higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

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MACHINE MANUFACTURING
NQF LEVEL 3

SUPPLEMENTARY EXAMINATION

(6030203)

2 March 2015 (X-Paper)
09:00–12:00

This question paper consists of 7 pages.

TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. Read ALL the questions carefully.
3. Subsections of questions may not be separated.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Write neatly and legibly.
6. Sketches must be neat.

SECTION A

QUESTION 1

1.1 List FOUR basic types of guards found in the mechatronics workshop. (4)

1.2 Carefully study the lathe shown in FIGURE 1. Identify and label each of the safety features. Write down the label number and correct answer in your examination book.

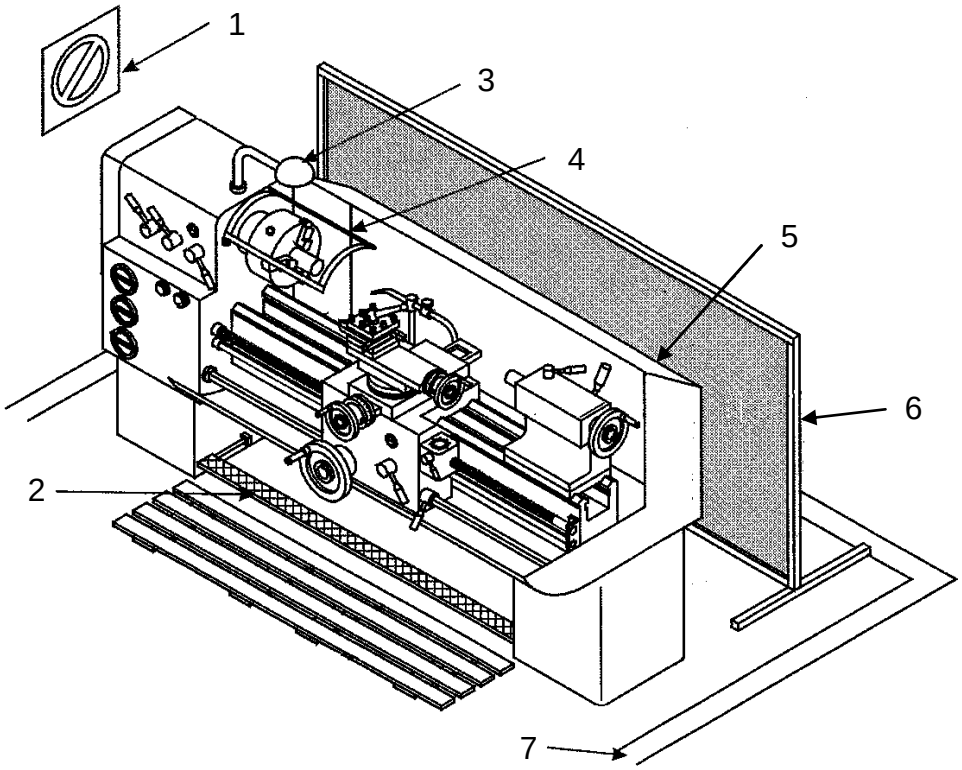

FIGURE 1 (7)

1.3 Differentiate between unsafe conditions and unsafe acts. (2)

1.4 What do you think can be the effects of poor ventilation and temperature controls in the workshop? (2)

[15]

QUESTION 2

2.1 Categorize the following into inputs and outputs devices that are used in engineering application. Keyboards, scanner, plotter, microphone, screen, digital camera and printers. Use the table below as an example. (7)

Input device	**Output device**
2.1.1	2.1.4
2.1.2	2.1.5
2.1.3	2.1.6
2.1.7	

2.2 Why are the layers important in the production of a CAD drawing? (1)

2.3 State whether the following statements are TRUE or FALSE. Write the only the answer next to the question number in your ANSWER BOOK.

2.3.1 One advantage of using CAD software package is that it is cheap. (1)

2.3.2 Toolbars can be seated at any position, but give access to the graphic editor when seated at the edge of the screen. (1)

2.3.3 CAM means computer aided measurement. (1)

2.3.4 Command *ellipse* can be used to draw a circle if used properly. (1)

2.3.5 CAD can be used for direct manufacturing as in the case of a CAD/CAM system. (1)

2.3.6 CAE means computer aided engineering system. (1)

2.3.7 A 3D-figure depicts a flat surface appearing in length and breath. (1)

[15]

TOTAL SECTION A: [30]

SECTION B

QUESTION 3

3.1 Explain what is meant by the following terms:

3.1.1 Hole basis system. (1)

3.1.2 Basic size. (1)

3.1.3 Clearance fit. (1)

3.1.4 Tolerance. (1)

3.2 Determine the lower and higher limit of a hole which given by 100 H7-h6.
Hint: ($100^{+0.035}_{-0.000}$) (4)

3.3 Determine the tolerance of a shaft which is given by 100 H9-f6.
Hint: ($100^{+0.036}_{-0.071}$) (2)

3.4 According to the surface texture symbols. Draw the following symbols with regards to heat treatment.

3.4.1 Tinned (1)

3.4.2 Galvanized (1)

3.4.3 Case hardening (1)

3.4.4 Nitriding (1)

3.4.5 Chrome plated (1)

[15]

QUESTION 4

4.1 A milling cutter is 100 mm in diameter and has 14 teeth. The cutting speed for the machine is given at 24 m/min and the feed per tooth is 0.051 millimeters.

Calculate the rotational frequency and the feed rate? (5)

4.2 Give TWO purposes of the rake angle on a lathe cutter. (2)

4.3 Refer to TABLE 1 below and choose the letter from COLUMN B that matches the description in COLUMN A. Write only the letter (A-D) next to question numbers (4.3.1-4.3.4) in the ANSWER BOOK.

	COLUMN A		COLUMN B
4.3.1	Cast iron.	A	14 degrees
4.3.2	Aluminium.	B	0 degrees
4.3.3	Brass.	C	20 degrees
4.3.4	Copper	D	30 degrees

(4)

TABLE 1

4.4 List FOUR advantages of using cutting fluid. (4)

[15]

QUESTION 5

5.1 FIGURE 2 below shows a centre lathe. Label the main components of the lathe. Write the component number and component name in your ANSWER BOOK.

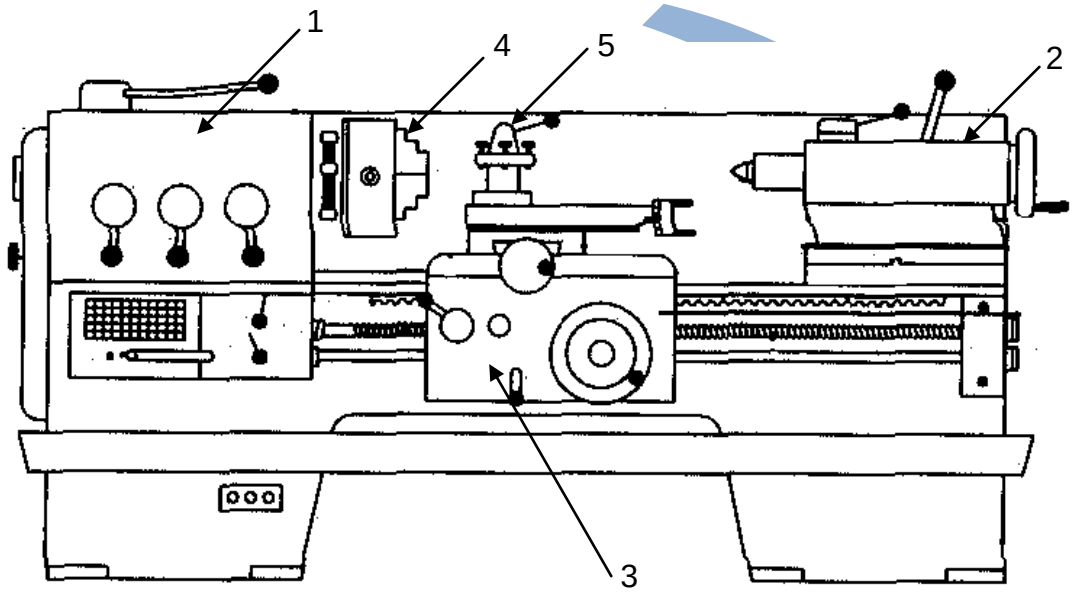

FIGURE 2 (5)

5.2 With the aid of a freehand sketch briefly explain how you would set up your work piece between two centres on the lathe. The following labels must be indicated on the sketch.

Headstock, carrier, work piece, revolving center and driving plate. (5)

5.3 List FOUR advantages and TWO disadvantages of work being held between centres. (6)

5.4 Briefly explain the function of a dividing head. (1)

5.5 You are working on a milling machine; suddenly you realise there is a vibration on the machine.

List THREE possible causes. (3)

5.6 Give the function of the following tools:

5.6.1 Dovetail cutter. (1)

5.6.2 Roughing milling cutter. (1)

5.6.3 Ball nose cutter. (1)

5.6.4 T-slot cutter. (1)

5.7 FIGURE 3 below shows a dividing head of a milling machine. Identify and label the components of the dividing head. Write the label number and the label name in your ANSWER BOOK.

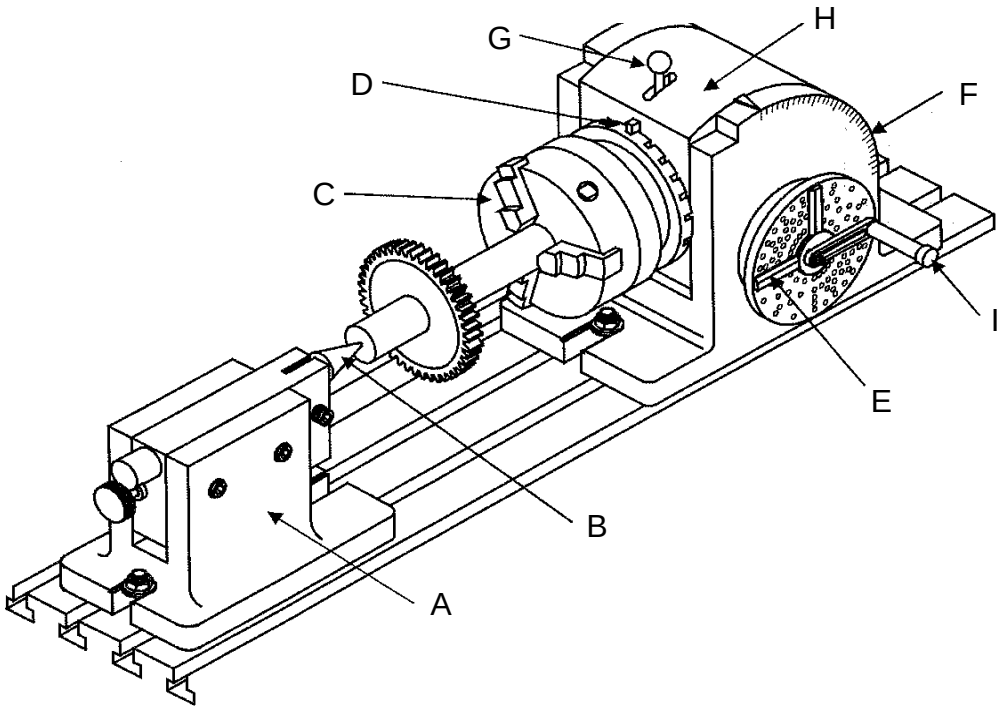

FIGURE 3 (9)

5.8 You are requested to machine a shaft and produce 23 sides on a milling machine. Calculate the indexing required making that shaft. (5)

5.9 There are four different types of centres used on machines. Identify the centres shown in FIGURE 4 below.

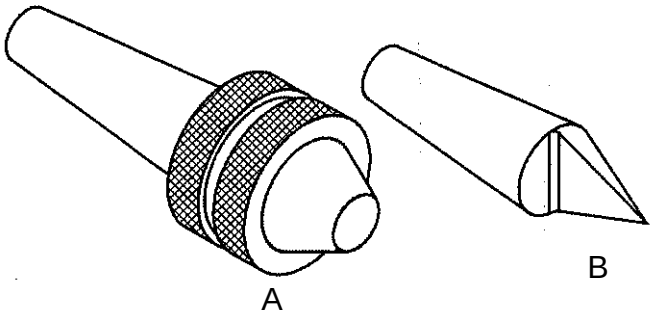

FIGURE 4 (2)

[40]

TOTAL SECTION B: 70
GRAND TOTAL 100