higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

FITTING AND TURNING
NQF LEVEL 3

(6011043)

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

This question paper consists of 6 pages.

373Q1N2327

Copyright reserved

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. Use only a black or blue pen.
5. The sketch must be neatly drawn, labelled and in good proportion. A pencil may be used.
6. Write neatly and legibly.

Copyright reserved

QUESTION 1: BEARINGS

1.1 State FIVE causes of overheating in plain bearings. (5)

1.2 Name the components of the bearing shown in FIGURE 1 by writing only the answer next to the letter (A−D) in the ANSWER BOOK.

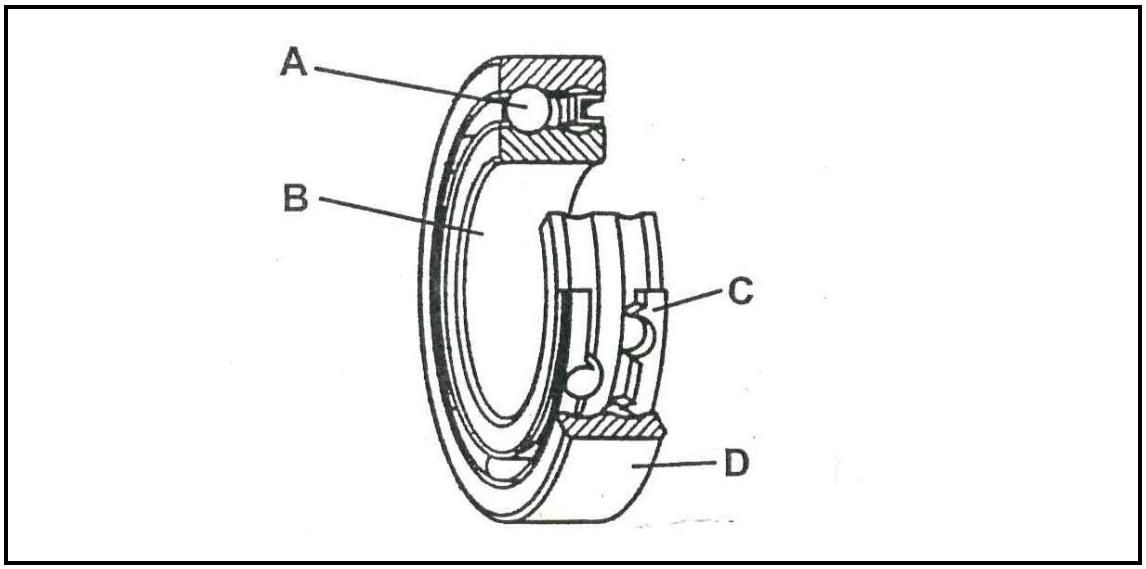


FIGURE 1 (4)

1.3 State THREE implications when the correct sequencing of activities is not followed during the replacement of the bearings. (3)

1.4 Explain in your own words, how you would go about cleaning a rolling-element bearing. (2)

1.5 Why can a bearing that uses a seal not be re-lubricated? (1)
[15]

QUESTION 2: COUPLINGS

2.1 As an artisan, you have completed the assembly of a coupling and you are required to perform a post-operational inspection.

State THREE important aspects that you have to attend to during this inspection. (3)

2.2 Shaft alignment is of utmost importance between the driver and driven shafts of a coupling assembly.

State FOUR advantages of having a proper shaft alignment. (4)

2.3 State THREE reasons for the use of couplings in the industry. (3)
[10]

Copyright reserved

QUESTION 3: BRAKES AND CLUTCHES

3.1 FIGURE 2 shows a diagram of a clutch.

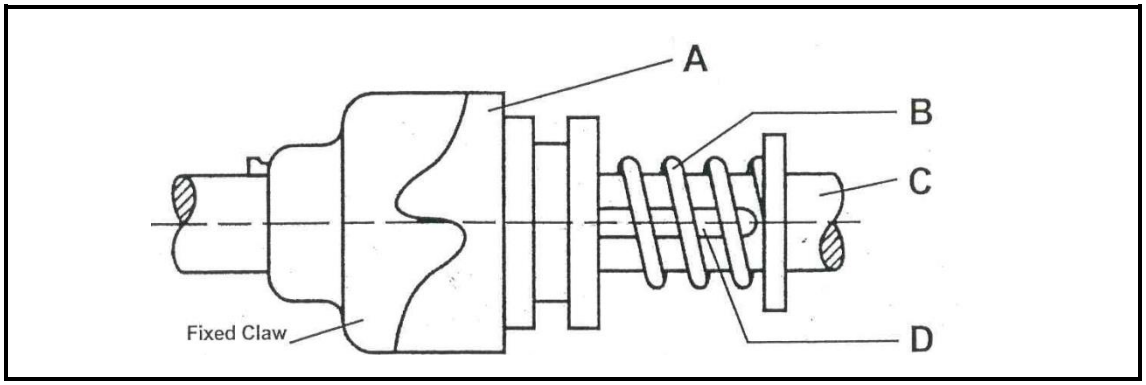


FIGURE 2

3.1.1 Name the type of clutch. (1)

3.1.2 Name the components indicated in FIGURE 2 by writing only the answer next to the letter (A−D) in the ANSWER BOOK. (4)

3.2 Name THREE general faults that may occur with brakes and clutches. (3)

3.3 Give TWO reasons why it is necessary to clean brake and clutch parts before they are inspected. (2)

[10]

QUESTION 4: BELT DRIVES, CHAIN DRIVES AND GEAR DRIVES

4.1 Define the following terms regarding belt drives:

4.1.1 Drive pulley

4.1.2 Driven pulley

4.1.3 Idler pulley

4.1.4 Arc of contact

4.1.5 Centre distance

(5 × 1) (5)

4.2 Make a neat, labelled sketch of an oil stream lubrication system. (5)

4.3 State FIVE advantages of a gear drive compared to a chain drive. (5)

[15]

Copyright reserved

QUESTION 5: PIPES, PIPE FITTINGS AND VALVES

5.1 Give FIVE reasons why flange joint failure may occur. (5)

5.2 State FIVE safety precautions when working with valves. (5)

[10]

QUESTION 6: CENTRE LATHE

6.1 Give FOUR reasons why automatic feed is preferred to manual feed on a centre lathe. (4)

6.2 The cutting speed (S) of mild steel is given as 20 m/min.

Calculate the rotational speed (N) in r/min when turning a bar with a diameter of 100 mm on a centre lathe.

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

6.3 State FIVE safety precautions that should be observed when setting up and operating a centre lathe. (5)

6.4 State FOUR key requirements when using a three-jaw chuck. (4)

6.5 Different problems can occur with cutting tools when using a centre lathe.

Copy the following table in the ANSWER BOOK and complete it by stating TWO problems and a possible cause of each problem.

PROBLEMS	POSSIBLE CAUSES
•	•
•	•
(2 × 1)	(2 × 1)

(4)

[20]

QUESTION 7: MILLING MACHINE

7.1 State FIVE factors that must be taken into consideration when clamping a workpiece to ensure that it is properly mounted and supported. (5)

7.2 State the function of each of the following clamping accessories:

7.2.1 V-blocks

7.2.2 Angle plate

7.2.3 Machine vice

7.2.4 G-clamp or C-clamp

(4 × 1) (4)

7.3 Name FOUR steps to take when preparing and setting up the dividing head for rapid indexing. (4)

7.4 A milling cutter is 75 mm in diameter and has 8 teeth. The cutting speed (S) for the material is given as 22 m/min and a feed per tooth is 0,08 mm per tooth.

Calculate the feed rate in mm/min.

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

7.5 Name the most common type of coolant used when milling a workpiece. (1)

[20]

TOTAL: 100

Copyright reserved