higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

FITTING AND TURNING
NQF LEVEL 4

(6011044)

28 November 2023 (X-paper)
09:00–12:00

This question paper consists of 6 pages

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
FITTING AND TURNING
NQF LEVEL 4
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
2. Read all the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Start each question on a new page.
5. Use only a black or blue pen.
6. Write neatly and legibly.

QUESTION 1: PUMPS AND COMPRESSORS

1.1 Explain the function of each of the following tools used to assemble a pump in a workshop:

1.1.1 Torque wrench

1.1.2 Induction heater

1.1.3 Levelling blocks or shims

1.1.4 Cleaning agent and solvent

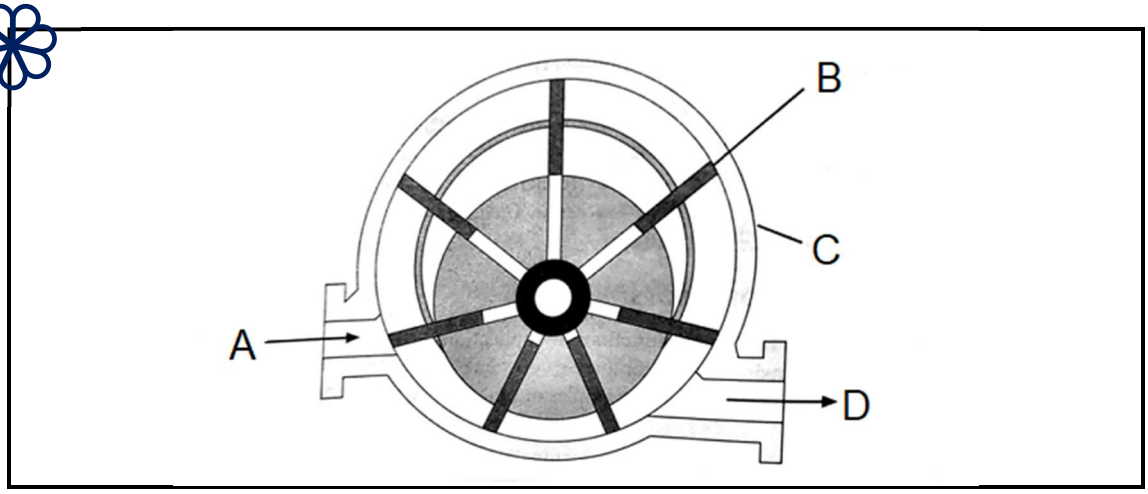
1.1.5 Snap ring plier

(5 × 1) (5)

1.2 List THREE checks to do when assembling a pump and its subcomponents. (3)

1.3 Give ONE reason why it is necessary to identify pump parts and associated components prior to disassembly. (2)

1.4



1.4.1 Identify the type of compressor shown above. (1)

1.4.2 Label the parts of the compressor by writing only the answer next to the letter (A–D) in the ANSWER BOOK. (4 × 1) (4)

1.4.3 Name the working principle of the above compressor. (1)

1.5 Explain the purpose of the following in a piston-compressor assembly:

1.5.1 Intercooler

1.5.2 After-cooler

(2 × 2) (4)

[20]

QUESTION 2: HYDRAULIC AND PNEUMATIC

2.1 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (2.1.1–2.1.5) in the ANSWER BOOK.

2.1.1 Using the correct tools, equipment, cleaning materials and protective equipment prevents damage to a hydraulic system.

2.1.2 An actuator uses the force generated by a pneumatic system.

2.1.3 Visual inspections must be done once a day to check whether the systems are still functioning in accordance with prescripts and regulations.

2.1.4 The piping system in a pneumatic system conveys fluid from one point to another or from one component to another.

2.1.5 The purpose of a pressure-regulator valve is to reduce incoming air to a pressure that is required by the specific machine.

(5 × 1) (5)

2.2 Give TWO reasons why it is necessary for an operator to obtain applicable consumables, lubricant and cleaning agent in preparation for the layout and construction of a circuit. (2 × 2) (4)

2.3 List FIVE things to do to ensure that a fitting workshop is clean and that all tools and equipment are stored after use to normalise the system environment. (5)

2.4 Explain the function of each of the following components used in hydraulic and pneumatic systems:

2.4.1 Reservoir

2.4.2 Hydraulic/Pneumatic cylinder

2.4.3 Filter

(3 × 2) (6)

[20]

QUESTION 3: SURFACE GRINDING

3.1 Explain why it is standard practice in a workshop to check grinding wheels for cracks and damages before fitting it on a grinding machine. (2)

3.2 Give TWO reasons why the lateral table speed and movement of a grinding machine table are important when grinding workpieces in a workplace. (2)

3.3 Explain how you would ensure that a surface grinding machine is switched off when loading and unloading a workpiece. (2)

3.4 Explain the meaning of each of the following:

3.4.1 Fixing a component to a grinding table using a magnetic table or clamp

3.4.2 Monitoring grinding and adjusting accordingly

(2 × 2) (4)
[10]

QUESTION 4: CENTRE LATHE AND MILLING MACHINE

4.1 Certain activities must be performed when the machine is switched off. Name TWO such activities performed by the machine operator. (2)

4.2 List THREE ways to ensure that the area where a centre lathe machine is operated in is clear and adequately spacious on completion of the machining process. (3)

4.3 List FIVE inspections that an operator should carry out on a centre lathe or milling machine before starting an operation. (5)

4.4 Differentiate between each of the following cutting operations:

4.4.1 Longitudinal turning (internal)

4.4.2 Longitudinal turning (external)

(2 × 2) (4)

4.5 Explain how to clamp a workpiece securely and to check the setup when working with each of the following:

4.5.1 Short workpiece

4.5.2 Long workpiece

(2 × 2) (4)

4.6 List THREE ways to avoid scratching when mounting a workpiece on a milling machine. (3 × 2) (6)
[24]

QUESTION 5: CNC CENTRE LATHE AND CNC MILLING MACHINE

5.1 List FIVE things that a CNC lathe operator should do to avoid edge chipping on the insert while machining components in the workshop. (5)

5.2 List FOUR things that should be in good order when inspecting CNC lathe machine tools and equipment. (4)

5.3 Should a quality controller always inspect the first component to be machined? Give a reason for the answer. (3)

5.4 Give the reason for each of the following activities that should be done during machining:

5.4.1 Check and simulate the part program in a PC or controller before execution.

5.4.2 Check assigned program zero to fixture offset.

5.4.3 Keep a backup copy of the CNC machine parameters.

5.4.4 Use reference tool T01 to assign program zero to the workpiece offset zero point.

(4 × 2) (8)

5.5 Explain when you will need to use an edge finder while machining components on a CNC milling machine? (2)

5.6 Name TWO ways to maintain conformity on a component. (2 × 2) (4)

[26]

TOTAL: 100