



**NATIONAL EXAMINATION  
AND SCHOOL INSPECTION  
AUTHORITY**

**T118**

**Tuesday, 20/7/2021**

08:30 – 11:30 AM

**Names:**

Index number

**TVET NATIONAL EXAMINATION, RTOF LEVEL 5, 2020-2021**

**QUESTIONS and ANSWERS BOOKLET**

OPTIONAL TRADE: MECHANICAL PRODUCTION TECHNOLOGY

**OPTION/TRADE: MECHANICAL PRODUCTION**  
**SUBJECT: Hydraulic and Pneumatic Systems**

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# TVET NATIONAL EXAMINATION, RTQF LEVEL 5, 2020-2021

## **INSTRUCTIONS TO CANDIDATES: PART I (Answer Booklet)**

1. A candidate should fill in the actual names and the index number on the cover of this questions and answer booklet on the provided place (Black Box).
2. It is illegal for a candidate to write any of his/her names, index number or a school name inside the answer booklet.
3. A candidate should check if all pages of the answer booklet are complete. No candidate should remove or tear any pages or part of it from the answer booklet.
4. A candidate should answer in the language in which the examination is set. (See page **(ii)**)
5. A candidate should sign on the sitting plan when submitting the answer booklet. He/she has also to check if the answer booklet is well sealed.
6. No extra paper is allowed in the examinations room. If a candidate is caught with it his/her results will be nullified.
7. No candidate is allowed to write answers not related to the subject being sat for, otherwise it will be considered as a cheating case.
8. Write your answers on the 12 lined pages (From page 1 of 12 to page 12 of 12).
9. Use the last non-lined pages as draft.
10. Results for any candidate who is caught in examination malpractices are nullified. The cheating can be recognized during examinations administration, marking exercise or even thereafter.

**TVET NATIONAL EXAMINATION, RTQF LEVEL 5, 2020-2021**

**OPTION/TRADE: MECHANICAL PRODUCTION TECHNOLOGY**

**SUBJECT: Hydraulic and Pneumatic Systems**

**DURATION: 3 hours**

**INSTRUCTIONS TO CANDIDATES: PART II (Question Paper)**

The paper is composed of two (2) Sections as follows:

**Section I: Attempt all the Twelve (12) questions (60 marks)**

**Section II: Attempt any Four (4) questions out of Six (6) (40 marks)**

**Allowed materials:**

- Ruler or square
- Calculator

**Note:**

***Every candidate is required to carefully comply with the provided assessment instructions.***

**Section II: Attempt any Four (4) questions out of Six (6) (40 marks)**

- 01.** Indicate the five (5) factors affecting selection of pipe used in pneumatic or hydraulic system. **(5 marks)**
- 02.** Enumerate any five (5) main elements of pneumatic system. **(5 marks)**
- 03.** Identify four (4) mounting technics of pneumatic system. **(5 marks)**
- 04.** Identify any five (5) tests conducted on accumulators. **(5 marks)**
- 05.** List down four (4) steps used for preparing the pipe way. **(5 marks)**
- 06.** Differentiate partial commissioning from definitive commissioning. **(5 marks)**
- 07.** List any five (5) disadvantages of pneumatic system. **(5 marks)**
- 08.** List any five (5) advantages for an anti-lock braking system. **(5 marks)**
- 09.** List down any five (5) PPE used for installing pneumatic and hydraulic system. **(5 marks)**

10. List down at least five (5) accessories used in installing pneumatic and hydraulic system. **(5 marks)**
11. Enumerate any five (5) types of pipe used in fluid power. **(5 marks)**
12. Write down three (3) means used to transfer mechanical force from motor to compressor. **(5 marks)**

**Section II: Attempt any Four (4) questions out of Six (6) (40 marks)**

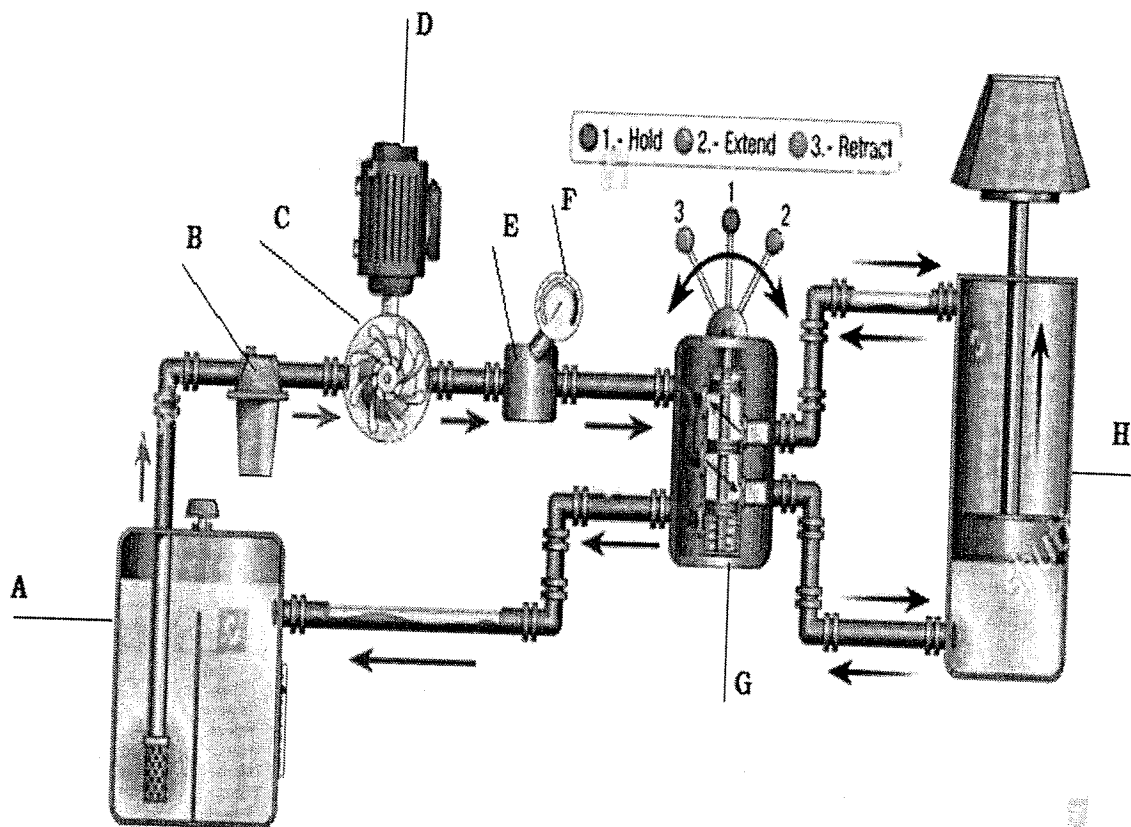
13. a) List down at least five (5) measuring instruments used for installing, testing pneumatic and hydraulic system. **(5 marks)**
- b) A volume  $0.5\text{m}^3$  of air at gauge pressure of 1500kpa (15bar) is allowed to expand in a cylinder until volume is  $2\text{m}^3$ , if the temperature is kept constant, what will be the new gauge pressure? Assume the atmospheric is equal to 100kpa (1bar). **(5 marks)**
14. a) Mention any five (5) steps for testing the fluid power installed system. **(5 marks)**
- b) Calculate the final volume of gas at the specified conditions assuming the temperature and mass remain constant. Where  $V_1 = 200\text{ cm}^3$ ,  $P_1 = 600\text{ mmHg}$  and  $P_2 = 800\text{ mmHg}$ . **(5 marks)**
15. Differentiate hydraulic from pneumatic system. **(10 marks)**
16. a) A pneumatic cylinder is required to extend at a minimum speed of  $0.75\text{ m/s}$  in a system with a flow rate of 50 LPM. What is cylinder size (Piston Diameter) required? **(5 marks)**
- b) An 8 cm diameter pneumatic cylinder has a 4 cm diameter rod. If the cylinder receives flow at 100 LPM and 6 bar, find the:
- Extension and retraction speeds
  - Extension and retraction load carrying capacities. **(5 marks)**

17. a) Identify any five (5) tools and hand machines used while installing pneumatic and hydraulic system and their corresponding roles.

b) What are five (5) factors must be considered for choosing a hydraulic fluid?

(10 marks)

18. Identify the name and roles of the following indicated elements:



(10 marks)





