# higher education & training

Department:
Higher Education and Training
**REPUBLIC OF SOUTH AFRICA**

## NATIONAL CERTIFICATE (VOCATIONAL)

## FITTING AND TURNING
### NQF LEVEL 3

### (6011043)

### 16 November 2022 (X-paper)
### 09:00–12:00

**This question paper consists of 6 pages.**

389Q1N2216

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│  │   TIME:  3 HOURS      │  │
│  │   MARKS:  100         │  │
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**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.      All diagrams must be neatly drawn and in good proportion.

5.      Start each section on a new page.

6.      Use only a blue or black pen.

7.      Write neatly and legibly.

## QUESTION 1: BEARINGS

1.1 State TWO reasons for a clean working area when you work with bearings. ⭐ (2)

1.2 State THREE advantages and TWO disadvantages of anti-friction bearings over friction (plain) bearings. (5)

1.3 Name THREE methods of mounting an anti-friction bearing by the application of heat. (3)

1.4 Explain with the aid of neat sketches the difference between *point contact* and *line contact* of anti-friction bearings. ⭐ (4)

1.5 State the function of a bearing seal. (1)

**[15]**

## QUESTION 2: COUPLINGS

2.1 FIGURE 1 below shows a diagram of a coupling.

2.1.1 Name the type of coupling. ⭐ (1)

2.1.2 Label the components by writing the correct answer next to the letters (A–E) in the ANSWER BOOK.
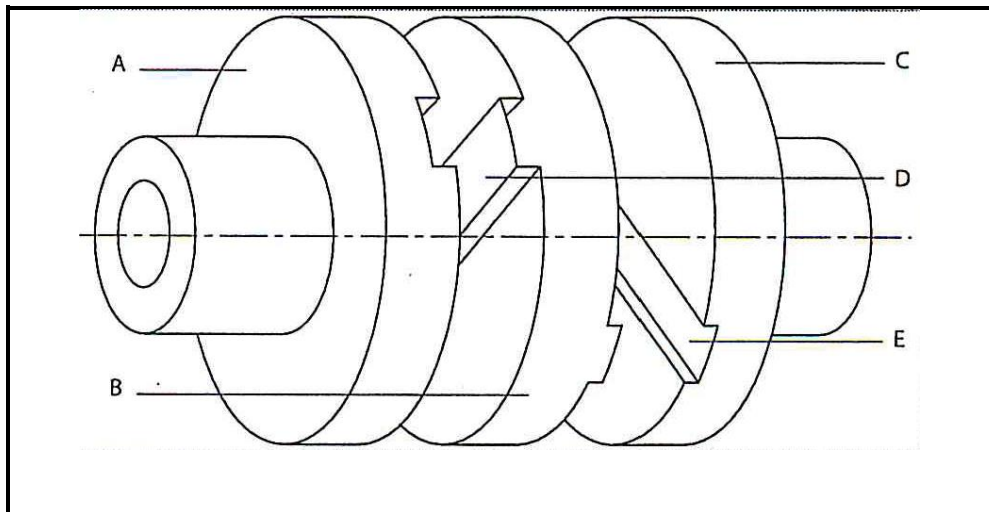


**FIGURE 1** (5)

2.2 State FOUR aspects that should be looked at during a coupling operation that would indicate that there is something wrong with the coupling. ⭐ (4)

**[10]**

## QUESTION 3: BRAKES AND CLUTCHES

3.1     State TWO advantages and TWO disadvantages of drum brakes.                    (4)

3.2     List FOUR brake defects.                                                        (4)

3.3     Briefly explain the need to inspect and clean clutch components.               (2)
                                                                                      **[10]**


## QUESTION 4: BELT DRIVES, CHAIN DRIVES AND GEAR DRIVES

4.1     Indicate whether the following statements are TRUE or FALSE by writing only
        'True' or 'False' next to the question number (4.1.1 – 4.1.5) in the
        ANSWER BOOK.

        4.1.1     Quality checks must be done on a v-belt drive assembly.

        4.1.2     A worker must make sure that only certain components are fitted on
                  a v-belt assembly.

        4.1.3     A report must be completed for all defective tools and equipment.

        4.1.4     Safety guards must be fitted to all rotating machinery.

        4.1.5     Reporting on completed work is not required.
                                                                      (5 × 1)       (5)

4.2     List THREE advantages and TWO disadvantages of gear drives compared to
        belt and chain drives.                                                          (5)

4.3     State FIVE benefits of good housekeeping.                                      (5)
                                                                                      **[15]**


## QUESTION 5: PIPES, PIPE FITTINGS AND VALVES

5.1     State THREE advantages and TWO disadvantages of plastic piping.               (5)

5.2     Name FIVE types of valves used in industry.                                    (5)
                                                                                      **[10]**

## QUESTION 6: CENTRE LATHE

6.1     FIGURE 2 below shows a centre lathe. Write only the answer next to the
        letters (A–I) in the ANSWER BOOK.



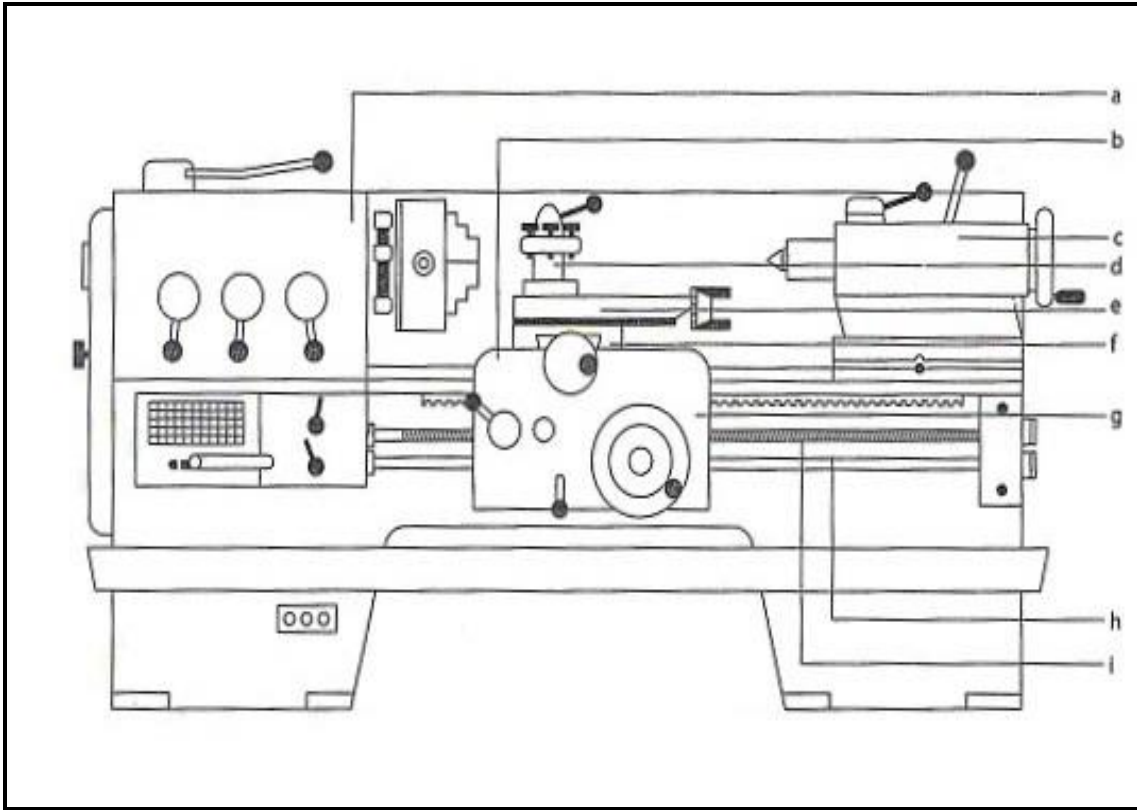**FIGURE 2**                                                                    (9)

6.2     A carbon steel pin with a diameter of 10 mm rotates at 2 000 rpm on a centre
        lathe.

        Calculate the cutting speed(S) of the tool in metres per minute (m/min) to
        execute the machining process.                                          (3)

        (HINT: $S = \pi \times D \times N$)

6.3     State TWO advantages and TWO disadvantages of a three-jaw chuck.        (4)

6.4     When a centre lathe is operated, cutting tools can have different problems.

        State TWO of these problems and their possible causes.          (2 × 2)    (4)
                                                                                **[20]**

## QUESTION 7: MILLING MACHINE

7.1     State FIVE reasons for using cutting fluids when machining is done on a milling
        machine.                                                                          (5)

7.2     Name SIX types of milling cutters.                                                (6)

7.3     State THREE factors that are necessary to calculate the feed rate on a milling
        machine.                                                                          (3)

7.4     A milling cutter is 25 mm in diameter and has 4 teeth. The cutting speed (S) for
        the material is 45 m/min and a feed of 0,18 mm per tooth.

        Calculate the feed rate in mm/min.                                                (6)

        (HINT: $S = \pi \times D \times N$ and $f = f_t \times T \times N$)

                                                                                        **[20]**

                                                    **TOTAL:    100**