**Section: Question 1**

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| **Q1:** | Which of the following best describes the purpose of  Economic Order Quantity (EOQ) model in inventory management? | **Mark (2)** |
|  | It helps decrease the safety stock. | |
|  | It determines the target inventory level. | |
|  | It minimizes the total holding cost and ordering cost. | |
|  | It can indicate the reorder point. | |

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| **Q2:** | What can the first 3 digits in a GTIN-13 format be used to represent? | **Mark (2)** |
|  | Country code | |
|  | Postal code | |
|  | Check digit | |
|  | Supplier code | |

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| **Q3:** | When demand is uncertain, which of the following is true? | **Mark (2)** |
|  | Safety factor is used to measure the demand variability | |
|  | Safety stock is not required since the demand is unpredictable | |
|  | Backorders are preferable when inventory ordering cost is higher than the product profit | |
|  | 95% of service level means there is 5% chance of stock-out | |

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| **Q4:** | Which of these strategies is most effective to improve the inventory turnover of a company? | **Mark (2)** |
|  | Increase the percentage of sales for Class A items from 70% to 80% | |
|  | Implement Vendor-Managed-Inventory (VMI) | |
|  | Implement continuous review policy on Class C items | |
|  | Increase safety stock to improve the service level | |

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| **Q5:** | Which of the following regarding continuous review system is correct? | **Mark (2)** |
|  | Continuous review system supports fixed order quantity which helps quantity discount negotiation with suppliers | |
|  | Continuous review system allows combining orders from the same suppliers | |
|  | Continuous review system is suitable for low value products | |
|  | Continuous review system provides same service level with higher inventory level | |

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**Section: Question 2**

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| **Q6:** | Beauty Corner (BC) is a local cosmetics and skincare product retailer with more than 10 shops in Singapore. It buys in bulk from suppliers of various brands and sells at neighbourhood shopping malls.  Q2 a) Sales manager suggests launching a sales promotion for one month in order to boost the current low sales. Discuss how this will lead to Bullwhip Effect. | **Mark (3)** |
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|  | Word Count: 47 | Max Words: 1000 |

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| **Q7:** | Q2 b) Suggest **TWO (2)** ways to reduce the Bullwhip Effect in the supply chain. | **Mark (2)** |
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|  | Word Count: 9 | Max Words: 1000 |

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| **Q8:** | Q2 c) Currently customers buy the products from BC’s retail shops, BC has to maintain the inventory for a wide range of products in its shops in order to satisfy the customers’ demand. This is a push-based, pull-based, or push-pull supply chain? Give **TWO (2)** advantages of adopting this type of supply chain? | **Mark (3)** |
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|  | Word Count: 22 | Max Words: 1000 |

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| **Q9:** | Q2 d) In order to expand the sales network in Singapore, BC decided to set up a few vending machines selling its products in more shopping malls in Singapore as shown in Figure 2a. To simplify the process of managing the vending machines, BC has set up the Vendor Managed Inventory (VMI) process with its suppliers.  C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_-396826209_-1950154683.png     Figure 2a Beauty Corner Vending Machines  List down **TWO (2)** responsibilities that were taken by BC’s suppliers in this VMI process which were done by BC before? | **Mark (4)** |
|  |  | |
|  | Word Count: 23 | Max Words: 1000 |

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| **Q10:** | Q2 e) The practice of setting up vending machines is a big success in terms of reducing inventory holding cost. Explain how this practice can reduce the inventory level compared to the way that BC manage their retail shops? | **Mark (3)** |
|  |  | |
|  | Word Count: 50 | Max Words: 1000 |

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**Section: Question 3**

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| **Q11:** | AI Technologies Co. Ltd. distributes electronic devices worldwide from their Global Distribution Centre (GDC) in Singapore. Its products are sourced from a few suppliers with long term relationship.  Q3 a) Inventory planner, Jack, is responsible for an electrical bone density diagnostic device. The average annual demand for this product is 162 units. Ordering cost is $4000 per order.  If Jack orders 30 units per order, what is annual ordering cost? Show your workings clearly | **Mark (2)** |
|  |  | |
|  | Word Count: 9 | Max Words: 1000 |

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| **Q12:** | Q3 b) The original unit price of this device was applicable for any quantity bigger than 10 units. In order to encourage Jack to buy more, the supplier of this device offered a discount as follows,  • For 40 units or more, 5% price discount  • For 120 units or more, 8% price discount and  • Ordering cost still remains at $4,000  Inventory holding cost per unit is 25% of the unit price per year. Jack worked out the discounted EOQ model as shown in Table 3a.  Table 3a Discounted EOQ Table   |  |  |  | | --- | --- | --- | | Quantity | Adjusted optimal order quantity | **Total Costs**  **(Ordering + Holding+ Material Cost)** | | 10 <= Q<40 | 36 | $ 684,000 | | 40 <= Q<120 | 40 | $ 650,800 | | Q>=120 | 120 | $ 656,760 |   Fill in the blank for the following questions: The Minimum Order Quantity (MOQ) required by this suppliers is  The final optimal order quantity based on the Table 3a is | **Mark (2)** |

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| **Q13:** | Q3 c) Based on the Table 3a and all the relevant data from question a) and b). What is the original unit price of this electrical bone density diagnostic device? Show your workings clearly. | **Mark (3)** |
|  |  | |
|  | Word Count: 31 | Max Words: 1000 |

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| **Q14:** | Q3 d) As customers of this device are willing to wait, Jack proposes to allow backorders for this product. The backorder cost per unit is estimated at $2800 per unit per year. Assume the holding cost is $1200 per unit per year, the rest of data remains no change and there is no quantity discount at all.  i) What is the optimal quantity to be backordered?  ii) If the replenishment lead time is 2 months, what is Re-Order Point (ROP) for this device? Show your workings clearly. | **Mark (5)** |
|  |  | |
|  | Word Count: 25 | Max Words: 1000 |

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| **Q15:** | Q3 e) When this medical device is imported into Singapore, a lot of information is required to be verified when receiving at the warehouse. Jack wants to change the current 1D barcode to QR code. In terms of information flow, explain how barcode system retrieves information and how QR code improves it? | **Mark (4)** |
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|  | Word Count: 56 | Max Words: 1000 |

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**Section: Question 4**

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| **Q16:** | Welcome Convenient Store is selling sandwiches for breakfast in the morning. Welcome has to place the order of sandwiches to the supplier one day before and decide the right quantity to order in order to maximize the profit. Currently the purchase price of one sandwich is $0.80 per piece, it sells at $1.50 per piece. All the sandwiches unsold after 3pm will be sent to a farm to feed animals at a salvage price of $0.10 per piece.  Table 4a shows the daily demand of sandwiches for the past 60 days and the frequency of occurrence for each demand.  Table 4a Historical Daily Demand for the Past 60 days   |  |  | | --- | --- | | Daily Demand (D) | Frequency | | 51 | 2 | | 52 | 5 | | 53 | 7 | | 54 | 8 | | 55 | 10 | | 56 | 9 | | 57 | 8 | | 58 | 6 | | 59 | 3 | | 60 | 2 |   Q4 a) Would you recommend Welcome to order 60 pieces to ensure no loss of sales? State **ONE (1)** reason to justify your answer. | **Mark (2)** |
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|  | Word Count: 55 | Max Words: 1000 |

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| **Q17:** | Q4 b) If Welcome orders 58 pieces of sandwiches,  i) What is the probability of selling all the 58 pieces?      ii) What is the expected loss of not selling the 58th piece of sandwich?   Show your workings clearly and keep 2 decimal places for your result. | **Mark (5)** |
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|  | Word Count: 172 | Max Words: 1000 |

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| **Q18:** | Q4 c) Based on the method of Marginal Analysis,  i) Calculate the critical ratio for Welcome. Show your workings clearly and keep 2 decimal places for your result.         ii) Based on the critical ratio, the optimal quantity to order is 55 pieces. However, Welcome has ordered 58 pieces. Suggest **ONE (1)** strategy that Welcome can reduce his loss to the minimum from the unsold sandwiches and explain how the strategy works. | **Mark (5)** |
|  |  | |
|  | Word Count: 113 | Max Words: 1000 |

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| **Q19:** | Q4 d) Welcome has decided to implement Cycle Counting to ensure more accurate inventory records in the stores. ABC classification has done based on the annual sales dollars of $ 10,500,000 and the following cut-off rules: • Class ‘A’ – top 70% • Class ‘B’ – next 20% • Class ‘C’ – last 10%  There are 20, 100 and 1500 items in the warehouse being classified as A, B and C items respectively.  SKU WLCX715 is found to be the 114th item in the Cumulative Percentage of Total Sales (%). WLCX715 is a Class  item. | **Mark (1)** |

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| **Q20:** | Q4 e) Base on the information from question d) i) 150,000 units of SKU WLCX338 have been sold in a year with an average price of $25. Which is its class? Justify your choice.  ii) C items are supposed to count twice a year. However the manager postponed the 2nd count for 100 items out of the 1500 items. Give **ONE (1)** reason for the manager’s decision. | **Mark (4)** |
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|  | Word Count: 54 | Max Words: 1000 |

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**Section: Question 5**

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| **Q21:** | B-plastics Pte Ltd is a company that buys and sells resin, a kind of important raw material for plastic products.  Q5 a) The following records in Table 5a shows the transactions in the 1st half of the year in 2018.  Table 5a 6 months Transaction of Resin   |  |  |  |  | | --- | --- | --- | --- | | **Month** | **Amount In**  **(Bought, in KG)** | **Cost/KG** | **Amount Out**  **(Sold, in KG)** | | **Jan-18** | **100** | **$540** | **78** | | **Feb-18** | **100** | **$550** | **68** | | **Mar-18** | **100** | **$560** | **88** | | **Apr-18** | **150** | **$560** | **118** | | **May-18** | **200** | **$570** | **188** | | **Jun-18** | **100** | **$580** | **88** |   Average Costing Method is used to understand the financial performance of the company. Calculate the following values, show your workings clearly and keep 2 decimal places for your results: i)Average cost per kg           ii)Ending inventory cost in June | **Mark (5)** |
|  |  | |
|  | Word Count: 34 | Max Words: 1000 |

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| **Q22:** | Q5 b) Refer to the information in Table 5b. Calculate profit after tax, show your workings clearly and keep 2 decimal places for your results.  Table 5b Information Extracted from Income Statement   |  |  | | --- | --- | | **Item** | **Amount** | | Revenue | $568,288 | | Cost of Goods Sold (COGS) | $345,819 | | Selling, General & Administrative Expenses | $23,000 | | Depreciation & Amortization Expenses | $15,000 | | Goodwill Expenses | $7,500 | | Company Tax on Profit Before Tax | 14% | | **Mark (4)** |
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|  | Word Count: 24 | Max Words: 1000 |

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| **Q23:** | Q5 c) Given the information in Table 5a, if Bplastic wants to minimize their reported income, which inventory valuation method (FIFO, LIFO or Average Costing Method) it should use? Explain your choice. | **Mark (3)** |
|  |  | |
|  | Word Count: 18 | Max Words: 1000 |

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| **Q24:** | Q5 d) In order to reduce the inventory level, Bplastic decided to move close to their suppliers and implement a Kanban system to manage the order fulfilment process for their products. Explain how a Kanban system can help to reduce the inventory level. | **Mark (3)** |
|  |  | |
|  | Word Count: 30 | Max Words: 1000 |

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| **Q25:** | Q5 e) After the Kanban system is implemented, it is noticed that there is a red line in a container shown in Figure 5a.  C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_1989050289_-1959037962.jpeg                Figure 5a A Container used in Kanban System  i) What is the purpose of having this red line?       ii) How to determine where to paste this red line in the container? | **Mark (3)** |
|  |  | |
|  | Word Count: 41 | Max Words: 1000 |

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| **Q26:** | Q5 f) It is also observed that containers are attached with Kanban cards shown in Figure 5b.  C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_823359792_-1016580497.jpeg  Figure 5b Kanban Card  Fill in the blanks in the paragraph below with information found in the Kanban card shown in figure 5b.  When the front container is empty, the container with the card will be sent to ,  pieces of screws will be filled in the containers, and this order was placed on 2017 and would be delivered on 2017. And this container will be put back on  . | **Mark (5)** |

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**Section: Question 6**

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| **Q27:** | Mario Skating Pte Ltd produces various models of Skateboard in Malaysia. It has implemented SAP Enterprise Resource Planning (ERP) System to improve the efficiency and accuracy of planning.  Q6 a) List **TWO (2)** key function areas of an Enterprise Resource Planning software. | **Mark (2)** |
|  |  | |
|  | Word Count: 18 | Max Words: 1000 |

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| **Q28:** | Q6 b) List **TWO (2)** types of data that is required for Material Master in SAP. | **Mark (2)** |
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|  | Word Count: 5 | Max Words: 1000 |

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| **Q29:** | Q6 c) Figure 6a is the Bill of Material (BOM) for Entry-level Skateboard FG-888. Figure 6b is the Stock/Requirement List in SAP for Fiberglass board SF1-888.    C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_98466189_1815937515.jpeg  Figure 6a Bill of Materials for Entry-level Skateboard FG-888  QPP: Quantity per Parent LT: Lead Time    C:\Users\17046589\AppData\Roaming\Republic Poly\eQuest\_assessmentimages\_assessmentimg_98466189_857794491.png  Figure 6b Stock/Requirement List for Fiberglass board SF1-888  Based on Figure 6b, What lot sizing rule is used to determine the lot size of SF1-888, Lot-for-lot or Fixed order quantity? | **Mark (1)** |
|  | Lot-for-Lot | |
|  | Fixed Order Quantity | |

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| **Q30:** | Q6 d) Based on Figure 6b, there is a planned order on 29th June 2018 required to reschedule to 25th June 2018. What is the reason to have this adjustment? | **Mark (2)** |
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|  | Word Count: 15 | Max Words: 1000 |

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| **Q31:** | Q6 e) The in-house production lead time for SF1-888 Fiber Glass is reduced from 1 week to 2 days. What is/are the changes that will reflect in the page of Stock/Requirement List in Figure 5b after MRP re-run? | **Mark (1)** |
|  |  | |
|  | Word Count: 17 | Max Words: 1000 |

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| **Q32:** | Q6 f) Before SAP implementation is completed, Material Requirement Planning (MRP) was done by manual calculation via Spreadsheet. The 8 weeks’ product gross requirement, current inventory and scheduled receipt for FG-888 are all given in Table 6a. Lot size is determined by Lot-for-lot (L4L).                                           Table 6a FG-888 Material Requirement Planning   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **Locknut** | Lead time:  2 weeks | | Qty Per Product : **1** | | | Lot size : LFL | | | | | Time | Wk 0 | Wk 1 | Wk 2 | Wk 3 | Wk 4 | Wk 5 | Wk 6 | Wk 7 | Wk 8 | | Gross requirements | 0 | 300 | 250 | 350 | 0 | 300 | 250 | 0 | 200 | | Scheduled Receipt | 0 | 250 | 250 | 0 | 0 | 0 | 0 | 0 | 0 | | On Hand Inventory (at the end of the period) | 200 |  | **A** |  |  |  |  |  |  | | Net Requirements |  |  |  | **B** |  |  |  |  |  | | Planned orders |  |  |  |  |  | **C** |  |  |  |                 Find the value in the cell A, B and C respectively. Show your workings clearly if necessary. (Note: empty cells don’t mean the values are zero) | **Mark (5)** |
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|  | Word Count: 56 | Max Words: 1000 |

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| **Q33:** | Q6 f) Assume that there is no inventory on hand and scheduled receipt for all the sub-assemblies and raw materials, based on the BOM of FG-888 in Figure 6a and the material requirement of FG-888 in Table 6a, what is the gross requirement for raw material RM3-888 in week 3?  Explain how you derive this gross requirement. | **Mark (3)** |
|  |  | |
|  | Word Count: 59 | Max Words: 1000 |

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| **Q34:** | Q6 g) If the lot size of FG-888 is determined by Fixed Order Quantity (FOQ), will the inventory carrying cost increase, decrease or not change? Justify your answers. What kind of product is more suitable to use FOQ, instead of Lot-for-Lot to determine the lot size? | **Mark (3)** |
|  |  | |
|  | Word Count: 17 | Max Words: 1000 |

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