



UTHM

Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2021/2022**

- COURSE NAME : TECHNOLOGY MANAGEMENT
- COURSE CODE : BPA 21703
- PROGRAMME CODE : BPA
- EXAMINATION DATE : JULY 2022
- DURATION : 3 HOURS
- INSTRUCTION :
1. ANSWER ALL QUESTIONS
 2. THIS FINAL EXAMINATION IS AN **ONLINE** ASSESSMENT AND CONDUCTED VIA **OPEN BOOK**
 3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

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- Q1** (a) Technology can be thought of as an asset or a commodity to be purchased and sold. A company that owns certain technology should include technology exploitation as a component of its technology strategy. The methods of technology exploitation resemble those used for acquisition.
- (i) Define technology exploitation with an example. (2.5 marks)
 - (ii) Describe technology acquisition with an example. (2.5 marks)
 - (iii) Elaborate **TWO (2)** methods for acquiring technology using appropriate examples. (10 marks)
- (b) A user of a technology does not have to be its creator or inventor. In fact, most inventions are created outside the firms that benefit from them. Innovation may also occur outside a firm's boundaries, and even if it happens within the firm, it may be confined to one department or division.
- (i) Discuss using appropriate examples, **TWO (2)** categories of technology transfer. (5 marks)
 - (ii) Distinguish between planned channels and reverse-engineering channels using appropriate examples. (5 marks)
- Q2** Technology planning is a central component of corporate business planning. It is needed both at the corporate level and at the strategic business unit (SBU). Large successful corporations view technology planning as vital to the on superior technology. There is a difference between strategizing and planning, which can be considered as the difference between discovering and programming. Strategizing should be creative and revolutionary, while planning is systematic and follows established methodologies. Whereas strategy determines the formula by which the firm intends to win, planning charts the procedures and actions to be followed. Planning is essential for successful strategy implementation and evaluation.
- (a) Create **ONE (1)** technology planning framework using appropriate example. (15 marks)
 - (b) Discuss **FOUR (4)** characteristics of a good forecast. (10 marks)

Q3 Apple today released new details on the increased use of recycled content across its products. For the first time, the company introduced certified recycled gold, and more than doubled the use of recycled tungsten, rare earth elements, and cobalt. Nearly 20 percent of all material used in Apple products in 2021 was recycled, the highest-ever use of recycled content.

Apple has pioneered innovations in the recycling and sourcing of materials to spur industrywide change. To help its recycling partners build on this momentum worldwide, Apple today announced its newest recycling innovation, Taz, a machine that uses a groundbreaking approach to improve material recovery from traditional electronics recycling.

In 2021, 59 percent of all the aluminum Apple shipped in its products came from recycled sources, with many products featuring 100 percent recycled aluminum in the enclosure. Apple has also made significant progress toward the company's goal to eliminate plastics from its packaging by 2025, with plastics accounting for just 4 percent of packaging in 2021. Since 2015, Apple has reduced plastic in its packaging by 75 percent.

In addition to charting progress in recycling innovation and material stewardship, Apple's newly released 2022 Environmental Progress Report highlights the company's significant work to become carbon neutral across its global supply chain and the life cycle of every product, as well as progress reducing waste and promoting the safer use of materials in its products.

In a year when many other companies saw large increases in their footprints and the company's revenue grew 33 percent, Apple's net emissions remained flat. Apple has been carbon neutral for its global operations since 2020, and has relied on 100 percent renewable energy to power its offices, stores, and data centers since 2018.

Apple recently announced that its suppliers more than doubled their use of clean power over the last year, with over 10 gigawatts operational out of nearly 16 gigawatts in total commitments in the coming years. As of this month, 213 of the company's major manufacturing partners have pledged to power all Apple production with renewable electricity across 25 countries. In 2021, these renewable projects avoided 13.9 million metric tons of carbon emissions, the equivalent to removing 3 million cars from the road for one year.

(Source: Apple, 2022)

- (a) Discuss the type of innovation model that is used at Apple based on the case in **Q3**.
(5 marks)
- (b) Examine **TWO (2)** types of innovation that are applied at Apple based on the case in **Q3**.
(10 marks)
- (c) Examine **FOUR (4)** factors that promote innovation and have helped Apple to be one of the most innovative technology based company in the world.

(10 marks)

Q2 Artificial intelligence (AI) is now transforming the manufacturing industry. It can extend the sheer reach of potential applications in the manufacturing process from real-time equipment maintenance to virtual design that allows for new, improved, and customized products to a smart supply chain and the creation of new business models. AI in the manufacturing industry is being used across a variety of different application cases. It is being used as a way to enhance defect detection through sophisticated image processing algorithms that can then automatically categorize defects across any industrial object that it sees.

This technology is transforming the manufacturing industry by augmenting operators through the active analysis of all of the process and quality data coming off a manufacturing line. Through the analysis of this data, operators can be provided with the optimal decision-making at the point that they need to. This might be computer vision used for quality inspection to flag where surface defects have occurred. It might be the analysis of the process data to recommend changes in the production variables to prevent defects that might occur due to variation in the raw material, or it might be the analysis of the machine data to prevent failure of that machine at some future date through predictive maintenance.

Sungsam Electronics, a major manufacturer of smartphones and electronic components such as lithium ion batteries, image sensors and displays, is planning to use AI in its manufacturing activities as illustrated in the excerpt above.

(a) As an Operations Manager at Sungsam, you are required to formulate technology strategy for the company to facilitate its adoption of the AI technology.

Outline the steps to formulate the technology strategy for the company.

(15 marks)

(b) Propose **TWO (2)** methods that Sungsam can use for strategic analysis and decision making to determine the suitability of AI for its manufacturing activities.

(10 marks)

-END OF QUESTIONS-

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