NATIONAL CERTIFICATE (VOCATIONAL)

FITTING AND TURNING
NQF LEVEL 3

(6011043)

1 March 2024 (X-paper)
09:00–12:00

This question paper consists of 5 pages.

399Q1S2401

Please turn over

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA
NATIONAL CERTIFICATE (VOCATIONAL)
FITTING AND TURNING
NQF LEVEL 3
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.   Draw all diagrams neatly and in good proportion.

5.   Use only a black or blue pen.

6.   Write neatly and legibly.

QUESTION 1: BEARINGS

1.1   State FOUR functions of a bearing.   (4)

1.2   Give FOUR advantages of antifriction bearings.   (4)

1.3   Show with a sketch the THREE main loads applicable to antifriction bearings.   (3)

1.4   State FOUR common types of damages that can occur on a bearing.   (4)
                                                                                [15]

QUESTION 2: COUPLINGS

2.1   Describe the following types of misalignments on coupled shafts:
         Angular misalignment
         Parallel misalignment   (2 × 3)   (6)

2.2   State FOUR basic methods of coupling alignment.   (4)
                                                                                [10]

QUESTION 3: BRAKES AND CLUTCHES

3.1   FIGURE 1 shows a sectional view of a single-disc clutch assembly.
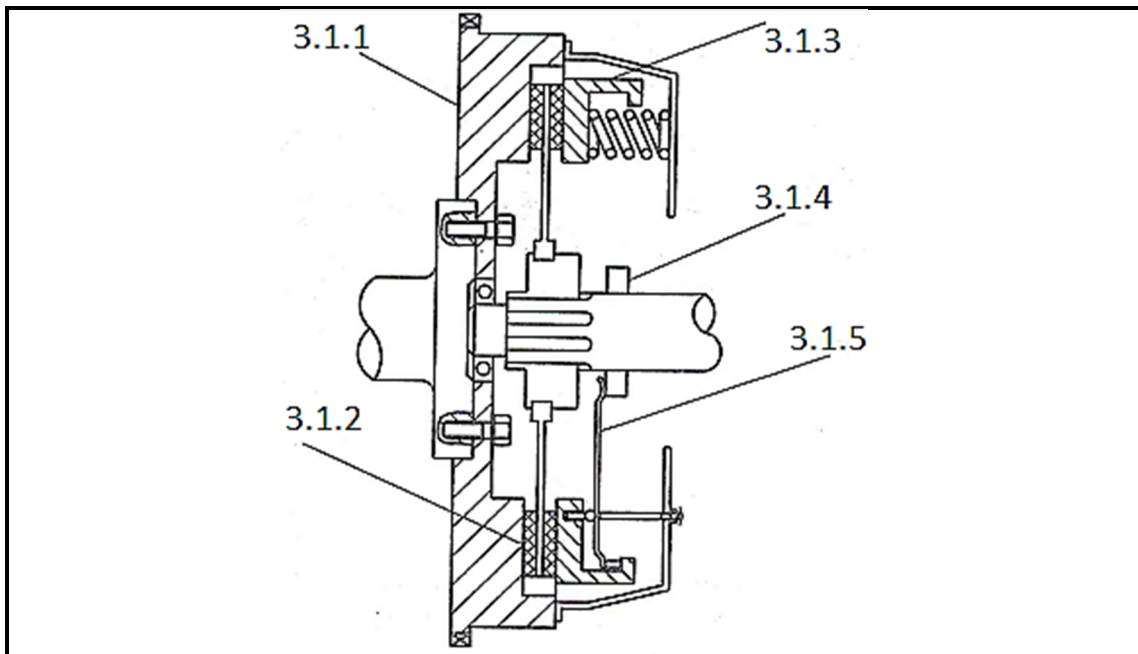

FIGURE 1

Label the assembly by writing only the answer next to the question number
(3.1.1–3.1.5) in the ANSWER BOOK.   (5 × 1)   (5)

3.2   Give TWO disadvantages of electromagnetic brake systems.   (2)

3.3   List THREE types of brake systems.   (3)
                                                                                [10]

QUESTION 4: BELT DRIVES, CHAIN DRIVES AND GEAR DRIVES

4.1   Make a simple sketch of a V-Belt system and show the following:
        Driver pulley; driven pulley; angle of contact and idler pulley   (4)

4.2   List THREE types of chains used in chain drives.   (3)

4.3   List THREE chain lubrication methods.   (3)

4.4   Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (4.4.1–4.4.5) in the ANSWER BOOK.

        4.4.1   Reporting on completed work is not required.

        4.4.2   A toolbox is used to store equipment.

        4.4.3   Quality checks must be done on a gear-drive assembly.

        4.4.4   Workers must make sure that only certain components are fitted to a gearbox.

        4.4.5   After cleaning and inspecting tools and equipment, a report must be completed on defective tools and equipment.
                                                                        (5 × 1)   (5)
                                                                                       [15]

QUESTION 5: PIPES, PIPE FITTINGS AND VALVES

5.1   Name SIX joining methods used for steel water pipes and plastic water pipes.   (6)

5.2   State FOUR functions of a valve.   (4)
                                                                                       [10]

QUESTION 6: CENTRE LATHES

6.1 Name FIVE safety precautions pertaining to personal protective equipment (PPE) that must be adhered to when working on a centre lathe. (5)

6.2 Calculate the cutting speed (S) in m/min to machine an aluminium workpiece with a diameter of 50 mm if the spindle speed (N) is 800 r/min.

HINT: $S = \pi \times D \times N$ (3)

6.3 Facing is an important operation on a workpiece using a centre lathe.

6.3.1 Explain *facing* as it applies to a centre lathe. (1)

6.3.2 State TWO methods of facing. (2)

6.4 Name TWO types of common lathe cutting tools for turning operations. (2)

6.5 State FIVE operations that a centre lathe can perform. (5)

6.6 Explain the purpose of flooding the cutting tool and workpiece with coolant. (2)
[20]

QUESTION 7: MILLING MACHINES

7.1 State FIVE malfunctions that may occur during a machining operation using a milling machine. (5)

7.2 Explain how to clean a milling machine after it has been used. (5)

7.3 Name TWO types of collets used on a milling machine to set and hold a cutter. (2)

7.4 A 50 mm diameter cutter with six teeth has a cutting speed (S) of 30 m/min and a feed of 0,06 mm per tooth.

Calculate the cut feed rate in mm/min.

HINT: $S = \pi \times D \times N$ and $f = ft \times T \times N$ (6)

7.5 Name TWO precision measuring instruments used to perform quality checks on milled workpieces. (2)
[20]

TOTAL: 100