PENINSULA COLLEGE GEORGETOWN

FINAL SEMESTER EXAMINATION
(in compliance with MQA's requirement)

Programme	:	**BA (HONS) BUSINESS 3+0**
Academic year	:	**2022/23**
Stage	:	**2**
Course	:	**INTRODUCTION TO OPERATIONS MANAGAMENT**
Course Code	:	**MAL2002**
Time Allowed	:	**3 HOURS**

INSTRUCTIONS TO CANDIDATES:

1. Please read the instructions given in the question paper **CAREFULLY.**
2. Answer **ALL** questions.
3. Answers to the questions are to be written into the examination booklet.
4. Electronic dictionaries, lecture notes, files or any unauthorised materials except writing equipment are strictly prohibited.

This question paper must be submitted along with all used and/or unused rough papers and/ or graph papers (if any). Candidates are **NOT ALLOWED** to take any examination papers out of the examination hall.

(*This booklet contains 5 printed pages including this page*)

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE ALLOWED TO DO SO

WARNING:
The Examination Board of Peninsula College Georgetown regards cheating as a very serious offence and will not hesitate to mete out the appropriate punitive actions according to the severity of the offence committed, and in the accordance with the clauses stipulated in the Students' Handbook, up to and including expulsion from Peninsula College Georgetown.

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QUESTION NO.	MARKS
1	/ 40
2	/ 30
3	/ 30
Total	**/ 100**

Answer **ALL** questions on the separate sheet provided.

Question 1

CASE STUDY: THE NEXT INDUSTRIAL REVOLUTION: HOW BUSINESS OPERATIONS CAN BENEFIT FROM INDUSTRY 4.0

The global health crisis that ensued from the first transmissions in China in late 2019 of the Coronavirus provided a shockwave that was perhaps unprecedented in modern business history. Like the Great Depression in the US in the 1920s and 1930s and the global financial crisis of 2008, the ensuing events highlighted several underlying issues across many sectors and economies. In the immediate aftermath of the crisis, there were no shortage of political, economic, social, and environmental reparations to be made to ensure that such widespread devastation could not be repeated. One example of this was how quickly or slowly, some businesses reacted to the sudden surge in demand for certain items.

An answer to a seeming lack of preparedness is to build a business that can flex around almost any scenario and respond with lightning speed to subtle or large changes in demand. Such a utopia is promised in what is known as Industry 4.0. While not looking at the Coronavirus crisis specifically, their work is nevertheless highly relevant as it looks into the near future and how business operations can benefit from the implementation of a host of new technologies. Despite the evident benefits of an Industry 4.0 that enabled business operations in a greater agility, ability to customize, better accuracy and improved efficiency, there are several barriers that prevent the next industrial revolution from taking place for many businesses.

In term of financial concerns, all this new technology comes at a price, and as with any emerging technology the return on investment is unclear. Besides, management support can be lacking as the changes to system dynamics can require a huge amount of training and development, as well as collaboration through the whole value chain network. This can cause numerous managerial headaches. As with any major change program, adopting Industry 4.0 will be resisted by many people both in the senior leadership team and on the shop floor due to the root-and-branch reform it requires of business processes. With new systems and technology comes the requirement for new skills, which may take a while to develop or be difficult to buy in. From legal perspective, although it is not an obvious barrier, but the amount of data being collated and transmitted around the new systems brings into focus the need for enhanced cybersecurity. National support networks are often slow on the uptake of new technology and ways of working, and as such governments may not focus on the digital transformation of infrastructure required to make Industry 4.0 happen smoothly.

It is for good reason that Industry 4.0 is referred to as the next industrial revolution, as it would take nothing less than major change in all areas for it to be implemented. However, business and society changed overnight during the Coronavirus crisis in 2020, so perhaps a revolution could happen as quickly if the demand for business change is there.

END OF CASE STUDY

Adapted from: The Impact of Industry 4.0 Implementation on Supply Chain, Ghadge, A., Er Kara, M., Moradlou, H. and Goswami, (2020), Journal of Manufacturing Technology Management, ISSN: 1741- 038X, doi: 10.1108/JMTM-10-2019-0368.

Question 1 (Continued)

1 a) Based on the case, examine the challenges faced by organisations in implementing Industrial 4.0 technologies. Provide relevant examples to support your answer. (15 marks)

b) Analyse the advantages of having Industrial 4.0 technologies in digital transformation of business operations. (15 marks)

c) Discuss **FIVE (5)** stages of industry 4.0 technologies based on project lifecycle approaches. Support your answer with relevant examples from the case. (10 marks)

[Total: 40 marks]

Question 2

CASE STUDY: TSMC'S MARKET POSITION

Taiwan Semiconductor Manufacturing Co Ltd (TSMC) posted its best-ever quarterly profit and hiked revenue and capital spending estimates to record levels as it forecast "multiple years of growth opportunities". The world's top contract chipmaker has become increasingly bullish as remote work amid the coronavirus pandemic drives demand for advanced chips to power premium devices. Demand that is expected to continue to surge as 5G technology and artificial intelligence applications are adopted more widely. TSMC now expects to lift capital spending on the production and development of advanced chips to between US$25 billion to US$28 billion this year, as much as 60% higher than the amount it spent in 2020. Demand for chips has been so high that manufacturers around the world are sounding alarm bells about shortages. Several car makers have seen production plans hit by insufficient supply, leading TSMC to see a jump in demand from automakers in the fourth quarter.

END OF CASE STUDY

Adapted from: TSMC Logs Highest Quarterly Profits, Sees Record Revenue and Capital Spending", Y. M. Lee and B. Blanchard (2021), The Edge Communications Sdn. Bhd.

2. a) The production volume for TSMC has shown an uptrend for four consecutive quarters since the 3rd quarter of 2020. It started with 19.8 billion in the 3rd quarter of 2020, 21.5 billion in the 4th quarter of 2020, 32.7 billion in the 1st quarter of 2021 and 36.8 billion in the 2nd quarter of 2021. Based on the facts as described, answer the following:

   i) Compute the forecast for the 3rd quarter of 2021 by using Naïve approach. (2 marks)

   ii) Compute the four-period weighted moving average forecasted volume for the 3rd quarter of 2021 using weights of 0.15 in 3rd quarter 2020; 0.25 in 4th quarter 2020; and 0.30 in 1st quarter of 2021. (3 marks)

   iii) Compute the forecasted volume for the 3rd quarter of 2021 by using exponential smoothing model with smoothing constant 0.8, whereby the forecasted volume for the 4th quarter of 2020 same as the actual volume of 3rd quarter of 2020. (5 marks)

b) TSMC's manufacturing engineer produces integrated circuit (IC) boards gathered 4 samples of 7 ICs each. The heights of each ICs in unit cm are listed below.

Sample	1	2	3	4	5	6	7
1	9.98	10.34	10.02	9.94	10.44	10.24	9.68
2	10.33	10.22	10.08	10.51	10.41	10.18	10.28
3	9.89	9.77	9.91	10.04	10.01	9.83	9.89
4	9.87	10.13	9.92	9.99	9.1	9.92	9.81

i) Calculate overall mean and average range. (4 marks)

ii) Calculate the upper control limit and lower control limit. (6 marks)

Question 2 (Continued)

c) Define continuous improvement and discuss **FOUR (4)** reasons that continuous improvement concept can be implemented in TSMC's supply chain. Support your answer with relevant examples. (10 marks)

[Total: 30 marks]

Question 3

3 a) As an operations manager of the AEON retailer store nationwide, discuss the essential function(s) that AEON needs to perform in order to stay competitive. (18 marks)

b) Assume that you are the AEON's operations manager, propose how should you manage the operations when its capacity exceeds demand. (12 marks)

[Total: 30 marks]

- END OF QUESTIONS -