higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

FITTING AND TURNING
NQF LEVEL 3

(6011043)

11 March 2019 (X-Paper)
09:00–12:00

Calculators may be used.

This question paper consists of 6 pages.

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.

QUESTION 1: BEARINGS

1.1 Give TWO reasons for having a clean working area when working with bearings. (2)

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

1.3 Name THREE methods of installing an antifriction bearing by the application of thermal expansion. (3)

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

1.5 Explain the purpose of the cage found in a rolling bearing. (1)

[15]

QUESTION 2: COUPLINGS

2.1 State THREE main groups in which couplings are classified. (3)

2.2 Make neat sketches to indicate a parallel (radial), angular (face) and gap (axial) misalignment. (3)

2.3 State FOUR basic methods of coupling alignment. (4)

[10]

QUESTION 3: BRAKES AND CLUTCHES

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

3.2 List THREE faults that normally occur in brakes and clutches. (3)

3.3 FIGURE 1 shows a sectional view of a cone-clutch assembly.

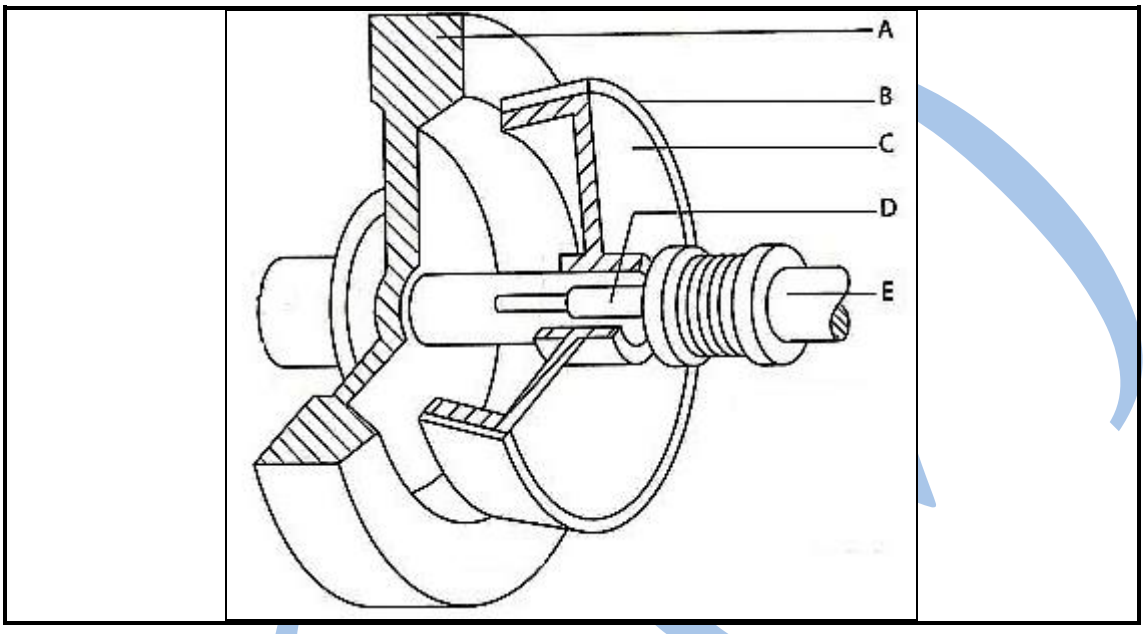

FIGURE 1

Label each part of the cone-clutch assembly by writing only the answer next to the letter (A–E) in the ANSWER BOOK. (5 × 1) (5)

[10]

QUESTION 4: BELT DRIVES, CHAIN DRIVES AND GEAR DRIVES

4.1 Explain the function of a V-belt drive. (2)

4.2 Give THREE reasons for fitting guards over belt drives. (3)

4.3 Make a neat labelled sketch of an oil-stream lubrication system. (5)

4.4 Give THREE advantages of gear drives compared to belt drives. (3)

4.5 Explain the purpose of intermediate (idler) gears. (2)

[15]

QUESTION 5: PIPES, PIPE FITTINGS AND VALVES

5.1 Give FIVE reasons for flange joint failure. (5)

5.2 State FIVE safety precautions to take when working with valves. (5)
[10]

QUESTION 6: CENTRE LATHES

6.1 FIGURE 2 shows a centre lathe.

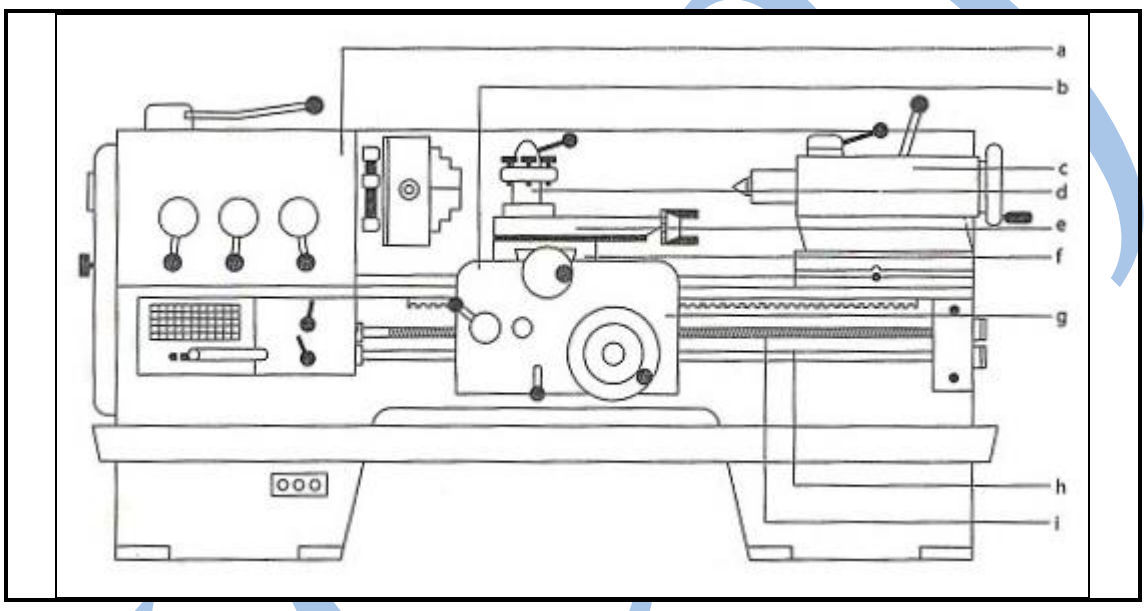

FIGURE 2

Label each component of the centre lathe by writing only the answer next to the letter (a–i) in the ANSWER BOOK. (9 × 1) (9)

6.2 A carbon steel pin with a diameter of 10 mm is rotating at 1 800 r/min 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 FOUR factors on which the feed rate of a centre lathe in turning operations depends. (4)

6.4 State THREE types of operations a centre lathe can perform. (3)

6.5 Explain why guards or shields must be fitted on a centre lathe. (1)
[20]

QUESTION 7: MILLING MACHINES

7.1 Name ONE use each of the following HSS milling cutters:

7.1.1 Roughing cutter

7.1.2 End mill

7.1.3 Slot drill

7.1.4 T-slot

7.1.5 Dovetail cutter

(5 × 1) (5)

7.2 State THREE safety precautions applicable when working on milling machines. (3)

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

7.4 A milling cutter is 20 mm in diameter and has FOUR teeth. The cutting speed for the material is given as 10 m/min and the feed is 0,04 mm per tooth.

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

[20]

TOTAL: 100