higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

FITTING AND TURNING
NQF LEVEL 3

SUPPLEMENTARY EXAMINATION

(6011043)

20 February 2014 (X-Paper)
09:00–12:00

This question paper consists of 10 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: GRINDING TOOLS AND BITS

1.1 Explain the reason for correctly positioning the drill bit on the tool rest. (1)

1.2 There are certain factors that you need to consider when selecting the wheel grade.

Name FOUR of these factors. (4)

1.3 Explain the meaning of the following grinding wheel markings:

A 80 – G 7 (4)

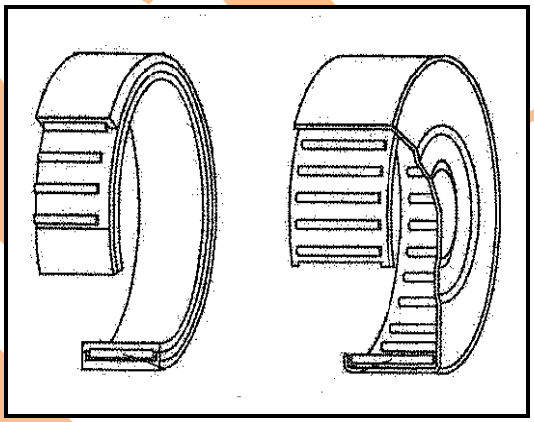
1.4 When you grind a cutting tool or drill bit, you need to cool it down.

State ONE reason why we need to cool down the grinding surface. (1)

[10]

QUESTION 2: BEARINGS

2.1 Name the bearing shown below.



(1)

2.2 Why are cylindrical roller bearings generally used for heavier loads? (1)

2.3 State FOUR aspects about a bearing that you should know before you remove or replace it. (4)

2.4 You want to install a bearing assembly on a lathe in the workshop.

Name FOUR types of equipment you will use to fit the bearing assembly. (4)

2.5 Fill in the missing parts of material used for bearings in the chart below. Write only the answer next to the question number (2.5.1–2.5.5) in the ANSWER BOOK.

MATERIAL	PROPERTIES	COMPOSITION
2.5.1	• Load carrying capacity very low	• Sulphur, manganese, phosphorus and free graphite
2.5.2	• Its composition provides corrosion resistance (zinc) • Compatibility and embedability (lead) • Strength and hardness (zinc)	• A copper alloy consisting of zinc lead, lead, tin and aluminium
White metal	• Low fatique, compatibility and embedability	**2.5.3**
Teflon	**2.5.4**	• A synthetic material which can be combined with silicone for hardness
2.5.5	• No lubrication required. • Used in appliances, fax machines, copiers, et cetera	• A synthetic material

(5 × 1) (5)
[15]

QUESTION 3: BRAKES AND CLUTCHES

3.1 Name the brake systems below. Write only the answer next to the question number (3.1.1–3.1.2) in the ANSWER BOOK.

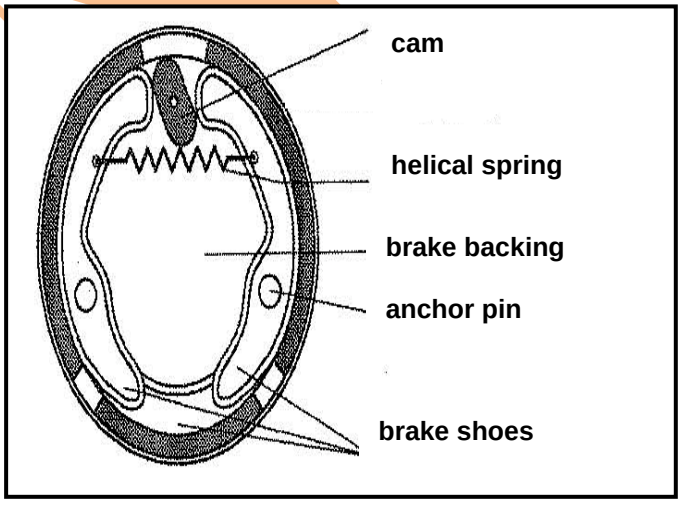


FIGURE 3.1.1

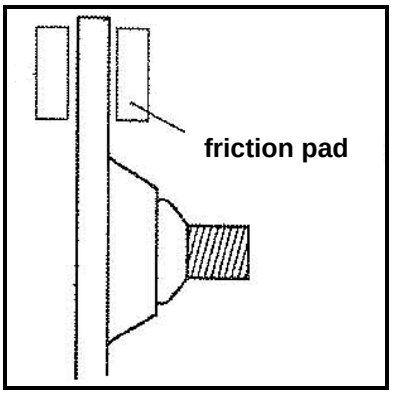


FIGURE 3.1.2

(2)

3.2 Why should you clean brakes or clutches when inspecting such an assembly? (2)

3.3 Identify THREE parts in the hydraulic clutch system that you should examine for leaks. (3)

3.4 Briefly explain the reasons for having a maintenance schedule. (3)

3.5 Why should the load be removed before doing maintenance on brakes? (1)

3.6 Give an example of each of the following clutches:

3.6.1 Positive clutches

3.6.2 Friction clutches

3.6.3 Centrifugal clutches

(3 × 1) (3)

3.7 State the importance of locking devices when installing brakes and clutches. (1)

[15]

QUESTION 4: DIRECT DRIVE

4.1 Name THREE different groups into which couplings are divided. (3)

4.2 Explain the final task that the operator needs to complete after maintenance and servicing has been completed. (1)

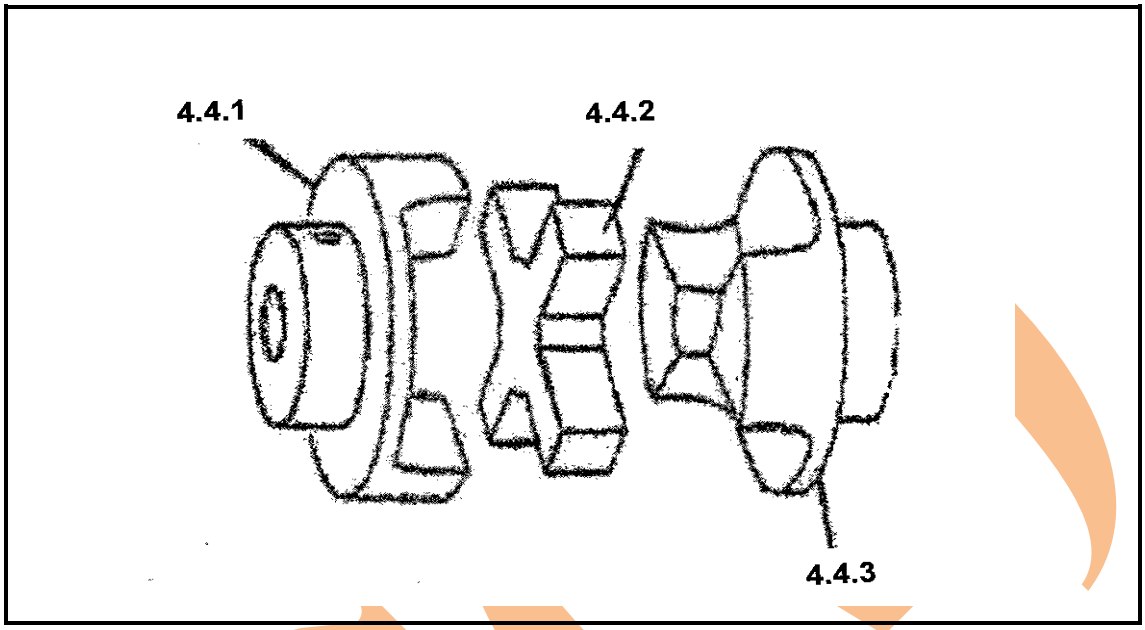
4.3 Define the following terms:

4.3.1 Axial alignment

4.3.2 Direct drive gap

(2 × 1) (2)

4.4 The diagram below shows a sketch of a spider coupling. Label the numbered parts by writing only the answer next to the question number (4.4.1–4.4.3) in the ANSWER BOOK.



(3)

4.5 Complete the following sentences by filling in the missing word(s). Write only the word(s) next to the question number (4.5.1–4.5.3) in the ANSWER BOOK.

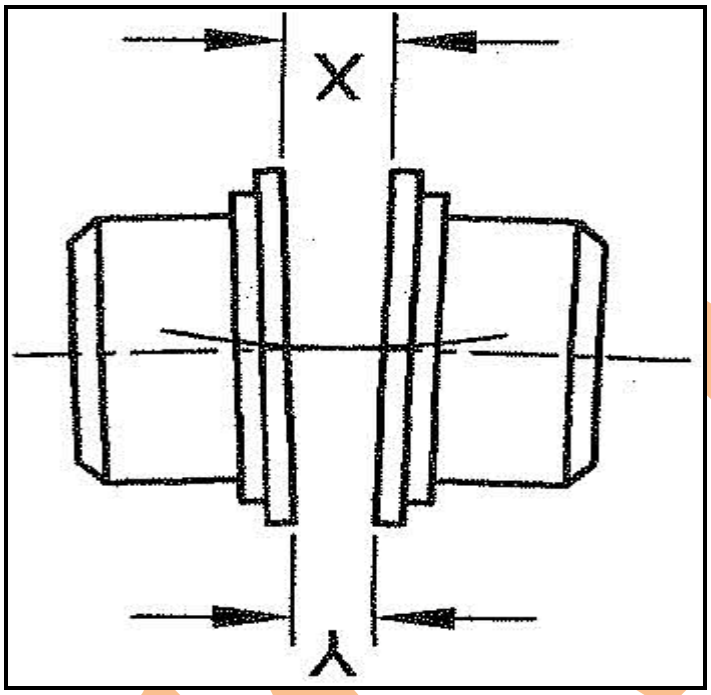
end float; misalignment; wear; movement

Most flexible couplings have components that wear due to (4.5.1) … or misalignment of shafts. This (4.5.2) … occurs as a result of (4.5.3) …

(3 × 1) (3)

4.6 What information must appear in the report on the system condition of direct drives? (2)

4.7 What type of alignment is illustrated on the following coupling?



(1)
[15]

QUESTION 5: DINAMIC SEALS IN MACHINES AND EQUIPMENT

5.1 Vincent has stripped a milling machine in the workshop. He discovered that the lip seals are worn and damaged.

Explain how he would install the lip seals on the machine. (4)

5.2 Name THREE types of dynamic seals and state the use of each. (3 × 2) (6)

5.3 Name the appropriate lubricant to apply to dynamic seals and state what you must ensure when applying it. (2)

5.4 Give TWO reasons why a system must be depressurised. (2)

5.5 What should be done to prevent corrosion after equipment has been cleaned? (1)
[15]

QUESTION 6: HEAT EXCHANGERS AND PRESSURE VESSELS

6.1 Name THREE components that must be inspected when doing visual inspection on a pressure vessel or heat exchanger. (3)

6.2 It is important that all the pressure gauges used on pressure vessels be correctly calibrated.

State TWO reasons for this statement. (2)

6.3 Study the following practices and implications and choose an item from COLUMN B that matches a description in COLUMN A. Write only the letter (A–C) next to the question number (6.3.1–6.3.3) in the ANSWER BOOK.

COLUMN A		COLUMN B	
6.3.1	Use of incorrect parts on a machine	A	unplanned starting of the machine may occur
6.3.2	Failure to lockout a machine	B	certificate of compliance will not be issued
6.3.3	A pressure test conducted by an authorised officer	C	lost manufacturers warranty

(3 × 1) (3)

6.4 Briefly explain the working principle of a heat exchanger. (4)

6.5 Nkaile, an apprentice, must do maintenance on heat exchangers and pressure vessels in the workshop. A few things are still unknown to him.

Briefly explain to him the following terms and state possible problems that may occur if these are not attended to:

6.5.1 Temperature shocks (1)

6.5.2 Excessive flow rate (2)

[15]

QUESTION 7: LUBRICATION

7.1 State TWO possible causes of each of the following lubrication system faults:

7.1.1 The temperature of the machine is too high

7.1.2 The colour of the oil has become darker

(2 × 2) (4)

7.2 Refer to FIGURE 7.2 below, which shows a splash feed lubrication system and explain step by step how the bearing is lubricated.

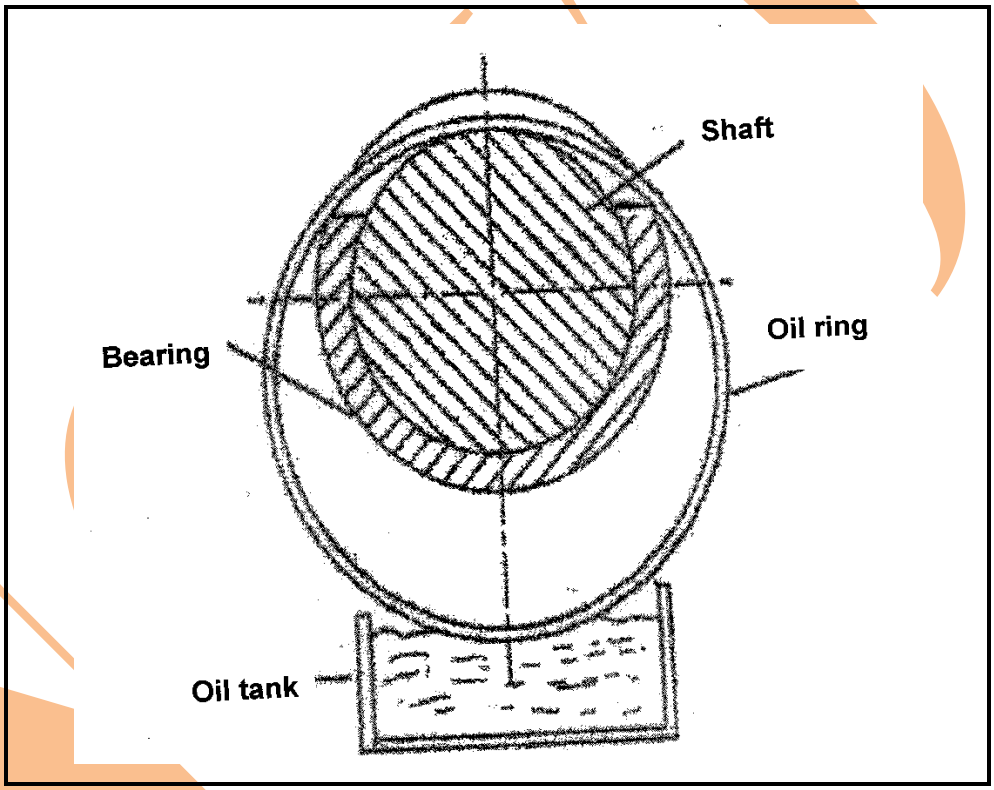


FIGURE 7.2 (4)

7.3 7.3.1 What does the term *spectrometry* mean?

7.3.2 What is the purpose of a centralised lubrication system?

(2 × 1) (2)

7.4 Study the sequence of procedures below and the consequences of not following the sequence when doing maintenance on lubricating systems.

Choose an item from COLUMN B that matches an item in COLUMN A. Write only the letter (A–E) next to the question number (7.4.1–7.4.5) in the ANSWER BOOK.

	COLUMN A (CORRECT PROCEDURE)		COLUMN B (RESULT OF WRONG PROCEDURE)
7.4.1	Complete ALL the electrical and mechanical lockout procedures	A	if the assembly is dirty, you may not be able to see any damage
7.4.2	Gather ALL the necessary tools and equipment for the maintenance of lubricating systems	B	if you do not follow the instructions in the book, you may make a mistake and damage the lubricator
7.4.3	Clean the lubricating system	C	if you do not isolate the machine, someone who does not know you are working on it, may start the machine and cause an accident and injury
7.4.4	Check that the work has been done properly and that the lubricating systems are working properly	D	if you do not have all the tools and equipment ready, it can cause delays when doing the work
7.4.5	Remove the lubricator from the machine as shown in the instruction book	E	if the maintenance has not been properly done, the parts will not be lubricated, causing the machine to break down

(5 × 1) (5)

[15]

TOTAL: 100