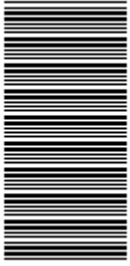


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**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

**FITTING AND TURNING
NQF LEVEL 3**

NOVEMBER EXAMINATION

(6011043)

**1 December 2015 (X-Paper)
09:00–12:00**

This question paper consists of 8 pages.

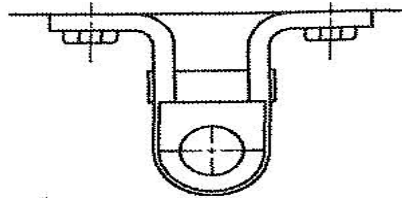
TIME: 3 HOURS
MARKS: 100

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 Identify TWO types of bearings and give an example of each type. (4)
- 1.2 Identify the bearing below and give ONE example of where it is used.



- 1.3 What equipment is usually used to do the following? (2)
 - 1.3.1 Removing of bearings from shafts
 - 1.3.2 Placing a bearing onto a shaft (2 × 1) (2)
- 1.4 Besides wearing the correct PPE, other precautions must also be taken before removing a bearing from electrical and mechanical machinery. (2)

Name TWO of these precautions.
- 1.5 As the fitter of a plant you have just removed a bearing from a shaft. (2)

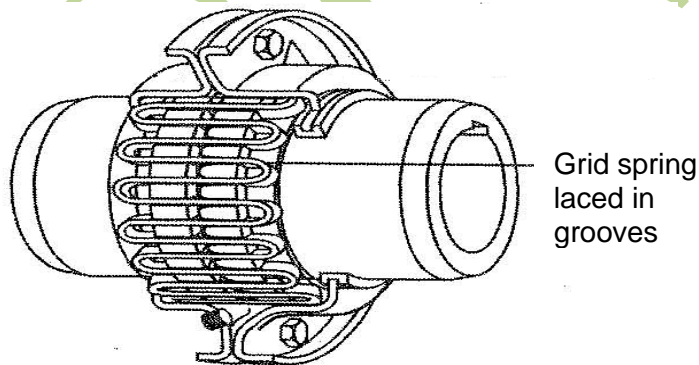
What are the telltale signs that the bearing or shaft needs replacing? [12]

QUESTION 2: COUPLINGS

- 2.1 Briefly explain the function of a coupling. (1)
- 2.2 State THREE important factors to consider when installing a coupling. (3)
- 2.3 Complete the following TABLE on different types and groups of couplings by filling in the missing answers. Write the answer next to the question number (2.3.1–2.3.4) in the ANSWER BOOK.

GROUP OF COUPLING	TYPE OF COUPLING
2.3.1	Muff coupling
2.3.2	Oldham coupling
Flexible coupling	2.3.3
2.3.4	Metal disc coupling

- 2.4 Name any TWO quality checks that must be performed on a coupling after assembly is completed and before a report is written. (2)
- 2.5 Name the coupling below.



(1)
[11]

QUESTION 3: BRAKES AND CLUTCHES

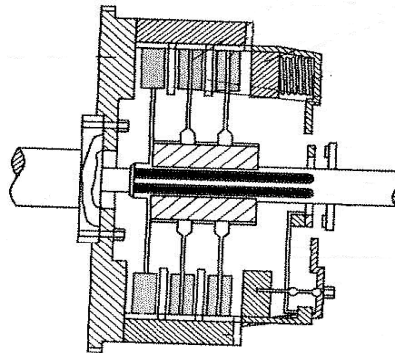
3.1 State the reason why the air gaps on brakes and clutches have to be measured. (1)

3.2 During an inspection no leaks were found on a hydraulic system, but the system does not function properly.

Name TWO problems that could be the reason for this malfunction. (2)

3.3 Explain in your own words why it is necessary to clean brake and clutch parts before they are inspected. (2)

3.4 Identify the clutch system below and state which type it is:



(2)
[7]

QUESTION 4: BELT DRIVES, CHAIN DRIVES AND GEAR DRIVES

4.1 Explain the function of a V-belt. (1)

4.2 Name FIVE advantages of belt drives when compared to gear drives. (5)

4.3 Explain FOUR benefits of good housekeeping. (4)

4.4 A malfunctioning chain drive can be identified by certain symptoms.

4.4.1 List TWO of these symptoms.

4.4.2 Describe the fault that caused the symptoms.

4.4.3 State how you would correct this malfunction.

(3 x 2) (6)
[16]

QUESTION 5: PIPES, PIPE FITTINGS AND VALVES

- 5.1 Name FIVE joining methods for steel and plastic water pipes. (5)
- 5.2 Give FOUR reasons for the failure of flanged joints in a pipeline. (4)
- 5.3 When assembling a flanged joint it is important to check the condition of each component and to follow established procedures.
Name FOUR proper flange joint assembly demands that need to be checked before assembly. (4)
- 5.4 Explain the function of a valve. (1)
- [14]**

QUESTION 6: CENTRE LATHES

- 6.1 Give TWO reasons why automatic feed would be preferred to manual feed on a lathe. (2)
- 6.2 A long thin shaft is turned on the lathe. After the first cut it is measured and found to have the same diameter at both ends. The middle portion of the shaft is found to be bigger in diameter than that at both ends.
- 6.2.1 Give a reason for the fault.
- 6.2.2 Describe how this fault can be rectified. (2 × 1) (2)
- 6.3 When preparing to machine a workpiece on the lathe the tools and equipment must be checked for effectiveness.
Name any FOUR features regarding the condition of the lathe itself that need to be checked. (4)
- 6.4 The cutting speed for bronze is given as 25 m/min.
- 6.4.1 Calculate the rotational speed in r/min when turning a bar with a diameter of 60 mm. Given: $S = \pi \times D \times N$ and $f = f_t \times T \times N$
The spindle speeds available are 40; 65; 95; 125 and 169 r/min. (3)
- 6.4.2 Which speed would you recommend the machine to be set to? (1)

- 6.5 While working on a lathe you realise that the machine makes a strange noise.
- 6.5.1 What could be the cause of this noise?
- 6.5.2 How would you rectify this? (2 × 1) (2)
- 6.6 What purpose does the tailstock serve on a lathe? (1)
- 6.7 Explain the concept *tolerance* as encountered in drawings of parts to be machined. (1)
- 6.8 Give the maximum and minimum diameters allowed during machining in each of the following tolerances:
- 6.8.1 43 mm tolerance = $\pm 0,1$
- 6.8.2 20 mm tolerance = $\pm 0,2$ (2 × 2) (4)
- [20]**

QUESTION 7: MILLING MACHINES

- 7.1 Name THREE facts that are needed in order to calculate the feed rate on a milling machine. (3)
- 7.2 Calculate the feed rate in mm/min that would be required when using an end mill to machine a brass workpiece with a 25 mm diameter HSS end mill. The cutting speed for brass is 45 m/min and the feed per tooth is 0,18. The number of teeth is 4. Given: $S = \pi \times D \times N$ and $f = f_t \times T \times N$ (5)
- 7.3 The milling machine cuts metals by using various cutters.
State the use of the following cutters?
- 7.3.1 Dove tail cutter
- 7.3.2 Slotting cutter
- 7.3.3 End mill cutter
- 7.3.4 Slot drill cutter (4 × 1) (4)

- 7.4 A plain helical milling cutter is centrally fitted on the milling machine arbor. The machine vibrates during the machining process. You observe that the cutter chatters on the workpiece.
- 7.4.1 List TWO possible causes of this problem
- 7.4.2 Recommend a solution for each of the mentioned problem (2 × 2) (4)
- 7.5 Bruno is given the task of measuring holes on a block of mild steel. His micrometer has been lying outside in the cold morning air.
- What must Bruno do to make sure his measurements are within the correct specifications? (2)
- 7.6 A record must be kept of each job an artisan completes.
- Name TWO methods of filing the report to make sure that the record is saved well. (2)
- [20]**
- TOTAL: 100**