UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2018/2019

COURSE NAME	:	INDUSTRIAL ENGINEERING
COURSE CODE	:	BPB 31303
PROGRAMME CODE	:	BPB / BPP
EXAMINATION DATE	:	JUNE / JULY 2019
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWERS **ALL** QUESTIONS

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

Q1 Ah Keong Nut Ice is a famous ice kacang shop in Penang. In order to improve its operation, the shop's manager is analyzing the process at their shop. The general flow of the process is shown in **Figure Q1**. Please note that there is a separate person working at each of the steps in the process and the shop operates 8-hours work day.

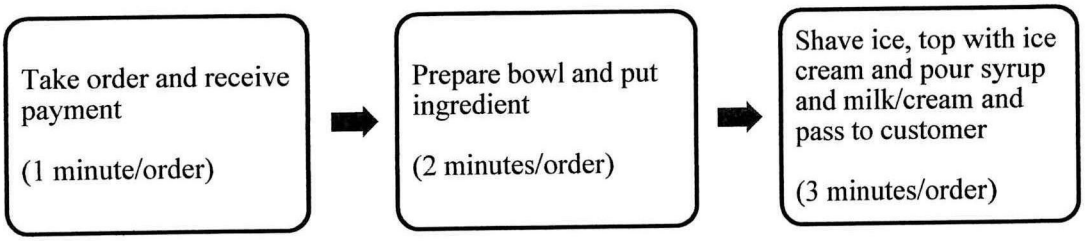

Figure Q1: General flow of ice kacang process

(a) Calculate the current maximum output for each processes.

(10 marks)

(b) State which operation should have a new worker based on **Q1(a)**.

(1 marks)

(c) Calculate the new maximum output if Ah Keong intended to hire one new worker for operation based on **Q1(b)**.

(9 marks)

(d) Calculate the new maximum output with existing three workers operation if Ah Keong exploring to improve the current operation by reducing 1 minute from ice shaving operation.

(10 marks)

Q2 Harmony FPTP Sdn Bhd is setting up an assembly line to produce 360 units of printer. This assembly line will operate 600 minutes per day. The information on this printer production task time and precedence relationships as tabulated in **Table Q2**.

Table Q2: Task time and precedence relationships

Task	Time (seconds)	Immediate predecessor (s)
A	90	-
B	30	-
C	70	A
D	10	A,B
E	30	C,D
F	60	D
G	50	E
H	50	E,F,G

(a) Sketch the precedence diagram.

(2 marks)

(b) Calculate the cycle time for this operation (in second).

(3 marks)

(c) Calculate the theoretical minimum number of workstations.

(3 marks)

(d) Propose the balance line using the longest task time as a secondary criterion to break ties.

(15 marks)

(e) Determine the overall efficiency based on **Q2(d)**.

(2 marks)

Q3 (a) Define the definition of Total Productive Maintenance (TPM).

(2 marks)

(b) Explain **SEVEN (7)** elements of TPM House.

(14 marks)

(c) Describe **TWO (2)** reasons to implement TPM.

(4 marks)

Q4 Creating a suitable computer environment is important. **Figure Q4** demonstrates an appropriate computer workstation.

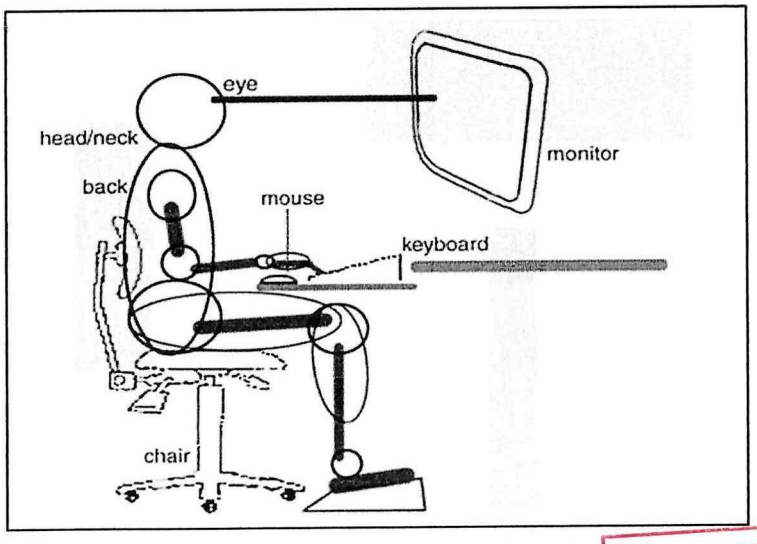

Figure Q4: Computer workstation

(a) List **FIVE (5)** potential injuries that could occur as a result of long term computer use.

(5 marks)

(b) Determine the ideal range of monitor distance for good ergonomic practice.

(3 marks)

(c) Determine ears position in relation to shoulder and monitor when sitting at a computer workstation

(3 marks)

(d) Discuss the ideal wrist position when using the keyboard.

(3 marks)

(e) Determine the body angle should be in contact with the chair when sitting at a computer workstation.

(3 marks)

(f) Determine the position and angle of feet when sitting at a computer workstation.

(4 marks)

(g) Regardless of experience intelligence, motivation or vigilance, human beings make "silly" mistakes.

Discuss **TWO (2)** situations associated with an increased risk of mistakes.

(4 marks)

- END OF QUESTIONS -