higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PROFESSIONAL ENGINEERING PRACTICE
NQF LEVEL 4

(6021014)

7 November 2022 (X-paper)
09:00–12:00

This question paper consists of 7 pages.

121Q1N2207

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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. Use only a blue or black pen.
5. All the drawings should be neat and labelled and may be done in pencil.
6. Write neatly and legibly.

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QUESTION 1

1.1 State THREE harmful chemicals that causes air contamination. (3)

1.2 Explain THREE consequences of dumping waste, with particular reference to chemical disposals. (3)

1.3 Explain how the following character changes in an employee's state of mind could negatively impact their colleagues and performance at work.

1.3.1 Lack of concentration (2)

1.3.2 Aggressiveness (2)

1.3.3 Anxiety (2)

1.3.4 Reduced decision making capabilities (2)

1.4 Discuss the effect that deforestation has on the following:

1.4.1 Climate change (4)

1.4.2 Animal habitats (4)

1.5 Name THREE responsibilities and roles of professional bodies. (3)

[25]

QUESTION 2

2.1 Name the SIX missing steps, as indicated by the Roman numerals, in the following engineering design process:

- (i)
- Define the need or problem
- (ii)
- Draw up specifications
- (iii)
- (iv)
- (v)
- Build prototype
- (vi)
- Analyse test results
- Final report to customer or manager (6)

2.2 Explain the function of the following models as used in engineering design:

2.2.1 Scaled Physical models (2)

2.2.2 Mathematical models (2)

2.2.3 Simulations (2)

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2.3 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (2.3.1–2.3.5) in the ANSWER BOOK.

2.3.1 During the concept generation, designers must generate the least number of concepts.

2.3.2 The design brief is a statement of intent that contains enough information to start designing.

2.3.3 Product development always occurs to satisfy the customer's needs.

2.3.4 When judging whether the final design is satisfactory or not it is necessary to find a way of measuring the success or failure of the product.

2.3.5 An action plan is a chart of tasks that are time-related and show the team's responsibilities in the design.

(5 × 1) (5)

2.4 Define the following terms as used in the Concept Selection Matrix:

2.4.1 Concepts

2.4.2 Criteria

2.4.3 Weighting factors of criteria

2.4.4 Rating factors of concepts measured against criteria

(4 × 2) (8)

[25]

QUESTION 3

3.1 Choose an item from the following list to complete each sentence below. Write only the answer next to the question number (3.1.1-3.1.5) in the ANSWER BOOK.

block diagrams; sketches; oblique drawings; logic networks; graphs; assembly drawings; flow charts; detail drawings;

3.1.1 … are freehand drawings that are not drawn to scale.

3.2.2 … are a method of drawing objects three-dimensionally to scale.

3.2.3 … are charts or diagrams used to depict the relationship between two or more variables.

3.2.4 … make use of symbols such as the OR and NOT gates.

3.2.5 Machine symbols are found on …

(5 × 1) (5)

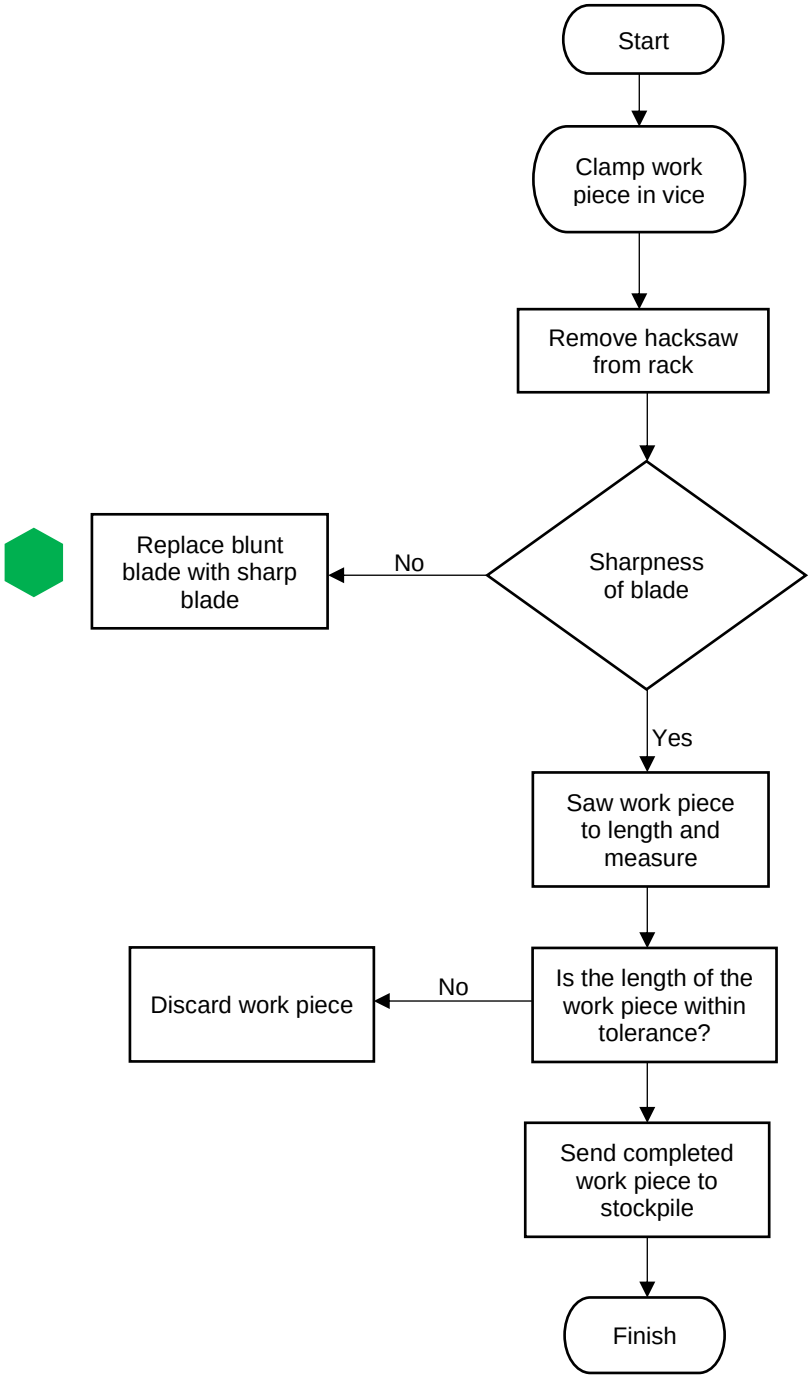
3.2 Choose a description from COLUMN B that matches a term in COLUMN A. Write only the letter (A–M) next to the question number (3.2.1–3.2.10) in the ANSWER BOOK.

COLUMN A		COLUMN B	
3.2.1	References	A	The subject and purpose of the report is outlined in this section of the technical report
3.2.2	Date of report		
3.2.3	Introduction	B	In this section, all the materials used in the research is listed
3.2.4	Conclusion		
3.2.5	Table of contents	C	This section of the technical report follows directly after the body of the report
3.2.6	Abstract	D	Using other people's work without their permission
3.2.7	Detail calculations		
3.2.8	Body of report	E	Discussion of methods used, findings and evaluation is found in this part of the report
3.2.9	Recommendations		
3.2.10	Plagiarism	F	Overview of the whole report
		G	Style of the technical report
		H	Instructions on how to correctly write a technical report
		I	Found in the Appendix of the report
		J	The length (number of words) of the technical report is indicated in this section
		K	The list of headings with page numbers is depicted in this part of the report
		L	Suggested solutions
		M	This information appears on the Title page of the report

(10 X 1) (10)

3.3 State FIVE steps that a presenter should take to ensure that his or her verbal presentation is of excellent quality. (5)

3.4 The following flowchart contains five mistakes. Analyse the flow chart, and list the FIVE mistakes, and indicate how the mistakes must be corrected:



(5)

[25]

QUESTION 4

4.1 Discuss the principles of data processing. (4)

4.2 Explain the difference between primary storage and secondary storage as used in relation to a computer. (4)

4.3 Name FOUR input devices as used in computers. (4)

4.4 Name TWO output devices as used in computers. (2)

4.5 Name TWO levels of computer languages. (2)

4.6 Analyse the following spreadsheet, and answer the questions that follow:

	A	B	C	D	E	F	G	H	I
1									
2	***South Africa Premier Soccer League 2023/24 – Leadership Board (Top half)***								
3									
4		MP	W	D	L	GF	GA	GD	Pts
5									
6	Mamelodi Sundowns	30	19	8	3	56	20	36	65
7	Kaizer Chiefs	30	12	13	5	32	24	8	49
8	Orlando Pirates	30	12	11	7	43	31	12	47
9	Cape Town City	30	11	14	5	32	23	9	47
10	Amazulu	30	13	8	9	34	26	8	47
11	Supersport United	30	10	14	6	34	28	6	44
12	Royal AM	30	8	17	5	24	22	2	41
13	Stellenbosch	30	10	10	10	36	32	4	40
14									
15			95	95	50	291	206	85	

Information:

For each win, a team receives 3 League points
For each draw, a team receives 1 League point

4.6.1 For the information in row 2, which THREE font styles were used in the presentation of the information? (3)

4.6.2 Cell F15 indicates the total number of goals scored by the eight teams. Write a Microsoft Excel RANGE formula that you can insert into cell F15 in order to calculate the total as indicated in cell F15. (3)

4.6.3 Using the information supplied above, write a Microsoft Excel formula that you can insert into cell I6 to calculate the total League Points achieved by Mamelodi Sundowns. (3)

[25]

TOTAL: 100

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