NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF ENGINEERING

DEPARTMENT OF ELECTRONIC ENGINEERING

ENGINEERING MANAGEMENT   (EEE 3255)

Final Examination Paper

March 2025

Time Allowed	:	3 hours
Total Marks	:	100
Examiner's Name	:	Mr Bhekisisa Dube

INSTRUCTIONS

1. This examination paper consists of eight (8) printed pages

2. Answer **ALL QUESTIONS** in this paper.

3. Show all your steps clearly in any calculation (Use of calculators is permissible)

4. Start the answers for each question on a fresh page.

MARK ALLOCATION

QUESTION	MARKS
1.	25
2.	25
3.	25
4.	25
TOTAL	**100**

QUESTION 1

a) In the context of a telecommunications company such as Telone, briefly discuss why engineering managers need to pay attention to each of these for continued success;

    i)   rapidly changing customer needs

    ii)   a global marketplace

    iii)   advancing technology

    iv)   knowledge management.   **[8]**

b) Define 'market segmentation'?   **[1]**

c) Explain the centrality of the customer to any three (3) of the 7Ps of Marketing.   **[6]**

d) Contrast the consequences of following an innovation-driven and market-driven approaches when to developing and delivering a product to the market.

    [4]

e) State any three (3) ways that an Engineering Manager may use to develop or better their subordinates.   **[3]**

f) State three (3) strategies used by managers to motivate their subordinates.   **[3]**

QUESTION 2

a) Differentiate between 'leadership' and 'management' in a couple of sentences. **[2]**

STEM
leadership

Ethics

Marketing

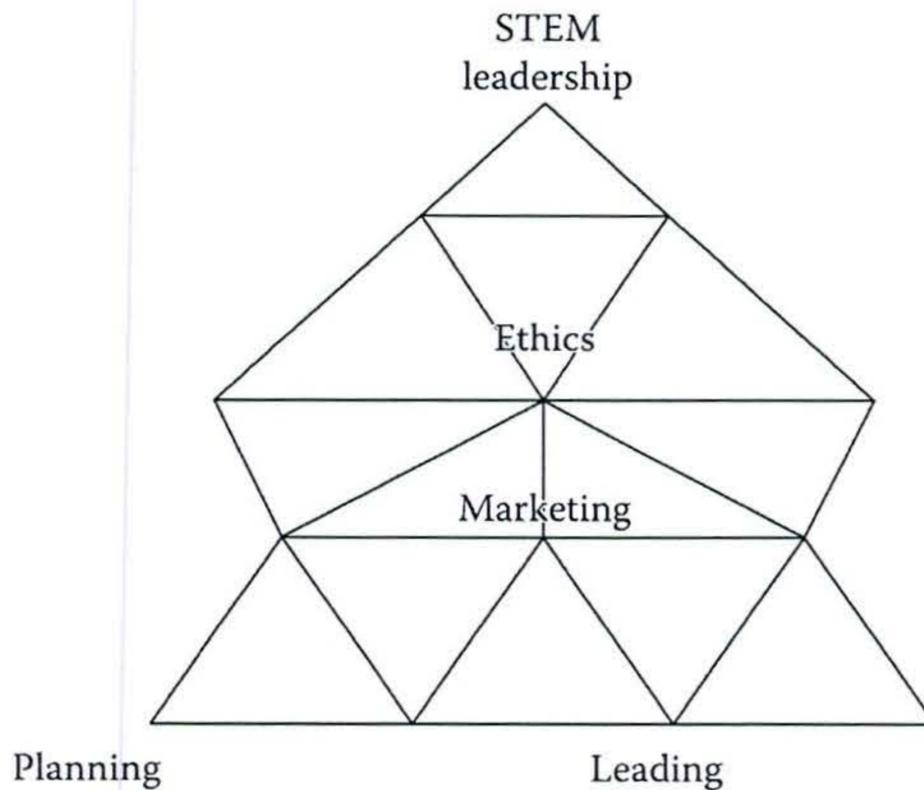Planning   Leading

Figure Q2a Three-decker leadership architecture

b) Identify the other eight (8) skills and/or knowledge that Electronic Engineers and other STEM professionals ought to master to achieve STEM Leadership as graphically represented by the Three-Decker Leadership Architecture in Figure Q2a.

[8]

c) A budgeting committee at a public institution is tasked with allocating a $1 million budget to improve infrastructure across multiple departments. The committee has shortlisted four potential projects (A, B, C, and D) since they all meet the minimum requirements of being feasible and aligned with the institution's strategic goals. The committee will further evaluate the projects based on the following criteria, with the attached degrees of importance: Cost-Effectiveness (0.4), Impact on Students (0.3), Sustainability (0.2), and Innovation (0.1).

The four shortlisted projects are:
  Project A: Upgrading IT systems.
  Project B: Renovating laboratory facilities.
  Project C: Improving campus safety and security systems.
  Project D: Expanding library resources and study spaces.

The consolidated assessments by all the committee members are shown in figure Q2b.

	Cost-Effectiveness (0.4)	Impact on Students (0.3)	Sustainability (0.2)	Innovation (0.1)
Project A	4/5	3/5	0/5	3/5
Project B	3/5	2/5	3/5	2/5
Project C	2/5	4/5	0/5	1/5
Project D	3/5	3/5	4/5	1/5

Table Q2b Consolidated Assessment Scores for Each Project

If the consolidated scores from the 4 interview panelists are as shown in Table Q4.

i)   Use an appropriate tool to determine and recommend the project the Committee should prioritise. *(In your solution, include the other two criteria that all projects met.)*

[12]

ii)   Make a case for the choice of that tool instead of intuition or gut feeling.

[1]

iii)   Which type of decision-making criteria do *feasibility* and *alignment with strategic goals* belong to?

[1]

iv)   How about *impact on students* and *sustainability*? Which criteria do they belong to?

[1]

QUESTION 3

a) Using an example, discuss how deduction is used in strategic planning.

[2]

b) The Table Q3 below represents the account balances of InCognito Engineering for the month ended 28 February 2025. All account balances are normal balances.

Accounts Payable	$500
Rent Expense	$1 000
Cash	$10 025
Fees earned	$16 500
Auto expense	$1 350
Accounts receivable	$5 350
Salaries expense	$2 500
Supplies	$1 275
Capital stock	$10 000
Miscellaneous expense	$150
Dividends	$5 000
Supplies expense	$350

Table Q3 *Account balances of InCognito Engineering (as at 28 February 2025)*

Come up with the following financial statements;
   i)   Income Statement   [8]
   ii) Statement of Retained Earnings   [3]
   iii) Balance Sheet   [12]

QUESTION 4

Read the Case Study Q4 on pages 7-8 and answer the following questions.

a) How is the entry of Starlink into the Zimbabwean market a game changer? [1]

b) Provide two examples of leadership skills engineers must demonstrate to ensure successful service delivery in the context of Starlink's operations in Zimbabwe. [2]

c) Briefly deliberate on three (3) factors that contributed to either the successful market entry or delayed entry of Starlink?

[6]

d) Starlink organised its operations in Zimbabwe through direct sales and authorised resellers. Explain an advantage of this dual-channel distribution strategy. [2]

e) Explain the term 'exclusive distribution' in the context of Starlink's strategies. [2]

f) Starlink's pricing strategy is tailored to the Zimbabwean market.
   i) Calculate the total cost of Starlink's Standard and Mini kits, including shipping fees. [2]

   ii) Which of the two (2) pricing strategies discussed in the course does Starlink's pricing strategy in Zimbabwe seem to have adopted? [1]

   iii) Explain the financial implications of Potraz's annual fee of 3.5% of gross revenue on Starlink's operations.

[2]

g) Starlink differentiates itself in Zimbabwe's internet market through operational excellence and unique service offerings. Identify two strategies Starlink uses to achieve operational excellence and explain how these strategies give it a competitive edge.

[4]

h) Innovation is a key driver of Starlink's success. Discuss one example of how Starlink demonstrates creativity and innovation in its service offerings or business model in Zimbabwe. How does this innovation address customer needs and market challenges?

[3]

Case Study Q4 - *Starlink's Entry into Zimbabwe – A New Era of Internet Connectivity*
From the Business Weekly & TechZim | September 2024 | Harare, Zimbabwe

In September 2024, Starlink, the satellite internet service provider owned by SpaceX, officially entered the Zimbabwean market after receiving dual licenses from the regulator, the Postal and Telecommunications Regulatory Authority of Zimbabwe (Potraz). These licenses allow Starlink to operate as both a network service provider and a national internet service provider (ISP), enabling Starlink to legally offer internet services via its low-earth orbit (LEO) satellites. This move marks a significant shift in Zimbabwe's internet landscape, particularly for rural areas where traditional connectivity options are limited or nonexistent.

Starlink's entry into Zimbabwe was facilitated by a government decision to improve rural internet access, where ground-based wireless and cable services are either expensive or unavailable. The company paid US$525 000 for a 20–year network license US$50 000 for a 20-year ISP license, standard rates set by Potraz. Additionally, Starlink is required to pay an annual fee of 3.5% of its gross revenue, which supports Potraz's universal service fund for shared telecommunications infrastructure. This regulatory framework ensures a level playing field for all providers while promoting rural connectivity.

Starlink introduced two main service packages in Zimbabwe: a Standard residential package priced at US$50 per month and a mini-residential package at US$30 per month. The Standard package offers speeds ranging from 25 Mbps to 250 Mbps, while the Mini package provides 10 to 100 Mbps. Both packages offer unlimited data, with bandwidth being the only limiting factor. To manage network capacity, Starlink limits sign-ons in each area and prioritises Standard users during peak demand. The company also offers a portable internet option for US$100 per month, allowing users to roam with their satellite kits.

Starlink's pricing strategy is tailored to the Zimbabwean market, with the $50 Standard package significantly cheaper than the 120 charged in the United States. However, the company has warned that prices may fluctuate, as seen with recent fee increases in other African markets. This pricing model reflects Starlink's commitment to affordability while ensuring sustainable operations.

Starlink's hardware, which includes an antenna, router, stand, and cabling, is priced at US$373 for the Standard kit and US$223 for the Mini kit, including a US$23 DHL shipping fee. These prices are significantly lower than the US$700–800 previously speculated, because Potraz intervened to curb profiteering. Starlink sells directly to customers and through authorised resellers approved by both Starlink and Potraz. Currently, TelOne and Aura are the only approved resellers, with Frampol and Dandemutande awaiting approval. This dual-channel distribution strategy ensures widespread availability while maintaining quality control.

Starlink's entry intensifies competition in Zimbabwe's internet market, which is dominated by TelOne and Liquid. TelOne offers unlimited DSL services for US$90 per month, while Liquid provides bundled packages ranging from US$90 per month. Econet, another major player, recently launched its Smartbiz service at US$45 per month, undercutting Starlink's Standard package. Despite this, Starlink's satellite

technology offers a unique value proposition, particularly in rural areas where traditional providers struggle to deliver reliable service.

While Starlink's satellite internet is a game-changer for rural connectivity, it faces challenges in urban areas where cable and wireless services are more affordable. For instance, urban customers can rent Wi-Fi modems for a few dollars a month, making Starlink's hardware costs a barrier. However, the company's portable internet option and high-speed capabilities give it an edge in specific niches, such as businesses and remote locations.

Starlink's success also depends on effective installation and customer support. While users can set up their kits outdoors with a clear view of the sky, roof or gable mountings may be necessary, potentially incurring additional costs. Resellers like TelOne and Aura can leverage their expertise to offer installation services, enhancing customer experience.

TelOne's appointment as an authorised Starlink reseller is a strategic move that benefits both parties. TelOne's extensive distribution network and government-backed infrastructure position it as a key player in Starlink's expansion. However, the silence of other major providers like Liquid and Econet is puzzling, given their history of innovation and market leadership. Their absence from the Starlink reseller frenzy suggests a missed opportunity to diversify revenue streams and retain customers.

Starlink's entry has significant implications for Zimbabwe's socio-economic development, particularly in education and healthcare. Rural schools and clinics, often underserved by traditional providers, stand to benefit from affordable, high-speed internet. However, the high upfront costs of Starlink's hardware may be prohibitive for many institutions. To address this, stakeholders could tap into Potraz's universal service fund or seek community support to subsidise costs.

Starlink's entry into Zimbabwe represents a transformative moment in the country's internet landscape. By leveraging satellite technology, the company addresses critical gaps in rural connectivity while challenging established providers in urban areas. Its success hinges on effective management of pricing, distribution, and customer support, as well as strategic partnerships with local resellers. As competition intensifies, Starlink's ability to innovate and adapt will determine its long-term impact on Zimbabwe's digital transformation. This case study underscores the importance of regulatory frameworks, market dynamics, and technological innovation in shaping the future of internet connectivity.

Sources:
Business Weekly (24 Sept, 2024). *Starlink creates new options for internet.* Available at https://www.businessweekly.co.zw/starlink-creates-new-options-for-internet/ (Accessed 3 October 2024)
Techzim (18 Sept, 2024). *TelOne Becomes Starlink Authorised Reseller.* Available at https://www.techzim.co.zw/2024/09/telone-becomes-starlink-authorised-reseller/ (Accessed 3 October 2024)