



## UNIVERSITY COLLEGE TATI (UC TATI)

## FINAL EXAMINATION QUESTION BOOKLET

COURSE CODE	:	BMT 1053
COURSE	:	PNEUMATIC AND HYDRAULIC
SEMESTER/SESSION:		1 – 2022/2023
DURATION	:	3 HOURS

Instructions:

1. This booklet contains **4** questions. Answer **all** questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, rise up your hands and ask the invigilator.

**DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO**

**THIS BOOKLET CONTAINS 7 PRINTED PAGES INCLUDING COVER PAGE**

PNEUMATIC AND HYDRAULIC (BMT 1053)

---

**QUESTION 1**

a) You have selected a pneumatic system as a source of working medium in an automated assembly line at your workplace. Among the requirements for an assembly line are the air must be compressible and is it the non-electrical source of working medium. Give **EIGHT (8)** advantages of utilizing pneumatics as the working medium selected by you

(8 marks)

b) Pneumatic systems used in industry are commonly powered by compressed air. Explain the function of a pneumatic system for each of the components below:

- i. Filter
- ii. Pressure regulator
- iii. Lubricator
- iv. Air dryer
- v. Pressure gauge

(10 marks)

PNEUMATIC AND HYDRAULIC (BMT 1053)

**QUESTION 2**

a) Give the name of labeled components from (i) to (vi) in Figure 1 pneumatic circuit diagram below.

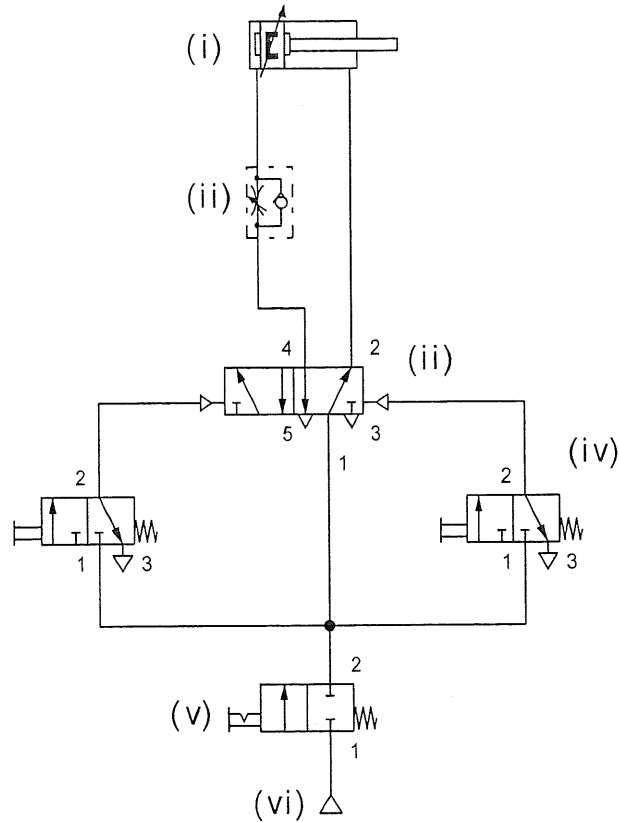


Figure 1

(12 marks)

b) A double pilot valve is installed to control a double acting cylinder. If one of two push button is pressed, the cylinder will extend. If the cylinder is reaching the fully extended position, the roller lever (limit switch) is used to ensure the cylinder reach the fully extend position. When the other button is pressed, the cylinder return to its original position. Sketch the pneumatic circuit based on the description above.

(20 marks)

PNEUMATIC AND HYDRAULIC (BMT 1053)

---

**QUESTION 3**

- a) For the construction industry, heavy loads and great amount of soil or rock are required to move by the earthmoving machineries. Hydraulic power system is the preferred source of working medium in this environment. Identify **FIVE (5)** advantages of using a hydraulic system here in comparison with other power systems.

(10 marks)

- b) In a manufacturing environment, hydraulic power is commonly used. Due to this, diligent maintenance practices are required and periodic services are performed as required. A badly performing hydraulic system will lead to unnecessary downtimes emergency repairs. Identify and discuss **FIVE (5)** problems that will occur in hydraulic system that were used in the manufacturing environment.

(10 marks)

## PNEUMATIC AND HYDRAULIC (BMT 1053)

**QUESTION 4**

- a) By analyzing and selected hydraulic component listed in the Table 1, construct a circuit that can open and closed a furnace door. Figure 2 shows the schematic of the door that will be controlled on the furnace.

No.	Item Label	Quantity	Description
1	0Z1	1	Hydraulic Power Pack
2	0Z2	1	Pressure gauge
3	0V	1	Pressure relief valve
4	1V	1	4/2 way valve, manually operated
5	1A	1	Double acting cylinder

Table 1

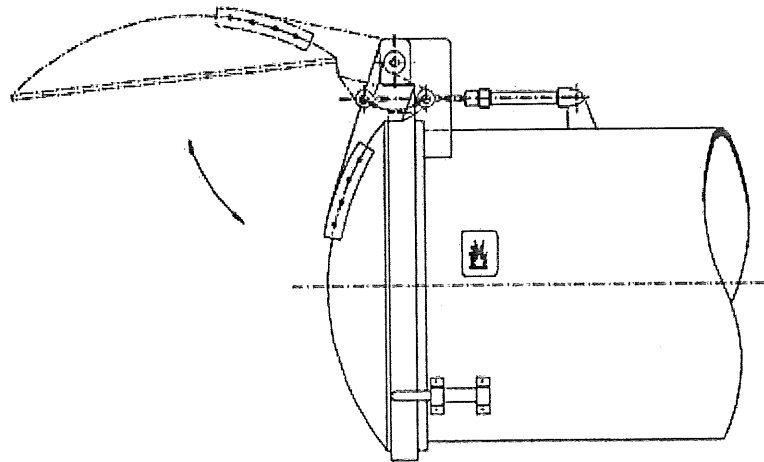


Figure 2

(10 marks)

PNEUMATIC AND HYDRAULIC (BMT 1053)

---

b) The piston rod of a double acting cylinder is to extend when a hand lever 4/2 way valve spring return is actuated. The cylinder remain extended until the hand lever has been released then the cylinder will return to the initial position. You need to figure out a hydraulic circuit diagram in accordance with:

i. The hydraulic circuit diagram based on the description above.

(10 marks)

ii. The extended speed of the cylinder can be controlled using metering in.

(5 marks)

iii. The retract speed of the cylinder can be controlled using metering out.

(5 marks)

-----End of questions-----

PNEUMATIC AND HYDRAULIC (BMT 1053)

Attachment

