

Section 1 - Part A

1) Which of these will be addressed if we pursue a value stream mapping?

- A) The problems faced by the supplier in manufacturing the component that he supplies to the organization
 - B) The lack of motivation faced by the employees in the organization
 - C) Stepping up of the value engineering exercises in the organization
 - D) The choice of an appropriate person as the CEO of the company
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2) From a perspective of Statistical Process Control (SPC), a six-sigma process will have which of the following attributes?

- A) The process center will be aligned with the LSL
 - B) All of the above
 - C) The number of defects produced by the process will be 0.0018 parts per million
 - D) The USL and LSL will be separated by a distance of six sigma
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3) Which of the following statements does not relate to Kanban

- A) Setting WIP limits
 - B) Providing a standard container to every employee to store tools and documents
 - C) Simplifying planning and control through visible signs
 - D) Improving the flow of value to the customers
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4) To reduce the bullwhip effect which of the following measures can be used?

- A) Consistent low pricing of products
- B) All the above
- C) Centralization of demand analysis
- D) Decreasing the number of layers in the supply chain

5) Which of the following is not an example of a non-value added activity?

- A) None of the above
 - B) Ordering raw material
 - C) Keeping inventory
 - D) Quality Control
-

6) The differentiating factor(s) of services industry from product industry is/are

- A) Service Workers are less skilled than Production Workers
 - B) Service quality happens only after the service is delivered, therefore unlike products, it cannot be planned for in advance
 - C) (A) and (B)
 - D) Services cannot be inventoried
-

7) Control charts are used to

- A) Finding the root cause of problem
 - B) Highlight the problem
 - C) None of the above
 - D) Identify the improvement opportunities
-

8) In a service firm, the following decisions are taken. What would be the impact of such decisions on performance measures – Cost, Quality, Delivery and Flexibility?

Decision 1 (D1): Training program for skill upgradation and Multiskilling of the workforce.

Decision 2 (D2): Standard Operating Procedures deployed at key steps in the process.

- A) D1 – Decrease in delivery; D2- Increase in delivery
- B) D1 – Increase in quality; D2- Increase in Delivery
- C) D1 – No change in quality; D2- Increase in quality
- D) D1 – Increase in Quality; D2- Increase in cost

9) Poka-Yoke is a technique to

- A) Identify improvement opportunity to a problem
 - B) Process of finding the root cause of a problem
 - C) Build quality into product by eliminating the source of problem
 - D) Highlight problem
-

10) In order to analyse the capacity of a sugar mill, which of the following is a necessary information?

- A) The amount of sugar cane that can be crushed per hour by the crushing machine(s)
 - B) All the above
 - C) The number of support staff per shift
 - D) The number of employees in management
-

11) A printing press is analysing its efficiency. It treats a job to be good, if there is no spelling mistake, font mismatch, colour mismatch or wrong spacing. Which of the following charts can be used for this situation?

- A) c chart
 - B) X bar and R chart
 - C) p chart
 - D) All the above
-

12) A logistics company is analysing the number of accidents its' fleet is involved in. Which of the following charts could be used in this process?

- A) p chart
- B) c chart
- C) X bar chart
- D) R chart

13) In a worker paced assembly line, if the demand is 20/hr and the sum of processes time is 15 min, what is the minimum number of stations required to ensure a cycle time of 5 min?

- A) 5
 - B) 1
 - C) 3
 - D) 4
-

14) In a hospital, a nurse is hired exclusively to take care of handling the instruments and equipment during the surgery in the operations theatre. This action would result in

- A) Decrease in the overall skillset of the nurses in the hospital
 - B) None of the above
 - C) Both A and B
 - D) Decrease in the overall time for the surgery
-

15) If a firm reduces the amount of safety stock it carries to three quarters of the current level, then

- A) Ordering cost will increase as the number of orders has increased
 - B) Ordering cost will decrease as the quantity ordered has decreased
 - C) Carrying cost will increase as the quantity per order has increased
 - D) Carrying cost will decrease as the quantity held has reduced
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16) In a case where a firm reduces the set up time, the lot size is expected to

- A) Reduce
- B) Remain unaffected
- C) Increase and then decrease
- D) Increase

17) Doubling the bottleneck capacity will result in doubling the output of a manufacturing system.

- A) Depends on the processes time of other processes in the manufacturing system
 - B) Always False
 - C) Always True
 - D) Cannot be determined as it depends on the initial capacity of the bottleneck and the initial output of the manufacturing system
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18) In order to design a supply chain, which of the following will impact the decision?

- A) Variations in the product
 - B) Demand cycles
 - C) All of the above
 - D) Life cycle of the product
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19) Upgrading a machine that is a bottleneck is an example of:

- A) Continuous improvement
 - B) Value added analysis
 - C) Both A and B
 - D) None of the above
-

20) Which of the following contributes to the bullwhip effect?

- A) All of the above
 - B) Many customers at the end of the supply chain
 - C) Many suppliers at the beginning of the supply chain
 - D) Many layers in the supply chain
-

21) If the process speed to sales rate is more than one, then which of the following statements are true?

- A) None of the above
- B) There will be shortage of finished goods inventory
- C) The sales team of the company is performing well
- D) There will be an eventual pile up of finished goods inventory

22) In six sigma methodology, the variables on which the data should be collected is defined in which stage?

- A) Implement
 - B) Analyse
 - C) Measure
 - D) Define
-

23) Which of the following relate to a gap resulting in a service quality problem?

- A) Management is unable to invest in appropriate technology required for service delivery
 - B) The worker morale is low in the organization
 - C) Service firms write an ambitious brochure about their service offerings
 - D) All of the above
-

24) Forwarding a Purchase Order to a warehouse is a

- A) Necessary but non value adding
 - B) Non value adding activity
 - C) Value adding activity
 - D) None of these
-

25) The tools and techniques used to analyze the operations of an organization depend on which of the following factors?

- A) None of the above
 - B) Type of products the organisation is producing
 - C) Both A and B
 - D) Industry in which the organisation is operating
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26) Streamline Flow is not suggested for which of the following?

- A) Pharmaceutical Drug Manufacturing
- B) Food Processing
- C) Ship Building
- D) Cement Manufacturing

27) Pareto Diagram can be used to

- A) None of the above
 - B) Highlight the problem
 - C) Finding the root cause of problem
 - D) Identify the improvement opportunities
-

28) In order to analyse the capacity of a hospital, which of the following is a necessary information?

- A) The number of doctors available in each shift
 - B) The number of beds in the hospital
 - C) The number of nurses available in each shift
 - D) All of the above
-

29) Which of the following paradoxes do not fall under the purview of operations management?

- A) There warehouse is full of finished goods, but there are backlogs of orders from customers
 - B) The price of product is lower than the competitor's product, but the sales are not reaching the target
 - C) All the above
 - D) The storage facility is full of raw material, but the production stopped due to lack of components
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30) A call centre is analysing the customer satisfaction scores. A customer is satisfied if the call gets answered within 4 rings. Which of the following charts can be used for this situation?

- A) R chart
 - B) p chart
 - C) X bar
 - D) c chart
-

31) Fishbone diagram can be used to

- A) None of the above
- B) Finding the root cause of problem
- C) Identify the improvement opportunities
- D) Highlight the problem

32) What is the outcome when a bottleneck resource is augmented with more capacity?

- A) Both B and C
 - B) The resource with the second most utilization becomes the bottleneck
 - C) Throughput time increases
 - D) Cycle time decreases
-

33) If an organisation has taken over a firm that supplies raw material, which of the following costs would reduce?

- A) Both
 - B) Ordering cost
 - C) None
 - D) Carrying cost
-

34) Which of the following is/are a characteristic(s) of streamlined flow?

- A) A break at one station would halt the entire flow
 - B) Both A and C
 - C) Uneven work times at each station can be handled easily
 - D) Maintenance of such a system is critical
-

35) What is the effect of delayed differentiation strategy?

- A) Production Planning and Control will become more difficult
 - B) The number of variants offered will be reduced
 - C) Bullwhip effect will be more pronounced
 - D) The inventory carrying costs will come down
-

36) Which of the following is not true in a JIT environment?

- A) Processing in batches of WIP
- B) Activity of each work station is authorized by the demand of downstream work stations
- C) Maintaining a constant flow of parts
- D) Moving the parts through production system based on end unit demand

37) Who among the following is responsible for day-to-day activities of a process in an organisation which strives for six sigma quality levels?

- A) Six sigma coach
 - B) Process owner
 - C) Team leader
 - D) Six sigma sponsors
-

38) Which of the following does not denote the flow of value in a value stream?

- A) From retailer to manufacturer
 - B) From raw material to finished good
 - C) From order to delivery
 - D) From concept to launch
-

39) What can we infer if a firm holds less inventory?

- A) The process design is not flexible
 - B) It deals with a smaller number of products
 - C) The firm has better forecasting and planning methods
 - D) There is no communication between departments, customers and suppliers
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40) If the standard deviation in demand doubles, to maintain same service level, the safety stock should

- A) Cannot be determined
 - B) Double
 - C) Halve
 - D) Increase by 1.4
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41) Which of the following are the characteristics of jumbled flow production process?

- A) Suited when too many entities are not involved
- B) None of the above
- C) Can handle highly complex work - flow
- D) Huge economies of scale

42) Company XYZ undertakes several improvement activities in a piecemeal fashion. What could it lead to?

- A) None of these
 - B) A simplified value stream mapping
 - C) Both A and B
 - D) Productivity paradox
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43) Which of the following is a reason for bullwhip effect?

- A) None
 - B) Both
 - C) Variation in demand
 - D) Variation in supply
-

44) Which of the following are the characteristics of a responsive supply chain?

- A) Low margin
 - B) High propensity to stock out
 - C) High margin
 - D) Both B and C
-

45) In a fast food joint, the owner has decided to replace the automated coffee dispenser with a person who makes coffee. This decision would result in

- A) None
- B) Both
- C) Increase the flexibility of service provided to the customers
- D) Decrease the delivery time to the customers

46) The time taken for a potter to make a pot, starting from bringing the mud, loading it onto the potter wheel, turning the wheel to shape the pot, drying and heat treating the pot is 6 hours. He starts working daily at 8 AM. Assume no stock at the beginning. Which of the following statements is true

- A) None of the above
 - B) The time to deliver the first pot is the cycle time for the process
 - C) Cycle time cannot be determined
 - D) The cycle time will be greater than the throughput time when the batch size is 1
-

47) Improvements in production should be:

- A) Driven by Marketing Requests
 - B) Data driven and Employee Centered
 - C) (A) and (B)
 - D) None of the above
-

48) Which option describes the following operating systems in the increasing order of complexity; (A – Organising a football tournament, B – Manufacturing of half litre plastic bottles, C – Mobile phone assembling plant, D – Customised Wooden tables manufacturing)

- A) B, C, D, A
 - B) C, D, A, B
 - C) D, C, A, B
 - D) A, B, C, D
-

49) In a two-stage serial system, the orders arrive at a rate of 12/hr at the first stage and gets processed at 8/hr at the first stage. What is the arrival rate at the second stage?

- A) 4/hr
- B) 1.6/hr
- C) 8/hr
- D) 12/hr

50) Which is a viable strategy to manage an intermittent flow system better?

- A) Redesign the operating system by creating sub-systems
 - B) Develop a planning methodology without estimating the available capacity
 - C) Cut down the variety of offerings thereby gaining better control on operations
 - D) Increase the volume of all offerings
-

51) Which of the following contributes to the productivity paradox?

- A) Change in customer's choice
 - B) All the above
 - C) Not paying attention to supply chain
 - D) Value migration
-

52) A manufacturing system has output rate of 10 units/hour. A process with capacity of 10 units/hr, is increased to 20 units/hr, then which of the following is true?

- A) There may or may not be an increase the output as it is depending on the capacity of the rest of the processes
 - B) Increase the output of the system to at most 20 units/hour
 - C) There will definitely be an increase in the output of the system, but the quantity of increase cannot be determined with the given data
 - D) Increase the output of the system to 20 units/hour
-

53) Which of the following statements are true with respect to service quality?

- A) Service recovery is the way to improve service quality
 - B) All of the above
 - C) Management is generally not aware of the customer requirements
 - D) Quality of service is based on the outcome and the process of service delivery
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54) Which of the following products would need an efficient supply chain?

- A) All the above
 - B) A wrist-watch manufacturer
 - C) A high-end sports shoe company
 - D) A paper product manufacturer
-

55) A TQM program will result in the following:

- A) Increase in Productivity Paradox
- B) Increase in employee costs
- C) Focus on Marketing of products and services
- D) Process centered approach

Section 2 - Part B

Read the scenario and answer

Use of SPC in the guest check-in process in a Five Star Hotel

A five-star hotel monitors its guest check in process using principles of Statistical Process Control (SPC). Based on the prevailing conditions in the market, customer preferences and its own understanding of the situation, the management felt that it is a very important metric for them.

Based on a market survey, they found that the expectations are that customers would be happy if the guest check-in time is 100 ± 20 seconds. The hotel has been monitoring the process as follows:

every guest arrives at the check-in desk, the elapsed time to complete the process is measured and recorded in a file. Periodically, a sample of 100 such recordings are taken and those that exceeded 2 minutes were considered as defects. This is used to set up a control chart.

A sample measurement is reproduced below:

Number of defects for the sample numbers 1 to 10 respectively are [13, 12, 10, 18, 16, 12, 20, 14, 09, 12].

Meanwhile, a consultant who studied the process concluded that they were using an inappropriate control chart. The consultant recommended that since the detailed measurements of actual check-in time were being recorded it should be used to setup a control chart.

The hotel management was in alignment with the consultant's thinking and changed the type of control chart to X-bar chart. The process was monitored using it and found to be statistically stable. The mean of the guest check-in process was found to be 105 seconds and the standard deviation 8.

Using this information, answer the following questions.

56) Which of the following statement is true with respect to the old control chart?

- A) A plot of the data in the control chart shows that there are no points in zone C
 - B) The process is drifting towards zone A
 - C) There is at least one point in zone A or beyond
 - D) It may not be required to stop the process and check for any deterioration
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57) Which of the following statements best describe the old process of measuring defects (prior to the change suggested by the consultant)?

- A) The control chart used was variable based control chart
- B) The process was under statistical control
- C) The mean of the process was less than the standard deviation of the process
- D) The process will on an average produce defects less than 10%

58) How will you describe the transition that the hotel has made with respect to the use of control chart for the guest check-in process?

- A) The transition will take away the opportunity to identify and correct defects in the guest check-in process
 - B) The transition will reduce the quantum of information obtained through data collection
 - C) None of the above
 - D) It was a transition from the use of an attribute based control chart to a variable based control chart
-

59) Consider the revised methodology for monitoring the process. Which of the following describe the situation?

- A) The spread of the process is 24
 - B) With the available information it will not be possible to predict the number of defects the process is likely to produce
 - C) Potential capability (C_p) will be more than the Actual capability (C_{pk}) for this process
 - D) With some marginal efforts it should be possible to reach six-sigma level
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60) Which of the following statement is true with respect to the potential capability (C_p) of the process using the revised control chart?

- A) The potential capability (C_p) is zero
 - B) The potential capability (C_p) is more than one
 - C) The potential capability (C_p) cannot be estimated with the available data
 - D) The potential capability (C_p) is less than one
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Using the information below, answer the following questions.

CAR SERVICE CENTRE

CSC-Car service centre, offers different services for four wheeler maintenance.

Cars enter the service centre at a rate of one every 1.25 min. Since they know the daily capacity the centre can handle, they accept cars only up to its capacity using a numbered token system. Once the car is accepted for service, it is attended by an Analyst. The Analyst takes a test ride and assess the problems and arrives at the operations required, this process is called Check-In. This takes an average 10 min for each vehicle. Cars arrive at the centre from 7 AM to 11 AM. There are 8 Analysts employed by the service centre.

Each car that arrives at the service centre requires different procedures. There are three machine sections available in the service sections: Engine, Wheel, and Gear box cum transmission. Cars are sent to service sections as per the requirement (as advised by Analyst) in no particular order, i.e., there is no dependency across sections and any vehicle can go to any section as per availability in the section.

Let us assume that the processing time at each of the sections is constant.

The car enters different service sections as recommended by the analyst. The processing time at Engine section is 10 minutes and there is a capacity to process 5 vehicles simultaneously. The processing time for wheel service section is 20 minutes and 6 vehicles can be worked upon simultaneously. The Gear box cum transmission section can process 5 vehicles simultaneously and the time for processing is 12 minutes. All the service sections operate from 9 AM to 5 PM. Once all the procedures are completed, again the same (those who did check-in) Analysts take the vehicle for a test ride and check for proper service of all the parts, this is called check-out. This takes 15 minutes per vehicle. The Analyst takes the vehicle for post service checks from 2 PM to 7 PM.

The time required for initial formalities of receiving the car in the morning and actual delivery of the car back to the customer are assumed to be part of the marketing section and not of concern for the service centre from a capacity perspective.

Using this information, answer the following questions

61) What is the daily capacity of Engine section?

- A) 144
 - B) 240
 - C) 200
 - D) 192
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62) What is the daily capacity of the Check-out station?

- A) 192
 - B) 150
 - C) 160
 - D) 240
-

63) What is the bottleneck in the service centre, if 30% of the cars coming in are not in need of wheel servicing?

- A) Analysts- Check-in
- B) Gear box
- C) Analysts- Check-out
- D) Wheel Centre

64) What is the bottleneck for this service centre?

- A) Wheel Centre
 - B) Gear box
 - C) Analysts- Check-in
 - D) Analysts- Check-out
-

65) The capacity of Wheel Centre is increased to handle 7 cars at the same time. There is a proposal to the service centre exploring the option of sharing the Engine centre capacity with another firm. What percentage of capacity can the service centre share?

- A) 33.33%
 - B) 28%
 - C) 20%
 - D) 40
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Read the scenario and answer

A large hospital buys a specialized, single use medical grade plastic container for its use in the Operation Theaters. The plastic containers are available from a few suppliers and one unit of the box costs Rs. 2,000. The surgical sections (including the operating theaters) in the hospital work for 250 days a year and the daily consumption rate is four boxes. The suppliers take 7 working days to replenish an order. The ordering cost is Rs. 2,000 per order and the carrying cost is 20 percent.

The hospital has been utilizing an Economic Order Quantity (EOQ) model for inventory planning with respect to these boxes.

The supplier has of late introduced a Minimum Order Quantity (MOQ) restriction for all its buyers based on some internal exercise. The MOQ is 150 boxes.

In the meantime, the hospital plans to launch some improvement initiatives. This will bring down the ordering cost by 20 percent. The hospital may need to spend a sum of Rs. 10,000 towards these initiatives. A new supplier is willing to supply the plastic containers without any MOQ restrictions.

In view of this information, answer the questions given below

66) If the hospital spends on the improvement and chooses to work with the new supplier, what will be the impact?

- A) The total cost of carrying will decrease while the total cost of ordering will remain unchanged (compared to the old scenario)
 - B) Both the total cost of ordering and total cost of carrying inventory will come down making it an attractive plan
 - C) The total cost of ordering will increase in the new plan (compared to the old scenario)
 - D) The overall cost of the inventory plan will increase and will make this new offer unattractive
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67) Which of the statements will be true if the hospital uses an EOQ model for ordering the boxes?

- A) The maximum inventory of boxes in the hospital will be 50 boxes
 - B) If the hospital places an order it will last for 25 days
 - C) The total cost of ordering will be more than the total cost of carrying inventory
 - D) All of the above
-

68) The amount of pipeline inventory that the hospital will carry will be

- A) 100 boxes
 - B) 28 boxes
 - C) None
 - D) 75 boxes
-

69) If the hospital goes ahead with the improvement efforts, which of the following statements will be true with respect to the pay back of the investment?

- A) 4.74 years
 - B) 3.27 years
 - C) Less than 1 year
 - D) 2.37 years
-

70) What will be the impact of the MOQ restriction imposed by the supplier?

- A) The Hospital will not be affected in anyway
- B) The total ordering cost for the hospital will increase
- C) The total carrying cost for the hospital will increase
- D) The total cost (of ordering + carrying) for the hospital will decrease

Answer Key**Question Paper No: 60907_6**

1	A	26	C	51	B
2	C	27	D	52	A
3	B	28	D	53	D
4	B	29	B	54	D
5	B	30	B	55	D
6	D	31	B	56	D
7	B	32	A	57	B
8	B	33	B	58	D
9	C	34	B	59	C
10	A	35	D	60	D
11	C	36	A	61	B
12	B	37	C	62	C
13	A	38	A	63	C
14	C	39	C	64	A
15	D	40	B	65	A
16	A	41	C	66	B
17	A	42	D	67	B
18	C	43	C	68	B
19	A	44	D	69	D
20	D	45	C	70	C
21	D	46	C		
22	C	47	B		
23	D	48	A		
24	B	49	C		
25	C	50	A		