

**UNIVERSITY COLLEGE TATI (UC TATI)****FINAL EXAMINATION QUESTION BOOKLET**

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| COURSE CODE | : DEE 1013 |
| COURSE | : INDUSTRIAL INSTRUMENTATION |
| 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, raise up your hands and ask the invigilator.

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

THIS BOOKLET CONTAINS 5 PRINTED PAGES INCLUDING COVER PAGE

INDUSTRIAL INSTRUMENTATION (DEE 1013)

QUESTION 1

- a) Describe the meaning of:
- i. Instrumentation (2 marks)
 - ii. Measurement (2 marks)
 - iii. Instrument (2 marks)
 - iv. Electronics instrument (2 marks)
- b) Describe THREE (3) types of temperature transducers with the application of each. (4 marks)
- c) Describe the term of mechanical flow meter. Give TWO (2) example of flow meter with the basic principle and applications. (4 marks)

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QUESTION 2

- a) List TWO (2) types of temperature sensors. (2 marks)
- b) List FOUR (4) types of level measurement. (4 marks)
- c) Bimetallic strips formed by joining two different metals were having different thermal expansion coefficients. List three (3) advantages and disadvantages of Bimetallic strips. (6 marks)
- d) Describe the difference between thermistor and thermocouple. (2 marks)
- e) Give TWO (2) advantages and disadvantages of electromagnetic flow meter. (2 marks)
- f) List TWO (2) types of pneumatic actuator. (2 marks)

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QUESTION 3

- a) List FIVE (5) fundamental parts of the valve. (5 marks)
- b) Sketch and describe control valve. (4 marks)
- c) Select and describe a suitable valve based on the application below:
- (i) Valve is use to fully open and fully shut-off the gas flow in a pipe. (2 marks)
 - (ii) Valve for throttling. (2 marks)
 - (iii) Valve for quick opening. (2 marks)
 - (iv) Valve that allows one way direction. (2 marks)
 - (v) Valve for safety to release the air pressure. (2 marks)
- d) Give THREE (3) advantages and disadvantages of electric actuator. (3 marks)
- e) Figure 1 are manual valve.
- (i) Name each type of valve. (2 marks)
 - (ii) Describe the operation of each valve. (4 marks)

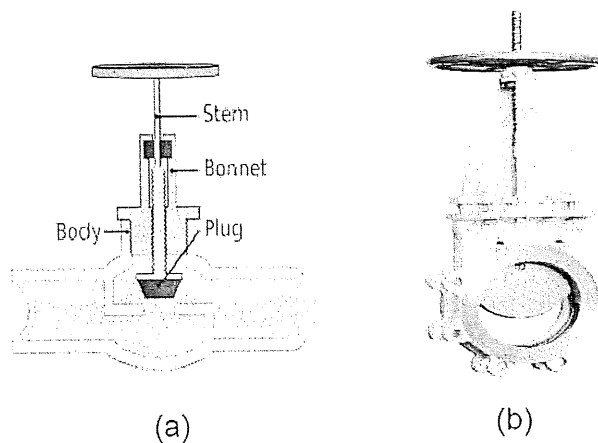


Figure 1: Manual valve

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QUESTION 4

- a) Describe a Globe Valve (5 marks)
- b) Give THREE (3) advantages and disadvantages of Globe Valve. (6 marks)
- c) Butterfly Valves are rotary motion valves usually used to stop, regulate and start fluid flow. List SIX (6) advantages of using this valve. (6 marks)
- d) Describe the importance of using Gate Valve in controlling liquid/gas flow. (6 marks)
- e) One way to measure flow is to measure the pressure difference between the inlet and outlet of the pressure from an obstruct material as shown by Figure 2.
- (i) Explain the operation of this type of flow meter. (2 marks)
- (ii) Give two (2) advantage and TWO (2) disadvantages of this flow sensor. (4 marks)
- (iii) Name THREE (3) type of flow sensors under the category of differential pressure measurement. (3 marks)
- (iv) Check Valves are designed to prevent the reversal of flow in a piping system. Explain the of reversal flow in Check Valves. (6 marks)

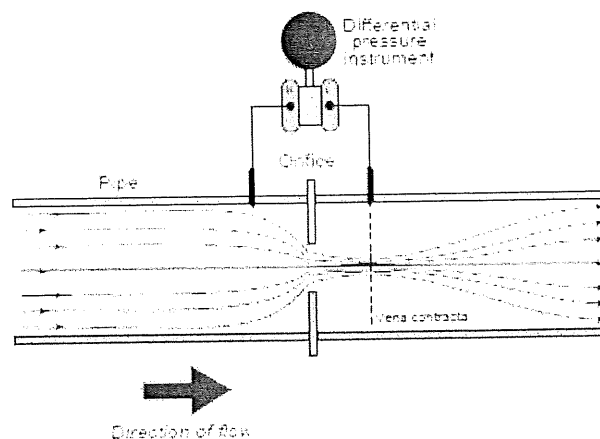


Figure 2: Flow Sensor

-----End of question-----

