higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

FITTING AND TURNING
NQF LEVEL 3

(6011043)

7 December 2020 (X-paper)
09:00–12:00

This question paper consists of 5 pages.

351Q1N2007

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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. Write neatly and legibly.

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QUESTION 1: BEARINGS

1.1 State TWO categories in which bearings are classified. (2)

1.2 Name FIVE categories of main causes of damage to bearings. (5)

1.3 State the type of load each of the following bearings can take:

1.3.1 Single-row deep-groove ball bearing

1.3.2 Tapered roller bearing

1.3.3 Single-row angular-contact ball bearing

1.3.4 Single thrust ball bearing

(4 × 1) (4)

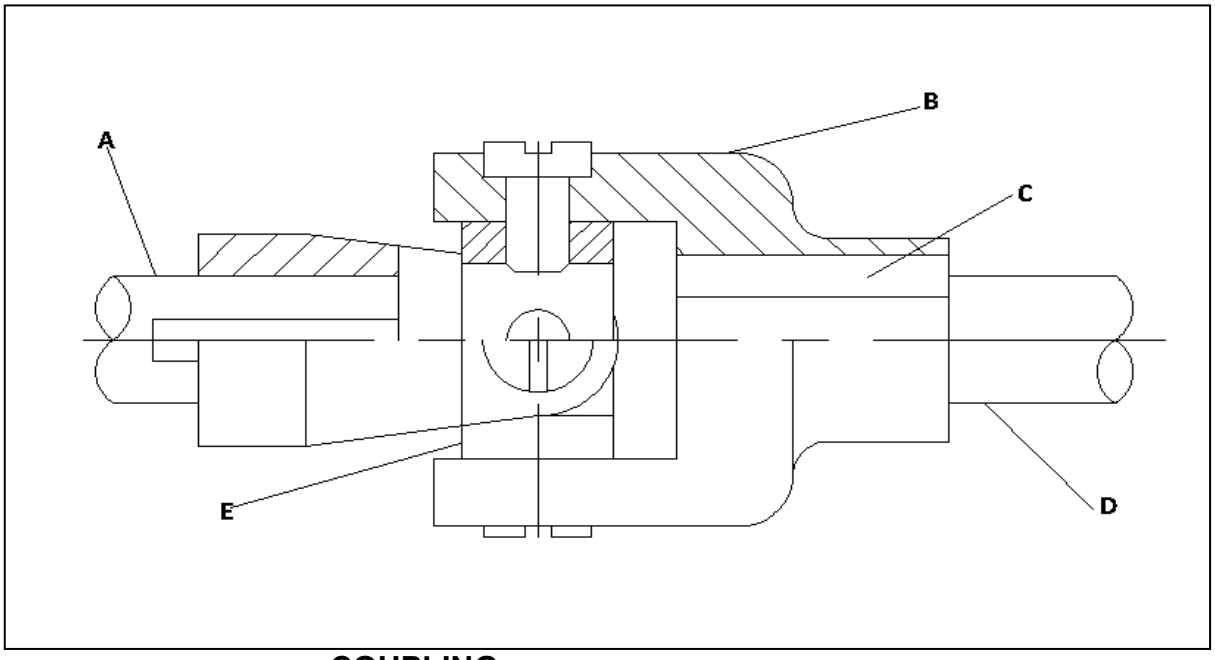
1.4 Explain, with the aid of neat sketches, the difference between point contact and line contact of bearings. (2 + 2) (4)

[15]

QUESTION 2: COUPLINGS

2.1 Name the type of coupling in QUESTION 2.2. (1)

2.2 Label the indicated components of the coupling by writing the answer next to the letter (A–E) in the ANSWER BOOK. (5)



COUPLING

2.3 State FOUR common faults when couplings are used. (4)

[10]

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QUESTION 3: BRAKES AND CLUTCHES

3.1 State TWO advantages of electromagnetic brake systems. (2)

3.2 Use a table format and give TWO causes of slip on a clutch and a remedy for each. (2 × 2) (4)

3.3 List THREE faults that normally occur with brakes and clutches. (3)

3.4 State the purpose of a torque limiter used in clutches. (1)
[10]

QUESTION 4: BELT, CHAIN AND GEAR DRIVES

4.1 Indicate whether the statements below 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 Reporting on completed work is not required.

4.1.2 All tools must be returned to the toolbox after completion of work.

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

4.1.4 The worker must ensure that only certain components are fitted during a v-belt assembly.

4.1.5 After cleaning and inspecting a report must be completed on defective tools and equipment.

(5 × 1) (5)

4.2 State FOUR reasons for the application of multiple-strand roller chains. (4)

4.3 Explain the purpose of intermediate gears. (2)

4.4 State FOUR advantages of gear drives compared to chain drives. (4)
[15]

QUESTION 5: PIPES, PIPE FITTINGS AND VALVES

5.1 State FIVE safety precautions when working with pipe and pipe fittings. (5)

5.2 State TWO functions of a valve. (2)

5.3 Name THREE valves used for liquids. (3)
[10]

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QUESTION 6: CENTRE LATHE

6.1 State FOUR factors on which the feed rate depends in turning operations. (4)

6.2 A carbon steel pin with a diameter of 10 mm is rotating at 1800 rpm on a centre lathe.

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

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

6.3 State TWO advantages and THREE disadvantages of a three-jaw chuck. (5)

6.4 State FIVE malfunctions that can occur during the machining of a workpiece on a centre lathe. (5)

6.5 State THREE operations that can be performed on a centre lathe. (3)
[20]

QUESTION 7: MILLING MACHINES

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

7.2 State FOUR safety precautions when working on milling machines. (4)

7.3 State FOUR types of indexing that can be performed on a milling machine. (4)

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

Calculate the feed in mm/min.

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

7.5 Name the cutting fluid most often used during machining processes. (1)
[20]

TOTAL: 100

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