



SCHOOL OF MECHANICAL ENGINEERING
CONTINUOUS ASSESSMENT TEST – II
FALL SEMESTER 2025-2026

Reg. No.
(To be filled by the student)
22BMM0008

Programme Name & Branch : SMEC -BME
Course Code : BMEE310L
Course Name : Supply Chain Management
Faculty Name(s) : Dr. K. Jayakrishna
Class Number(s) : VL2025260103161
Slot : G1
Date of the Exam : 11-OCT-2025
Exam Duration : 90 minutes

Maximum Marks: 50

General instruction(s): Answer ALL Questions

- Answer All Questions
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
- Course Outcome Statements:
CO 3: Analyze the impact of information in achieving coordination.
CO 4: Optimize inventory level in a Supply Chain.

Q. No	Question	Marks	Course Outcome (CO)	Bloom's Taxonomy (BL)
1.	A multinational electronics company has observed that its suppliers and distribution centers often place large, infrequent orders rather than smaller, more regular ones. This batching of orders has caused delays, excess inventory, and coordination problems across the supply chain. Analyze the situation and answer the following: A. Identify the factors within the supply chain that contribute to order batching. B. Explain how large, infrequent orders affect coordination between suppliers, manufacturers, and distributors. C. Suggest practical actions the company can take to minimize large batches and improve supply chain coordination.	10	CO3	BL4
2.	Infineon, a leading semiconductor manufacturer, noticed significant fluctuations in inventory levels across its supply chain. During investigation, the Supply Chain Innovations team observed that small changes in market demand caused increasingly larger swings in inventory at the semiconductor production stage - a phenomenon known as the bullwhip effect. Analyze the Infineon supply chain scenario and answer the following: A. Identify the factors in this supply chain that contribute to the bullwhip effect. B. Explain how fluctuations in market demand are amplified as they move upstream to semiconductor production. C. Suggest strategies Infineon could implement to mitigate the bullwhip effect and improve forecasting accuracy.	10	CO3	BL4



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Q. No	Question	Marks	Course Outcome (CO)	Bloom's Taxonomy (BL)
3.	The Burger Queen can produce burgers at a rate of 4,000 per day. Burger Queen supplies burgers to local college canteens at a steady rate of 200 per day. The cost to prepare the equipment for producing burgers is Rs.60. Annual holding costs are 1 rupee per burger. The factory operates 250 days a year. Find the (i) Optimal run size (ii) Number of runs per year (iii) How many days it takes to produce the optimal run quantity? (iv) Annual Ordering/Setup Cost (v) Annual Holding Cost (vi) Annual Total Ordering and Holding Cost?	10	CO4	BL4
4.	V-mart purchases home goods made by a supplier in China. V-mart's stores in India sell 200,000 units of home goods each month. Each unit costs Rs.10 and the company has an annual holding cost of 20 percent. Placing a replenishment order incurs clerical costs of Rs.500/order. The shipping company charges Rs.5,000 as a fixed cost per shipment along with a variable cost of Rs.0.10 per unit shipped. What is the optimal order size for V-mart? What is the annual holding cost of the optimal policy? How many orders per year does V-mart place? What is the annual fixed transportation cost? What is the annual variable transportation cost? What is the annual clerical cost?	10	CO4	BL4
5.	A manufacturer stocks a component with weekly demand distributed normally: average 3000 units/week, standard deviation 500 units/week. The lead time for replenishment is exactly 2 weeks. The company wishes to maintain a 95% service level ($Z=1.65$). Currently, the order quantity is 15,000 units, and the reorder point is set at 7000. (a) Calculate the mean demand during lead time, safety stock, cycle inventory, and average inventory. (b) Compute the standard deviation of demand during lead time. (c) Analyze if the current reorder point (7000) is sufficient for stock outs. Support your reasoning using the calculated safety stock and demand during the lead time, and discuss possible adjustments for greater reliability.	10	CO4	BL4