higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

ENGINEERING PROCESSES
NQF LEVEL 4

(6021004)

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

This question paper consists of 5 pages.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
ENGINEERING PROCESSES
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. Use only a blue or black pen.
5. Write neatly and legibly.

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QUESTION 1: SERVICING MECHANICAL COMPONENTS

1.1 State FOUR measures to reduce hazards in the area where flammable and dangerous chemicals are stored. (4)

1.2 Explain how you will check if each of the following is properly aligned when manually checking the component for operation:

1.2.1 Pump or gearbox (1)

1.2.2 V-belt and chain alignment (1)

[6]

QUESTION 2: DISMANTLING AND ASSEMBLING COMPONENTS

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 When tightening a flange of a valve or cylinder head of a vehicle, you need to tighten the bolts in a diagonal and specific sequence to make sure that the pressure is the same

2.1.2 Scrutinising and memorising the make of a component is done once a component has been dismantled and pre-cleaned.

2.1.3 A fitter should choose the correct tools and equipment for the job before dismantling the components to save time.

2.1.4 Residue in the sump indicate worn bearings and bushes or any other defective part.

2.1.5 If a replacement part on a component fails to operate longer than the guarantee, this is an indication that part was not fitted properly, or the part was not genuine (5 × 1) (5)

2.2 You are employed as a maintenance fitter at a big engineering company in Australia that deals with pumps and gearboxes.

State FIVE causes of constant breakages on the pump and gearbox in your workplace. (5)

2.3 List FOUR checks that an artisan must perform after selecting the correct replacement of parts and assembling them in accordance with the manufacturer's manual. (4)

2.4 Explain the importance for each of the following during maintenance in the workplace:

2.4.1 Select correct equipment and tools

2.4.2 Check and operate assembled components and record your results (2 × 2) (4)

2.5 Describe FOUR reasons why replacement parts must be inspected for quality and correctness. (4 × 2) (8)

[26]

QUESTION 3: OPERATING AND MONITORING MACHINERY

3.1 List FOUR pieces of information that a machine operator must obtain from the job card. (4)

3.2 Explain why an operator should always ensure that there is enough cutting fluid to lubricate the cutting area during machining. (6 × 1) (6)

3.3 Describe how you will do fault finding on the machine to determine if something is wrong during operation or the cutting processes. (2)

[12]

QUESTION 4: CUTTING USING POWERED MACHINERY

4.1 Describe how an oxyacetylene cutter cuts metals in the workshop. (3 × 2) (6)

4.2 Give THREE reasons why it is necessary to identify the type of material and its composition before machining the material. (3 × 2) (6)

4.3 Explain what to do if the electrode you are using is non-consumable. (2)

4.4 List FOUR checks that you will perform when inspecting and reporting on completed components. (4)

4.5 Explain why selecting the correct cutting speed is so important when cutting components on the band saw machine. (2)

4.6 List FIVE safety precautions to consider before the cutting operation can start. (5)

[25]

QUESTION 5: COMPUTER-AIDED MACHINERY

5.1 List FIVE advantages of using a CNC machine in our engineering workplace. (5)

5.2 Explain how you would fit machine tools to meet machine specifications to enable machining of the product. (4)

5.3 Describe how you will do out the following:

5.3.1 Convert the planned machining operation. (2)

5.3.2 Draw up the operation planning sheet (2)

5.4 State FOUR advantages of glass doors on the CNC machine. (4)

[17]

QUESTION 6: JOINING PROCESSES IN MATERIALS TECHNOLOGY

6.1 Describe the term *neutral flame.* (2)

6.2 Explain why each of the following factors are considered when selecting a joining method.

6.2.1 Environmental condition

6.2.2 Thickness of materials

6.2.3 Visual reasons

6.2.4 Economic reasons

(4 × 2) (8)

6.3 Explain why it is very important to assess the joining method for a particular design. (2)

6.4 In your own words explain what *metal fatigue* is. (2)

[14]

TOTAL: 100

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