higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PROFESSIONAL ENGINEERING PRACTICE
NQF LEVEL 4

(6021014)

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09:00–12:00

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)
PROFESSIONAL ENGINEERING PRACTICE
NQF LEVEL 4
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. Start each section on a new page.
5. Use only a black or blue pen.
6. Write neatly and legibly.

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QUESTION 1

1.1 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (1.1.1–1.1.5) in the ANSWER BOOK.

1.1.1 ONE of the responsibilities of engineers towards communities is to …

A accredit institutions and members.
B ensure safety, health and welfare of the public.
C set and monitor international standards.
D grow the profession.

1.1.2 Air pollution can have negative effects on the environment such as …

A destruction of wetlands.
B attracting rats.
C contamination of underground water.
D depletion of the ozone layer.

1.1.3 Which ONE of the following processes is not used when treating water?

A Filtering and screening
B Chemical addition
C Sedimentation
D Incineration

1.1.4 … is not ONE of the alternatives to crop spraying.

A Crop rotation
B Monoculture
C Trap crops and beneficial weeds
D Polyculture

1.1.5 People who come in contact with pesticides have one of the following symptoms:

A Coughing
B Sore joints
C Back pain
D Nausea

(5 × 1) (5)

1.2 Global warming means that the earth's temperatures are rising which has numerous effects on our environment.

Name FOUR of these effects. (4)

1.3 All employees should carry out their work in an efficient, honest and correct manner. Certain factors should be observed, and the findings should be recorded.

List FOUR factors that should be observed. (4)

1.4 Methods of improving job satisfaction exist in an effort to keep employees happy and productive.

Name FOUR factors influencing satisfaction. (4)

1.5 One way in which the impact on vegetation and land is controlled is through landscape and vegetation ordinances.

State THREE features of a typical ordinance. (3 × 2) (6)

1.6 Name TWO responsibilities expected of the conduct of professional body members. (2)

[25]

QUESTION 2

2.1 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (2.1.1–2.1.5) in the ANSWER BOOK.

2.1.1 Establishing specifications is a way of measuring the success or failure of a product.

2.1.2 The descriptive design process is analysed to identify the fundamental nature of a design problem.

2.1.3 Generating a brief is a graphical method of showing the stages and decisions involved in a process.

2.1.4 A design strategy is to design a method that consists of a framework of intended actions within which to work.

2.1.5 One of the features of the design proposal is the legal requirements. (5 × 1) (5)

2.2 What actions should the project leader follow to have a successful brain-storming session? (5)

2.3 Explain how the project team should select the final concept solution from the shortlisted concept solutions, by using the Concept Selection Matrix. (4)

2.4 Name Six basic stages in a design action framework that should be adopted. (6)

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2.5 Various models are used in engineering design.

2.5.1 Name THREE physical models (3)

2.5.2 Name TWO theoretical models (2)

[25]

QUESTION 3

3.1 FIGURE 3 shows a typical assembly diagram. Analyse the assembly diagram and answer the questions that follow.

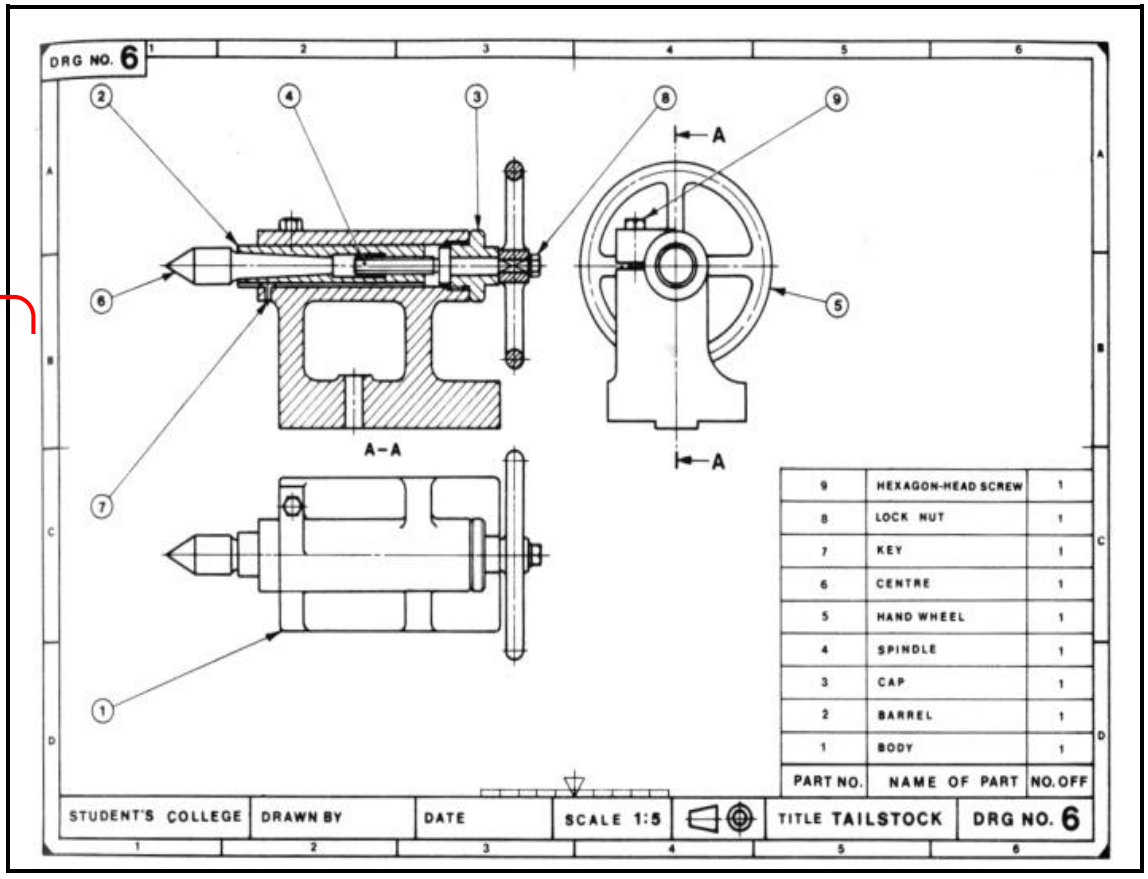


FIGURE 3

3.1.1 Name the title of the drawing in FIGURE 3.

3.1.2 What is the name of the company where the drawing was created?

3.1.3 Name the projection symbol used in this drawing.

3.1.4 What is the scale of this drawing?

3.1.5 Name part number 4 in FIGURE 3.

(5 × 1) (5)

3.2 Draw the first angle and third-angle projection symbols. (2 × 2) (4)

3.3 A shaft and a hub have the following sizes in mm.
The shaft has a diameter of 100mm with an upper limit of +0,05mm and a lower limit of -0,02mm.
The hub has a diameter of 100mm with an upper limit of +0,01mm and a lower limit of -0,04mm.

3.3.1 Calculate the minimum allowable size of the shaft. Show all calculations. (3)

3.3.2 Calculate the maximum allowable size of the hub. Show all calculations. (3)

3.4 Name THREE system representations in manufacturing, engineering and technology. (3)

3.5 Differentiate between the 'Conclusions' and 'Recommendations' in a technical report. (2 × 2) (4)

3.6 State THREE necessities for reporting in various stages of a project. (3)
[25]

QUESTION 4

4.1 Complete the following sentences by choosing a word or words from the list below. Write only the answer next to the question number (4.1.1–4.1.5) in the ANSWER BOOK.

information; hard disks; webcam; flash memory; data; memory; bit; microprocessor; data processing; CD-ROM; optical storage

4.1.1 … is text, numbers, pictures, of sounds that have not been organised.

4.1.2 … is changing observed data into a form that can be used for processing by hardware.

4.1.3 By using an electric charge (or its absence) the … in a computer can understand the binary numbers and change them into calculations.

4.1.4 Although … and storage means the same thing, they are used differently in computers.

4.1.5 Nowadays computers most often use … as secondary storage devices.

(5 × 1) (5)

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4.2 FIGURE 4 shows the component parts of a computer. Name the labelled parts by writing the name next to the letter (A–F) in the ANSWER BOOK.

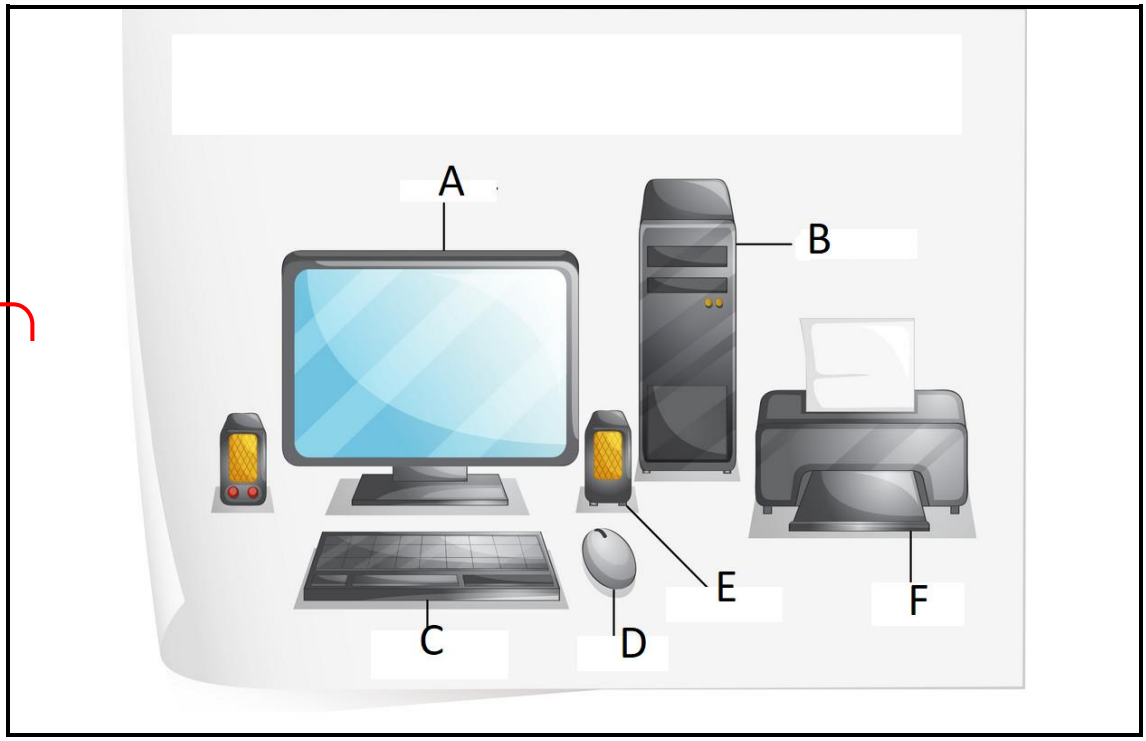


FIGURE 4

(6 × 1) (6)

4.3 Explain the difference between *low level* and *high level* computer languages. (4)

4.4 List FOUR high level computer languages that are used in the industry today. (4)

4.5 Explain the difference between the 'For' loop and the 'While' loop as used in programming. (6)

[25]

TOTAL: 100

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