Name: Enrollment No:	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM & ENERGY STUDIES

End Semester Examination – Dec., 2021

Program: MBA AVM **Semester : III**
Subject/Course: Supply Chain Management **Max. Marks: 100**
Course Code: 8015P **Duration : 3 Hours**

It carries 6 pages.

Section A

1. **Attempt all the questions. Each question carries 2 marks.**
2. **Instruction: Complete the statement / Select the correct answer(s)**

S.No.	Questions	Marks	Cos
Q.1.	Define AAA model.	**2**	**CO1**
Q.2.	a) Highest volume of air cargo is traded in ……. Hub in Asia. b) Taxibot operations launched by ……..……..at IGI airport, New Delhi in 2020-21.	**2**	**CO1**
Q.3.	In Weber's theory, ……..cost is the major factor for location decision.	**2**	**CO1**

<table>
<tr><td>Q.4.</td><td>If monthly Demand of an item used in manufacturing avionic component is 50 units, ordering cost per order is Rs. 800, storage cost is 10% per unit. Purchase price of the item is Rs.600 per unit. Determine EOQ.</td><td>2</td><td>CO1</td></tr>
<tr><td>Q.5</td><td>Write Huff formula for location decision of a mall.</td><td>2</td><td>CO1</td></tr>
<tr><td>Q.6</td><td>Mention any two advantages of ABC Analysis.
a) ……..
b) …….</td><td>2</td><td>CO1</td></tr>
<tr><td>Q.7</td><td>……is a pre-condition in case of NMCM/LCM/VAM.</td><td>2</td><td>CO2</td></tr>
<tr><td>Q.8</td><td>b) In case, supply of factories is more than demand for warehouses, ……is added to balance the transportation problem.</td><td>2</td><td>CO2</td></tr>
<tr><td>Q.9</td><td>Mention any 2 benefits of Outsourcing:
a)……
b)…..……..</td><td>2</td><td>CO2</td></tr>
<tr><td>Q.10</td><td>Differentiate MRP from MSRP.</td><td>2</td><td>CO2</td></tr>
<tr><td>S.N.</td><td>Section B
Attempt all the questions. Each carries 5 marks.</td><td>Marks</td><td>Cos</td></tr>
<tr><td>Q.11</td><td>Determine the initial basic feasible solution of the following Transportation Problem by using matrix North West Corner Method (NWCM).
Destination
<table><tr><td>Source</td><td>W1</td><td>W2</td><td>W3</td><td>W4</td><td>Supply</td></tr><tr><td>P1</td><td>10</td><td>50</td><td>30</td><td>30</td><td>34</td></tr><tr><td>P2</td><td>30</td><td>30</td><td>10</td><td>20</td><td>15</td></tr><tr><td>P3</td><td>15</td><td>20</td><td>20</td><td>30</td><td>12</td></tr><tr><td>P4</td><td>20</td><td>70</td><td>20</td><td>40</td><td>19</td></tr><tr><td>Demand</td><td>23</td><td>23</td><td>17</td><td>17</td><td>80</td></tr></table></td><td>5</td><td>CO3</td></tr>
<tr><td>Q.12</td><td>Discuss significance of Route Planning and various stakeholders involved in the process. Support your answer with real example.</td><td>5</td><td>CO3</td></tr>
</table>

Q.13	Discuss Green supply chain Framework. Specify any three best practices of green supply chain to create value to enhance customer satisfaction. Support your answer with live examples from aviation sector.	**5**	**CO4**
Q.14	How Michael Porter's model contributes to value chain for any organization. Explain with examples from airline industry.	**5**	**CO1**
	Section C **Attempt any two questions. Each question carries 10 marks** **Instruction: Write long answer.**		
Q.15	Comment on "Inventory is a necessary evil". Discuss costs associated for Inventory assurance in case of a spare parts in aviation sector for efficient supply chain. Discuss the significance of VMI in case of aviation industry. Illustrate with some live examples.	**10**	**CO3**
Q.16	The following information is known about a group of items. Classify the material in A, B, C categories and draw ABC chart also. Model No. Volume Unit Price 1 1000 90 2 500 154 3 1550 17 4 350 42.86 5 1000 12.5 6 600 14.17 7 2000 0.6 8 100 8.5 9 1200 0.42 10 250 0.60	**10**	**CO3**
Q.17	Aviation industry has been disrupted badly under pandemic in last two years. Discuss the significance of Industry 4.0 applications in aviation sector. Explain the supply chain strategies adapted and the challenges faced by aviation companies under COVID 19**.** **OR** Discuss *KPIs for Airport Operators,* Cargo Terminals and Airlines. What performance measurement models you suggest for these KPIs?	**10**	**CO4**
Q.18	**Section D** **Attempt the case study.** **Each question carries 15 marks, total 30 marks.** **Instruction: Write long answer.**		

Attempt the following case:

Global Sourcing in Aerospace Industry: A380 AIRBUS

The continuous internationalization of trade and the phenomenon of globalization have made global sourcing available and appealing to the global industries. With regard to the upstream part of the supply chain, the need for better suppliers, and the research into specific competences and concerns related to international competition, have forced companies to improve their ability to cope with suppliers located in different countries around the world (Golini and Kalchschmidt, 2011). This is 'global sourcing,' which is defined as the purchasing of goods outside the geographical area to which the company belongs (Kotabe and Omura, 1989, Murray et al., 1995a and Murray et al., 1995b). During the last two decades the number of companies outsourcing to external suppliers increased drastically which in turn contributed to economic development. It is argued by Rossetti and Choi (2005) that strategic sourcing integrates the buying firm's strategic decisions with those of its key suppliers, promoting trust and decreasing transaction costs.

According to the 'Reach for the Skies Report' (2014), through to 2030, the forecast global demand for civil aerospace stands at 56,700 aircraft, valued at $4.14billion, 27,000 of which will be 100-plus seat passenger aircraft (themselves worth $3.2 trillion). Average sector annual growth by 2030 is forecast at 4.8%, with much of this growth forecast to occur in Asia-Pacific, where 33% of world traffic is expected to take place by 2030.

Buy or Outsource

The above evidences illustrate the increase in aircraft manufacturing to respond to the demand in the market place. In addition, the next generation of aircraft will be based on radically different technologies, requiring new manufacturing processes and placing new challenges on the UK supply chain if it is to remain globally competitive. Thus the UK aerospace industry needs to identify upcoming opportunities to broaden its base across the global market, selling to a wider range of aircraft and equipment manufacturers. This raises a question of where the equipment and structures are sourced from. Does the UK needs to globally out-source these capabilities?

It is argued by Johnson, Leendersand Flynn (2011) that companies decide whether to 'buy or outsource' to get access to superior supply chain management expertise, technical expertise, and because outsourcing may open up markets for the firm's products or services. On the other hand, Chopra and Meindl (2013; p. 442) argue that the decision to outsource is based on the growth in supply chain surplus provided by the third party and the increase in risk incurred by using a third party. Outsourcing should be considered by a firm if the growth in surplus is large with a small increase in risk. Performing the function in-house is superior if the growth is surplus is small or the increase in risk is large.

	Supplier Selection Strategy In selecting suppliers, a firm must decide whether to use single sourcing or multiple suppliers. Single sourcing, according to Chopra and Meindl (2013) can secure the supplier's sufficient business when the supplier has to make a significant buyer-specific investment. Choosing single sourcing depends on the industry. For example, outsourcing is also used in automobile industry for parts such as seats that must arrive in the sequence production. Coordinating such sequence would be impossible with multiple sources. According to the UK Chief Engineer of A380, "*the outsourcing for the structure side of Airbus aircraft A380 tends to not travel from afar but equipment can come from over the world*". Airbus is cautious in choosing the supplier, as some of Airbus's suppliers are suppliers of its competitors. For the A380, the landing gear system and the nose are sourced from Canada, however, parts of the landing gear come from Poland to Canada. The control equipment are sourced from Massier-Bugatti-Dowty, an Anglo French Company; valves are made by the Zodiac group which is a French corporation; the brakes, and aviation control system are outsourced from the US; and a lot of pumps and equipment are sourced locally from an English company because the UK aerospace industry is strong from a technology, supply chain and manufacturing perspective. In particular, the key capabilities are; advanced wing design, integration and manufacturing; advanced aero-engines; advanced power trains; landing gear systems; aircraft and engine control systems; advanced propeller systems; wheels and brakes; electrical power system; and high-tech R&D. The four biggest suppliers for A380 are the US, Canada, France and UK. These are four areas that have the biggest history in aviation. Airbus uses single source supply for most of the equipment and structure part of aircraft, for example titanium is outsourced from Russia. This can generates real concerns when global instabilities such as the crisis in Ukraine in 2013 happened -what would be the alternative? Airbus also tends to multi-source some parts e.g. brakes which are consumables and they can be sourced from different suppliers. Chopra and Meindl (2013) state that having multiple sources ensures a degree of competition and also lower risk by providing a backup should a supplier fail to deliver. ***Risk Management in Sourcing*** It is argued by Chopra and Meindl (2013) that sourcing risks may lead to an increase in procurement costs, delay in meeting demand on time, or the loss of intellectual property. In particular in high tech industries such as aerospace, it is important to develop strategies to mitigate a considerable part of the risk. A supply chain with a single sourcing strategy can be vulnerable in on time delivery in the case of natural disasters or political instability and protest which can lead to the risk of supply disruption, for example, the case of earthquake and tsunami in Japan in early 2011. This kind of risk can be	**2x15=30**	**CO2, CO4**

	mitigated by multiple sourcing strategies (Chopra and Meindl, 2013). Given the high cost of developing multiple sourcing, this approach seems to be more appropriate for products with relatively high demand. Intellectual property risk can be mitigated by bringing and keeping sensitive production in-house. For Airbus, the main risk in global sourcing has been associated with the Intellectual Property Rights (IPRs) so far. The UK Chief Engineer for A380 believes that '*although IPRs is owned by the company who designed the structure, however, it is a real concern in recent years as new players from emerging economies such as China and Russia started to build their aircrafts'.* Scholars such as Chopra and Meindl (2013) stated that even when production is outsourced, firms can maintain ownership of part of the equipment if it is viewed as having significant intellectual property value. ***Managerial implications*** To date, global sourcing, strong innovation in advanced manufacturing processes and underpinning capability in key product areas have helped to sustain UK competitiveness in the global aerospace market. However, the next generation of single-aisle aircraft will feature much greater use of composites or advanced metal not currently available in today's market (Reach for the Skies Report, 2014). This would remain challenging to procurement managers when it comes to decide on the suppliers' selection strategy from the main and new players in Aerospace industry. **Answer the following questions:** a) Discuss the pros and cons of Single Sourcing Strategy. b) Analyze the supply chain risks involved in global sourcing and how to overcome these risks?		