UNIVERSITI KUALA LUMPUR
KAMPUS CAWANGAN MALAYSIAN SPANISH INSTITUTE

FINAL EXAMINATION

OCTOBER 2025 SEMESTER

COURSE CODE	:	SFB23102 (V1)
COURSE TITLE	:	PRODUCTION PLANNING
PROGRAMME NAME	:	BACHELOR OF ENGINEERING TECHNOLOGY (HONS) IN MANUFACTURING (AUTOMOTIVE)
DATE	:	24 JANUARY 2026
TIME	:	9:00AM - 11:00AM
DURATION	:	2 HOURS

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consist of ONE sections.
4. Section A consist of five questions. Answer FOUR (4) questions only.
5. Please write your answer on the answer booklet provided.
6. Please answer all questions in English only.
7. Refer to the attached Formula/ Appendies. ☑ *Tick if applicable*

THERE ARE 7 PAGES OF QUESTIONS INCLUDING THIS PAGE

SECTION A (Total: 100 marks)

Answer FOUR (4) questions.

Please use the answer booklet provided.

Question 1

Sarah Manufacturing Sdn. Bhd. would like to develop an aggregate plan via the transportation method. The table shows data related to production, demand, capacity, and cost. Using the transportation sheet, assess the production capacity to satisfy demand at a minimum cost. Determine the cost of this plan.

Refer Below - Table1 : Demand, Capacity & Cost Data .

(25 marks)

Table 1: Demand, Capacity & Cost Data

	SALES PERIOD		
	MAR.	APR.	MAY
Demand	800	1,000	750
Capacity:			
Regular	700	700	700
Overtime	50	50	50
Subcontracting	150	150	130
Beginning inventory	100 tires		

COSTS	
Regular time	$40 per tire
Overtime	$50 per tire
Subcontract	$70 per tire
Carrying cost	$ 2 per tire per month

Question 2

During the past 8 quarters, the Port of Baltimore has unloaded large quantities of grain from ships. The port's operations manager wants to test the use of exponential smoothing to see how well the technique works in predicting tonnage unloaded. He guesses that the forecast of grain unloaded in the first quarter was 175 tons. Two values of α are to be examined: $\alpha = 0.10$ and $\alpha = 0.50$.

(a) Predict the weight of grain unloaded for quarter 9 using $\alpha = 0.1$ and 0.5.

(9 marks)

(b) Compare the forecasting errors between $\alpha = 0.10$ and $\alpha = 0.50$ using any one of the error measuring method. Decide which α value should be used and explain why the value is selected.

(16 marks)

Question 3

These questions are related to Location Strategy

(a) Ching-Chang Kuo is considering opening a new foundry in Denton, Texas; Edwardsville, Illinois; or Fayetteville, Arkansas, to produce high-quality rifle sights. He has assembled the following fixed-cost and variable-cost data:
Refer Below - Table2 : Fixed and Variable cost .

Table 2: Fixed and Variable cost

		PER-UNIT COSTS		
LOCATION	FIXED COST PER YEAR	MATERIAL	VARIABLE LABOR	OVERHEAD
Denton	$200,000	$ .20	$ .40	$ .40
Edwardsville	$180,000	$ .25	$ .75	$ .75
Fayetteville	$170,000	$1.00	$1.00	$1.00

i. Assess range of annual volume for each facility to produce with lowest total cost.

(15 marks)

ii. Construct a graph that show the costs line and range of production

(5 marks)

(b) The Metropolis Public Library plans to expand with its first major branch library in the city's growing north side. The branch will serve six census tracts. The table shows the coordinates of each tract and the population within it. Using the center-of-gravity method, determine the coordinate location of the branch library.
Refer Below - Table3 : Coordinate and Population Within It .

(5 marks)

Table 3: Coordinate and Population Within It

CENSUS TRACT	CENTER OF TRACT	POPULATION IN TRACT
503—Logan Square	(3, 4)	45,000
519—Albany Park	(4, 5)	25,000
522—Rogers Park	(3, 6)	62,000
538—Kentwood	(4, 7)	51,000
540—Roosevelt	(2, 3)	32,000
561—Western	(5, 2)	29,000

Question 4

The figure below shows the structure and quantities of component needed of a product known as Alpha.

Refer Below - Figure1 : Product Structure of Alpha .

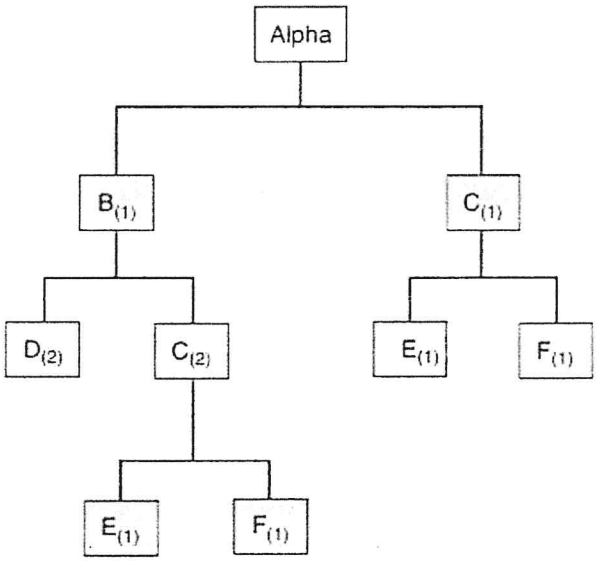

Figure 1: Product Structure of Alpha

(a) Choose suitable type of Bill of Material (BOM) for the Alpha product structure. Also, include the exploded BOM with level and quantities of components required.

(13 marks)

(b) Determine each component quantity required if 10 unit Alpha to be produced.

(12 marks)

Question 5

These questions are related to entrepreneur management

(a) The Fawwaz Computer Sdn Bhd. purchases 8,000 transistors each year as components in minicomputers. The unit cost of each transistor is $10, and the cost of carrying one transistor in inventory for a year is $3. Ordering cost is $30 per order. Assume that Fawwaz operates on a 200-day working year. The transistor supplier needs 5 days to deliver the item.

i. Assess the optimal order quantity of the transistors.

(2 marks)

ii. Decide the expected number of orders should be placed.

(2 marks)

iii. Decide the expected time between orders.

(2 marks)

iv. Calculate the total annual cost.

(3 marks)

v. Determine the reorder point of the transistors.

(2 marks)

(b) Rahmah Manufacturing Company, located produces flashing lights for toys. The facility runs 300 days annually and receives orders for approximately 12,000 lights each year. It can manufacture up to 100 lights per day. Each setup for production incurs a cost of $50, while the production cost per light is $1. The annual holding cost is $0.10 per light. Determine:-

i. The optimal size of the production run?

(4 marks)

ii. Average holding cost per year

(2 marks)

iii. Average setup cost per year.

(2 marks)

iv. Total cost per year.

(2 marks)

(c) Differentiate between dependent and independent demand. Provide example to support your explanation.

(4 marks)

END OF EXAMINATION PAPER

LIST OF FORMULAS (SFB23102)

$$F_t = F_{t-1} + \alpha(A_{t-1} - F_{t-1}) \qquad MAD = \frac{\Sigma|Actual - Forecast|}{n}$$

$$Q = \sqrt{\frac{2DS}{H}} \qquad Q = \sqrt{\frac{2DS}{H\left(1-\frac{d}{p}\right)}}$$

$$No\ of\ orders@production\ run\ (N) = \frac{Demand\ (D)}{Order\ quantity\ (Q)}$$

$$Time\ between\ orders\ (T) = \frac{No.\ of\ working\ days\ per\ year}{Expected\ no.\ of\ orders}$$

$$Holding\ Cost = \frac{Q}{2}H \quad \text{OR} \quad \frac{Q}{2}\left[1 - \left(\frac{d}{p}\right)H\right]$$

$$Set\ up\ Cost = \frac{D}{Q}S$$

$$Total\ annual\ cost\ (TC) = \frac{D}{Q}S + \frac{Q}{2}H \quad \text{OR} \quad Total\ annual\ cost\ (TC) = \frac{D}{Q}S + \frac{Q}{2}\left[1 - \left(\frac{d}{p}\right)H\right]$$

$$Inventory\ level_{max} = Q\left(1 - \frac{d}{p}\right)$$

$$Average\ Requirement = \frac{Total\ expected\ demand}{No\ of\ production\ days}$$

$$Total\ Cost = Fixed\ Cost + (Variation \times volume)$$

$$x - coodinate\ of\ the\ center\ of\ gravity = \frac{\sum_i d_{ix} Q_i}{\sum_i Q_i}$$

$$y - coodinate\ of\ the\ center\ of\ gravity = \frac{\sum_i d_{iy} Q_i}{\sum_i Q_i}$$

where d_{ix} = x coordinate of location i d_{iy} = x coordinate of location i

Q_i = Quantity of goods move to or from location i