higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

MACHINE MANUFACTURING
NQF LEVEL 3

SUPPLEMENTARY EXAMINATION 2013

(6030203)

12 March (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

SECTION A

QUESTION 1

Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (1.1 – 1.12) in the ANSWER BOOK.

1.1 FIGURE 1.1 illustrates that you should not carry a bucket in the workshop.

FIGURE 1.1 (1)

1.2 FIGURE 1.2 illustrates how dangerous loose clothing is and is showing both an act and a condition that is unsafe.

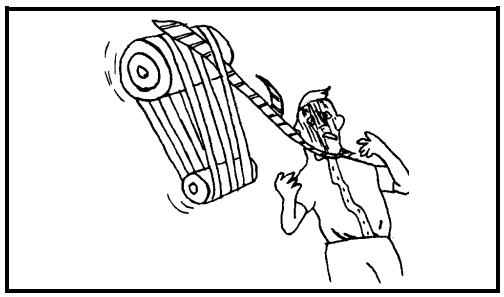

FIGURE 1.2 (2)

1.3 A machine operator can do *spot face* on the drilling machine. (1)

1.4 *A place for everything and everything in its place* is a definition for poor housekeeping. (1)

1.5 A drill bit has a shank that fits directly into the spindle of the drilling machine. (1)

1.6 To take out a taper shank drill from the spindle of a machine you need to use a drift. (1)

1.7 A lathe has three travelling steadies to support a workpiece during machining. (1)

1.8 It is possible to cut the internal thread of a nut on a centre lathe. (1)

1.9 The cutting speed of a drill 21 mm in diameter and turning at 300 r/min, will be 0,84 metres per minute. (2)

1.10 A cast iron bar with a diameter of 70 mm on a lathe at a cutting speed of 20 m/min will have a rotational speed of 159,15 r/min. (2)

1.11 In marking off it is possible to use the centre line of the hole to measure the length dimension. (1)

1.12 The level of accuracy that can be measured by a micrometer is 0,005. (1)
[15]

QUESTION 2

2.1 Name any TWO disadvantages of CAD applications in industry. (2)

2.2 What is the purpose of CAD in industry? State your view/opinion in a paragraph of not more than fifty words. (3)

2.3 Indicate whether the following are CAD programmes used in industry. Write only 'TRUE' or 'FALSE' next to the question number (2.3.1–2.3.5) in the ANSWER BOOK.

2.3.1 Pro-Engineer (1)

2.3.2 Microsoft Excel (1)

2.3.3 Caddie (1)

2.3.4 Solid Works (1)

2.3.5 Inventor (1)

2.4 Explain the function of the following CAD commands:

2.4.1 Construction line (1)

2.4.2 Rectangle (1)

2.4.3 Trim (1)

2.5 Make a neat sketch to illustrate the difference between the dotting punch and a centre punch. (2)
[15]

TOTAL SECTION A: 30

SECTION B

QUESTION 3

3.1 FIGURE 2 shows a sketch of a soft centre to be machined by a fitter and turner.

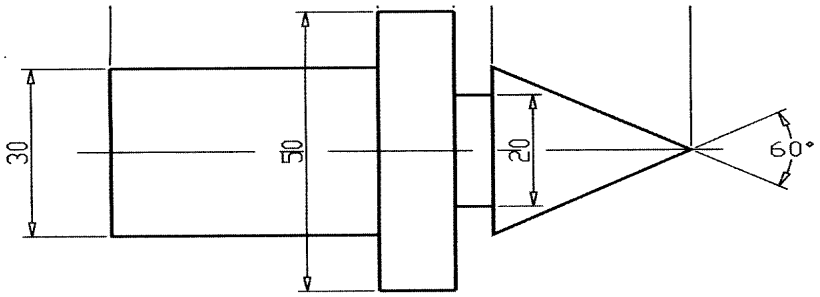

FIGURE 2

Determine the following:

3.1.1 The basic size of the biggest diameter (1)

3.1.2 The actual size of the biggest diameter (1)

3.1.3 The upper limit of the biggest diameter (1)

3.1.4 The tolerance of the biggest diameter (1)

3.1.5 The lower limit of the biggest diameter (1)

3.2 A precision running fit between a shaft and a sliding bearing is given as 45 H7 – g6.

What is meant by the following symbols represented by this fit?

3.2.1 Number 45 (1)

3.2.2 Capital letter H (1)

3.2.3 Number 7 (1)

3.2.4 the smaller letter g (1)

3.2.5 Number 6 (1)

3.3 What does the acronym I.S.O. stand for? (1)

3.4 Briefly explain the function of I.S.O. in the manufacturing industry. (2)

3.5 Show with the aid of a free-hand sketch the difference between the counter bore and countersink. (2)

[15]

QUESTION 4

4.1 The diagram shown in FIGURE 3 indicates that the drill bit has been sharpened correctly.

State TWO reasons to justify this statement.

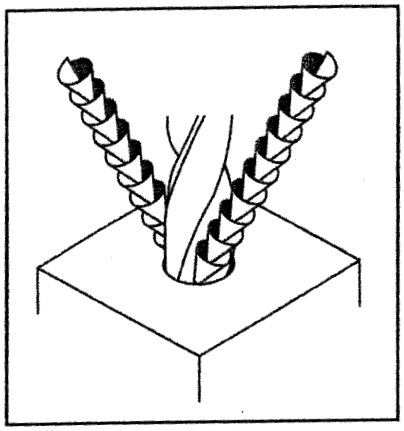

FIGURE 3 (2)

4.2 A centre lathe can be used to set cutting tools to the correct height. Refer to FIGURE 4 below and identify the different settings. Write only the answer next to the question number (4.2.1–4.2.3) in the ANSWER BOOK.

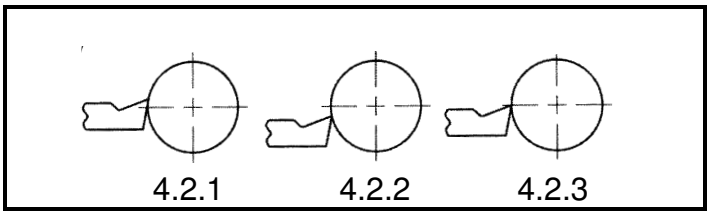

FIGURE 4 (3)

4.3 Consider two centre lathes: One lathe is operated by means of a digital readout (DRO) and the other is operated by means of a micrometer graduated handwheel. State TWO comparisons between these centre lathes. (2)

4.4 Sketch the following lathe cutting-tool angles on a high speed steel (HSS):

4.4.1 top rake and front clearance angles (2)

4.4.2 side rake and side clearance angles (2)

4.5 Give FIVE advantages of using cutting fluid on a machine. (5)

4.6 Briefly explain FOUR steps to be followed when using a parting-off tool on a lathe to separate a machined part from a parent material. (4)

[20]

QUESTION 5

5.1 Compare the operation of a milling machine against that of a centre lathe in terms of:

5.1.1 clamping of workpiece (2)

5.1.2 cutting tools (2)

5.1.3 emergency stop (2)

5.2 You are required to machine two grooves on a shaft by using a milling machine. The grooves are separated at an angle of 35 degrees. Use the Brown and Sharp dividing head to calculate the required indexing.

The details of the Brown and Sharp dividing head are as follows:

Plate 1: 15, 16, 17, 18, 19 and 20 holes
Plate 2: 21, 23, 27, 29, 31 and 33 holes
Plate 3: 37, 39, 41, 43, 47 and 49 holes (5)

5.3 Thomas is working for Curtis Engineering as a Tool and Die maker. He is given a job instruction sheet to machine an engine part on a milling machine.

Develop a SIX-point workplan activity that he may follow to complete the job. (6)

5.4 During drilling operations an apprentice fitter notices that the drill bit breaks quite often. Give SIX reasons as to the cause of the problem. (6)

5.5 When working with lathes, long slender workpieces often require extra supports to prevent vibration as well as pressure of the tool from pushing the workpiece away from it. FIGURE 5 below shows a steady.

Identify the different components of the steady marked (A–E).

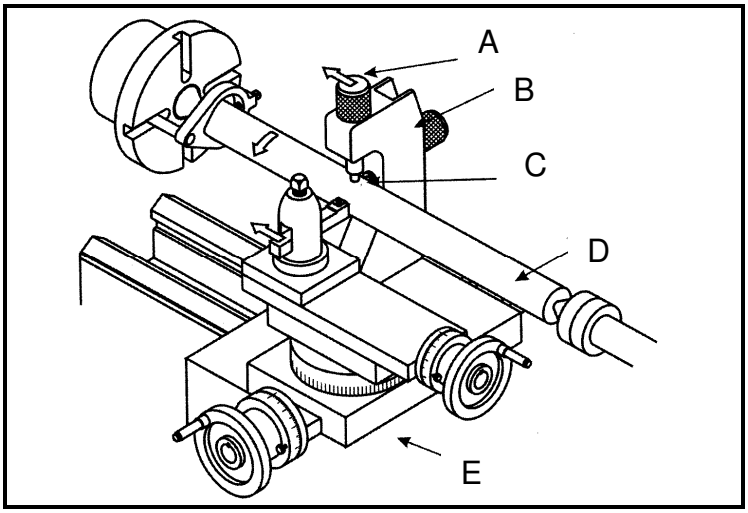

FIGURE 5 (5)

5.6 FIGURE 6 below shows a Knee-type Milling Machine.

Identify the different components of the milling machine. Write down the letter (A – G) and the correct answer in the ANSWER BOOK.

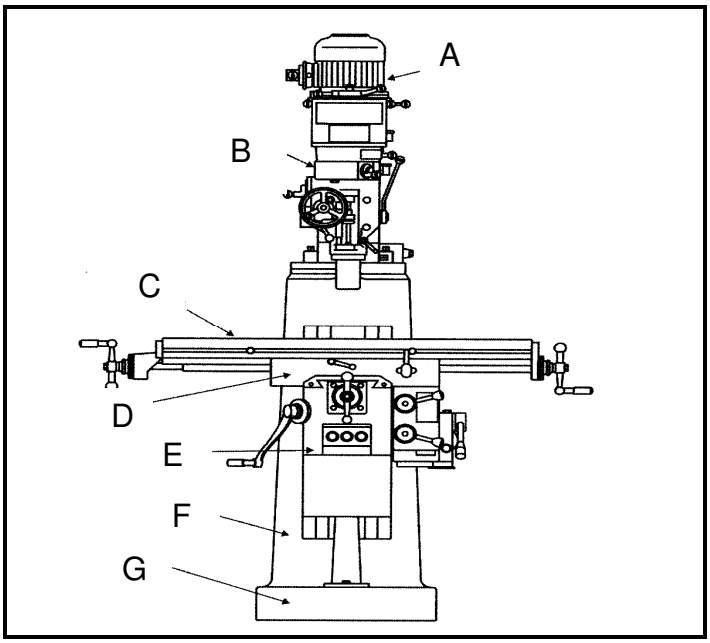

FIGURE 6 (7)
[35]

TOTAL SECTION B: 70
GRAND TOTAL: 100