cycle through many small iterative projects
 - c. Function Pushing for fast learning cycle with very big teams in order to have more resources on the same projects
 - d. Teams working at the same time on more projects in parallel
7. Which is the longest time in an operations system?
 - a. Throughput time

- b. Value adding time
 - c. Cycle time
 - d. Not-value adding time
8. 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?
- a. 3.15 days
 - b. 1.14 days
 - c. It depends on the amount of stocks and raw materials
 - d. 1.1125 days
9. The impact of Heijunka box is of
- a. Creating continuous flows
 - b. Reducing bullwhip effect
 - c. Increase safety stocks
 - d. Reducing setups
10. DECAF conditions analysis supports managers in
- a. Increase availability of a cell
 - b. Defining optimal level of stocks
 - c. Improving planning of production
 - d. Understanding gap for creating continuous flow

Yield

1. Chose the only correct answer
 - a. Cost of underestimation includes the lost revenue associated with reserving too few seats as discounted fare (underestimated demand)
 - b. 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
 - c. Cost of underestimation includes the lost revenue associated with reserving too few seats as full fare (underestimated demand)
2. How would you define the Heuristic EMSR method?
 - a. An iterative method used to set the right overbooking when there is no-show phenomenon
 - b. An iterative method used to maximise the profit by appropriately allocating the available capacity whenever there are more than 2 classes of customers
 - c. An iterative method used to maximise the profit by appropriately allocating the available capacity whenever there are less than 3 classes of customers
 - d. An iterative method used to set the right overbooking strategy by appropriately allocating the available capacity whenever there are more than 2 classes of customers
3. Which of these sets of characteristics represent the ideals for yield management?
 - a. Variable capacity, perishable inventory, low capacity-change costs, and product booked in advance
 - b. Fixed capacity, perishable inventories, low capacity-change cost, and ability to segment markets
 - c. Perishable inventory, high capacity-change costs, product sold after its use and fixed demand
 - d. Fixed capacity, perishable inventory, high capacity-change costs, ability to segment market, fluctuating demand and products booked or sold in advance
4. Choose only one correct option



- a. In order to maximise my revenues, it is more convenient to sell all tickets to low-cost passengers as I am sure they will buy them all
 - b. Having fixed capacity of event's seats, we should start selling full price tickets to ensure profit maximisation and cover all the seats available
 - c. Protection level of full price customers is necessary to avoid cannibalization from discounted price tickets
 - d. Protection level of discounted price tickets is necessary to avoid cannibalization from full price tickets
5. Which of the following system characteristics make YM not useful?

- a. Possibility to buy/book in advance the product/service
- b. Products are perishable
- c. System's variable capacity
- d. There are different types of customers (segments)

Cases

1. In the **HQ case**, which lever should you implement in order to improve flexibility performance?
 - a. Split production capacity in higher number of machines
 - b. Increase capacity saturation
Launch production of big batches in order to reduce setups
 - c. Increase automation grade in order to produce faster
2. **Shouldice Hospital** plays mainly on 2 levers to provide customers with such a high well-recognized value. Which are they?
 - a. High specialization (only one surgery) and high competences of its own employees
 - b. High specialization and low price
 - c. High competences of its own employees that enable Shouldice to deliver above-average quality
 - d. Low price and competences of its own employees
3. In the **HQ case**, which are the most significant performances to compete in the new market?
 - a. Time (speed), flexibility (product and plan) and quality of design
 - b. Time (speed), price and flexibility (variety)
 - c. Quality (conformity) and time (delivery reliability)
 - d. Price and quality of design
4. **Shouldice Case** represents a “best practice” of alignment between market and operations. How is its concept built?
 - a. The concept of Shouldice hospital is based on both outcome and experience provided to the patients
 - b. Shouldice hospital built its concept on the outcome, namely the high success rate in the hernia surgery
 - c. Shouldice hospital built its concept on the short and predictable time required to patients to recover from hernia surgery
 - d. The concept of Shouldice hospital is based on the low price for hernia surgery compared to competitors
5. In the **HQ case**, which of the following is not a consistent “structural choice” according to the new market?
 - a. Small number of big production machines in order to ensure machine saturation
 - b. Increasing the production capacity in order to absorb demand variability
 - c. Mono-impression moulding in order to ensure lower setup times
 - d. Low automation grade

1. **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
2. **INTHE 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
3. **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
4. **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
5. **THE IMPACT OF HEIJUNKA BOX IS OF**
 - └ Creating continuous flow
 - └ Reducing the bullwhip effect
 - └ Increase safety stocks
 - └ Reducing setups
6. **DECAF CONDITIONS ANALYSIS SUPPORTS MANAGER IN**
 - └ Increasing availability of a cell
 - └ Defining optimal level of stocks
 - └ Improving planning of production
 - └ Understanding gap for creating continuous flow

7. **WHICH OF THE FOLLOWING SENTENCES ABOUT THE FUTURE STATE MAP IS WRONG?**
- └ Once you draw the current state map, you must find improvements area and then draw the future state map is exists only one future state map for each current state
 - └ You need 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
 - └ The aim of future state map is to reduce the overall process lead time of the company
8. **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
9. **INVESTING IN CROSS-TRAINED EMPLOYEES SUPPORTS COMPANY IN:**
- └ Reducing demand variability
 - └ Making capacity more flexible
 - └ Increase time-buffer for customer
 - └ Increase overall capacity
10. **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
 - └ IoT for making data available to operators for taking decision
 - └ Investments in real time scheduling
 - └ Supplier visibility on forecasts, orders and inventories in order to anticipate stock-out
11. **WHAT ARE THE “PROS” OF LAGGING STRATEGY FOR CAPACITY MANAGEMENT?**
- └ Lower impact from overestimating demand, low production costs, high plant utilization
 - └ Low impact from overestimating demand, spare part capacity, faster response time
 - └ Higher impact from underestimating demand, longer response time, lower delivery reliability
 - └ Lower impact of uncertainty and unforeseen and low production costs
12. **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:**
- └ $Co = 49 + 2 + 3 = 54$
 - └ $Co = 49$
 - └ $Co = 49 - 2 - 3 = 44$
 - └ $Co = 49 - 2 + 3 = 50$
13. **YOU ARE A MANAGER OF A RESTAURANT; IF YOUR SERVICE PROCESS (OUTPUT) IS AFFECTED BY VARIABILITY, WHICH LEVER DO YOU INVEST IN?**
- └ Reservation system
 - └ Promotion
 - └ Standardization of activities

- ┘ Increase customer participation in the process
- 14. CONSIDER A MANUFACTURING COMPANY PRODUCING SHIRTS AND DEFINE WHICH ACTIVITY IS VALUE-ADDING:**
 - ┘ Perform a quality control on the color of the shirt before the delivering to the customer
 - ┘ Sew the buttons on the shirts
 - ┘ Bring the toolkit to the right place
 - ┘ Clean the stations
- 15. IN THE HQ CASE, WHICH IS THE MOST SIGNIFICANT PERFORMANCE TO COMPETE THE CONSOLIDATED MARKET?**
 - ┘ Time (speed)
 - ┘ Price
 - ┘ Quality (design)
 - ┘ Quality (conformity)
- 16. 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
- 17. 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
- 18. 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
- 19. WHICH CHARACTERISTIC BELONGS TO A PROFESSIONAL SERVICE SHOP**
 - ┘ Attention to price
 - ┘ Attention to customer specific requirements
 - ┘ Attention to quantity
 - ┘ Process innovation
- 20. 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 market, that have fixed capacity and perishable inventory, high capacity change cost, uncertain demand and the possibility to sell/book product in advance
- 21. CONSIDERING A R&D DEPARTMENT LED BY LEAN INNOVATION CONCEPTS, WHICH IS THE MOST PROBABLE CONTEXT YOU CAN FIND**
- └ Pushing for perfect learning, launching product on the market only when all the features are completed
 - └ Pushing for fast learning through many small iterative projects
 - └ Pushing for fast learning with very big teams in order to have more resources on the same project
 - └ Teams working at the same time on more projects in parallel
- 22. 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
- 23. RANK ORDER CLUSTERING IS A LEAN PRACTICE FOR:**
- └ Reducing set-ups
 - └ Identifying wastes
 - └ Defining product families
 - └ Creating the pull
- 24. DURING SMED**
- └ Setups activities are automatized
 - └ Internal activities are moved to the beginning or to the end of setup procedure
 - └ External activities are moved to the beginning or the end of setup procedure
 - └ Products are batched in order to reduce setups
- 25. 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
- 26. 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
- 27. 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

28. 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)
29. WHICH STRUCTURAL ELEMENTS STRENGTHEN THE CONCEPT OF SHOULDICE?
- ☐ Double rooms for patients, meeting rooms (as tea rooms or TV rooms), special stairs, surgery rooms with U shape (as manufacturing cells)
 - ☐ Double rooms for patients, meeting rooms (as tea rooms or TV rooms) and meeting rooms with employees and patients within the canteen
 - ☐ Surgery rooms with U shape with reinforce the teamwork concept among medical staff
 - ☐ Special stairs designed ad hoc, which enable patients to recover fast from hernia surgery
30. 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
31. WITH PRE-SHOP POOL AND WORKLOAD CONTROL PLANNING, THE COMPANY:
- ☐ Reduces WIP and shop-floor time
 - ☐ Controls the production and reduces necessity operators
 - ☐ Reduces setups
 - ☐ Immediately release production orders to shorten lead-time

31.08.2020

4. Considering a theme park service company, which of the following options could be considered an outcome of the company?
 - food outlets, toilets and white knuckle rides
 - easy parking, lots of riders and fun time
 - good food and 18 rides used
 - helpful staff, never a dull moment and enjoyable attractions
5. The role of the “deliberate strategy” in the operations strategy of a company is
 - to define a clear line to take many little good choice
 - to define investment in new technologies
 - to reach the gap with premium class competitors
 - to exploit opportunities emerging from the field in turbulent environment
6. Which type of company can benefit from implementing Yield Management
 - only companies that provide a service to customers
 - only companies belonging to specific industries (example transportation or entertainment) that have fixed capacity and want to maximize their profit
 - any kind of companies able to segment the market that have fixed capacity and perishable inventory, high capacity change cost, uncertain demand and possibility to sell/book products in advance
 - only service companies able to segment the market that have fixed capacity and perishable inventory
7. 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
8. Rank Order Clustering is a Lean practice for
 - reducing setups
 - identifying wastes
 - defining product families
 - creating the pull
9. 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

10. Which is the shortest time in an operations system?

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

11. Which characteristic belongs to a professional service shop compared to a professional service?

- attention to quality
- request of knowledge sharing
- attention to conformance
- product innovation

12. Considering a manufacturing company producing machine tools, define which activity is value adding

- inserting a ball bearing on its shaft
- planning internal and external operators activities for the next week
- testing a product before sending it to the customer
- bringing the electric motors from the warehouse to the place where the machine tool is assembled

13. The assembly stage of Ryccar Spa company processes 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 change. Changeover time is equal to 35 min/setup. Which of the following EPE for the assembly stage is the correct one?

- EPE = 0,79 days
- EPE = 1,16 days
- EPE = 1,45 days
- EPE = 0,38 days

14. 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

15. 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

16. The impact of Heijunka box is:

- reducing bullwhip effect
- reducing setups
- increasing safety stocks
- creating continuous flow

17. 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 **OW**
- the performance defines the competitive advantage of the company **OW**

18. 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

19. According to KDAM (Key Decisional Area Matrix), DHL transport services belongs to cluster

- service project
- service factory
- DIY service
- Service partnership

20. Which managerial and organizational elements strengthen the concept of Shouldice?

- being able to provide the hernia surgery in day hospital (short and predictable time)
- 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
- frequent interviews to patients not satisfied by other hospitals in better defining operations

- presentation on the surgery held by the medical staff to patients and the possibility for the patients to meet both employees and other patients in the canteen to share experience

21. 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 answers

22. How would you define the Heuristic EMSR method?

- 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 only three 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 available capacity whenever there are only three classes of customers. The computation starts from the most expensive class.

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. 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.

25. 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.

26. In a service company, which benefits does the centralization of back-office activities give?

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

27. 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.

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

28. 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?

- $P = \max \text{ of all probabilities} = 0.3$
- $P = 0.1 + 0.2 + 0.3 = 0.6$
- $P = 0.1 * 0.2 * 0.3 = 0.006$
- $P = (0.1 + 0.2 + 0.3) / 3 = 0.2$

29. Lean Innovation concepts drive R&D teams to tackle wastes in order to

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

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

- 5S
- Kanban
- SMED
- Value Stream Mapping

31. What are the benefits of small-scale capacity increments compared to big scale increments?

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

32. 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

- $C_u = 70 - 50 = 20$
- $C_u = 70 - 50 - 20 = 0$
- $C_u = 70 - 50 + 20 = 40$
- $C_u = 70$

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

34. Which is the most probable decision you can find if a company decides to drive digital transformation through lean principles?

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

35. Lean organizations are characterized by

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

36. 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?

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

37. Shouldice hospital plays mainly on two main levers to provide customers with such a high well-recognized value. Which are those levers?

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

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

- Standardization of activities

- Increasing customer participation in the process
- Reservation system
- Promotion

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

(1 Point)

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

5. Consider a manufacturing company producing shirts and define which activity is value adding.

(1 Point)

- ☐ 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

6. Choose the one correct answer

(1 Point)

- ☐ 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
- ☐ 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 full price tickets is necessary to avoid cannibalization from discounted price tickets

7. What are the benefits of small scale capacity increments compared to big scale increments?

(1 Point)

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

8. Usually, comparing SES company with a traditional company, SES company has

(1 Point)

- ☐ higher fixed cost and higher price
- ☐ higher fixed cost and lower price
- ☐ lower fixed cost and lower price
- ☐ lower fixed cost and higher price

9. Which is the longest time in an operations system?

(1 Point)

- ☐ Throughput time
- ☐ Value adding time
- ☐ Lead Time
- ☐ Not-value adding time

10. For the Shuldice hospital, which are the drawbacks of opening on Saturday?
(1 Point)

- ☐ Clients are not satisfied because the service provided is 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.
- ☐ 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.
- ☐ There are no drawbacks for this solution, and therefore is the one applied by Shuldice hospital.

11. With Pre-Shop-Pool and workload control planning, the company:
(1 Point)

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

12. Shotter Spa produces pencil and works with 2 shifts ($T_a=900$ min/day). The average demand is 300 pencil/day. There are two production stages, both fully dedicated and with availability of 100%: P1 (CT= 30sec/pencil; CO=5 min/setup) and P2 (CT= 25sec/pencil; CO=0 min/setup). Which is the Minimum Batch size for the company?
(2 Points)

- ☐ It depends on customers' requests
- ☐ MBS= 2 pencil/batch
- ☐ MBS= 150 pencil/batch

☐ MBS= unitary batch

13. Lean Innovation concepts drive R&D teams to tackle wastes in order to
(1 Point)

- ☐ 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

14. Which structural elements strengthen the concept of Shouldice?
(1 Point)

- ☐ Double rooms for patients, meeting rooms (as tea room or TV room), special stairs, surgery rooms with U shape (as manufacturing cells).
- ☐ Surgery rooms with U shape which reinforce the teamwork concept among medical staff.
- ☐ 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) and meetings with employees and patients within the canteen.

15. How would you define the Heuristic EMSR method?
(1 Point)

- ☐ 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 only three 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.

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

(1 Point)

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

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

(1 Point)

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

18. What are the service product characteristics?

(1 Point)

- ☐ 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

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

(1 Point)

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

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

(1 Point)

- ☐ helpful staff, never a dull moment and enjoyable attractions
- ☐ good food and 18 rides used
- ☐ easy parking, lots of rides and fun time
- ☐ food outlets, toilets and white knuckle rides

21. What are the "PROs" of leading strategy for capacity management?

(1 Point)

- ☐ 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

22. 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 ?
(1 Point)

- ☐ it decreases
- ☐ it increases
- ☐ it depends on peak times
- ☐ it remains unchanged

23. Lean organizations are characterized by
(1 Point)

- ☐ flat organisation composed by few large teams, high level of power delegation to team officers
- ☐ flat organisation composed by many small teams, high level of power delegation to people
- ☐ hierarchical organisation composed by few large teams, low level of power delegation to team officers
- ☐ hierarchical organisation composed by many large teams, low level of power delegation to people

24. Which characteristic belongs to a performance that is classified as Order Qualifier?
(1 Point)

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

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

(1 Point)

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

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

(1 Point)

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

27. What are the "PROs" of lagging strategy for capacity management?

(1 Point)

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

28. 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.

(1 Point)

- ☐ 0,5
- ☐ 0,2
- ☐ 1,5
- ☐ 0,67

29. For the Shuldice hospital, which are the drawbacks of opening a second clinic (even outside Canada)?

(1 Point)

- ☐ 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 in hiring new doctors and staff.
- ☐ The difficulties of replicating the same concept, especially for what regards hard elements (patients rooms, stairs, surgerys rooms with U shape...).
- ☐ The difficulties in guaranteeing the same duration and predictability of hernia surgeries.

30. Investing in cross-trained employees supports company:

(1 Point)

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

31. Which of the following sentences about the future state map is wrong?
(1 Point)

- ☐ You need to define (1) material flow, (2) information flow and (3) timeline.
- ☐ The aim of the future state map is to reduce the overall process lead time of the company.
- ☐ 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.
- ☐ 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.

32. 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?
(1 Point)

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

33. During SMED:
(1 Point)

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

34. Choose the only correct answer regarding the customer behavior in a queuing system modeling.

(1 Point)

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

35. Which characteristic belongs to a single queue with respect to multiple queue?

(1 Point)

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

36. According to KDAM (Key Decisional Area matrix), DHL transport services belongs to cluster


(1 Point)

- ☐ Service project
- ☐ Service factory
- ☐ Dff service
- ☐ Service partnership

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

(1 Point)

- ☐ 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.

38. In the HQ case, which of the following is not a consistent "structural choice" according to the new market? 

(1 Point)

- ☐ Low automation grade
- ☐ 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.

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

(1 Point)

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

5. Consider a manufacturing company producing shirts and define which activity is value adding.

(1 Point)

- ☐ 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

6. Choose the one correct answer

(1 Point)

- ☐ 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
- ☐ 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 full price tickets is necessary to avoid cannibalization from discounted price tickets

7. What are the benefits of small scale capacity increments compared to big scale increments?

(1 Point)

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

8. Usually, comparing SES company with a traditional company, SES company has

(1 Point)

- ☐ higher fixed cost and higher price
- ☐ higher fixed cost and lower price
- ☐ lower fixed cost and lower price
- ☐ lower fixed cost and higher price

9. Which is the longest time in an operations system?

(1 Point)

- ☐ Throughput time
- ☐ Value adding time
- ☐ Lead Time
- ☐ Not-value adding time

10. For the Shuldice hospital, which are the drawbacks of opening on Saturday?
(1 Point)

- ☐ Clients are not satisfied because the service provided is 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.
- ☐ 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.
- ☐ There are no drawbacks for this solution, and therefore is the one applied by Shouldice hospital.

11. With Pre-Shop-Pool and workload control planning, the company:
(1 Point)

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

12. Shotter Spa produces pencil and works with 2 shifts ($T_a=900$ 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?
(2 Points)

- ☐ It depends on customers' requests
- ☐ MBS= 2 pencil/batch
- ☐ MBS= 150 pencil/batch

☐ MBS= unitary batch

13. Lean Innovation concepts drive R&D teams to tackle wastes in order to
(1 Point)

- ☐ 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

14. Which structural elements strengthen the concept of Shouldice?
(1 Point)

- ☐ Double rooms for patients, meeting rooms (as tea room or TV room), special stairs, surgery rooms with U shape (as manufacturing cells).
- ☐ Surgery rooms with U shape which reinforce the teamwork concept among medical staff.
- ☐ 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) and meetings with employees and patients within the canteen.

15. How would you define the Heuristic EMSR method?
(1 Point)

- ☐ 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 only three 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.

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

(1 Point)

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

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

(1 Point)

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

18. What are the service product characteristics?

(1 Point)

- ☐ 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

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

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

20. Considering a theme park service company, which of the following options could be considered an outcome of the company?
(1 Point)

- ☐ helpful staff, never a dull moment and enjoyable attractions
- ☐ good food and 18 rides used
- ☐ easy parking, lots of rides and fun time
- ☐ food outlets, toilets and white knuckle rides

21. What are the "PROs" of leading strategy for capacity management?
(1 Point)

- ☐ 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

22. 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 ?

(1 Point)

- ☐ it decreases
- ☐ it increases
- ☐ it depends on peak times
- ☐ it remains unchanged

23. Lean organizations are characterized by

(1 Point)

- ☐ flat organisation composed by few large teams, high level of power delegation to team officers
- ☐ flat organisation composed by many small teams, high level of power delegation to people
- ☐ hierarchical organisation composed by few large teams, low level of power delegation to team officers
- ☐ hierarchical organisation composed by many large teams, low level of power delegation to people

24. Which characteristic belongs to a performance that is classified as Order Qualifier?

(1 Point)

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

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

(1 Point)

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

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

(1 Point)

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

27. What are the "PROs" of lagging strategy for capacity management?

(1 Point)

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

28. 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.

(1 Point)

- ☐ 0,5
- ☐ 0,2
- ☐ 1,5
- ☐ 0,67

29. For the Shuldice hospital, which are the drawbacks of opening a second clinic (even outside Canada)?

(1 Point)

- ☐ 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 in hiring new doctors and staff.
- ☐ The difficulties of replicating the same concept, especially for what regards hard elements (patients rooms, stairs, surgerys rooms with U shape...).
- ☐ The difficulties in guaranteeing the same duration and predictability of hernia surgeries.

30. Investing in cross-trained employees supports company:

(1 Point)

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

31. Which of the following sentences about the future state map is wrong?

(1 Point)

- ☐ You need to define (1) material flow, (2) information flow and (3) timeline.
- ☐ The aim of the future state map is to reduce the overall process lead time of the company.
- ☐ 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.
- ☐ 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.

32. 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?

(1 Point)

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

33. During SMED:

(1 Point)

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

34. Choose the only correct answer regarding the customer behavior in a queuing system modeling.

(1 Point)

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

35. Which characteristic belongs to a single queue with respect to multiple queue?

(1 Point)

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

36. According to KDAM (Key Decisional Area matrix), DHL transport services belongs to cluster


(1 Point)

- ☐ Service project
- ☐ Service factory
- ☐ DIY service
- ☐ Service partnership

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

(1 Point)

- ☐ 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.

38. In the HQ case, which of the following is not a consistent "structural choice" according to the new market? 

(1 Point)

- ☐ Low automation grade
- ☐ 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.