higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

PROFESSIONAL ENGINEERING PRACTICE
NQF LEVEL 4

(6021014)

12 November 2018 (Y-Paper)
13:00–16:00

This question paper consists of 9 pages.

NCV

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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. ALL sketches must be neat, clear and in proportion.
5. ALL work you do NOT want to be marked must be clearly crossed out.
6. Start each question on a NEW page.
7. Write neatly and legibly.

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QUESTION 1

1.1 You are an engineer at a factory, and your manager gives you a project to manage that would be harmful to the environment.

List FOUR steps that you will take to handle this situation. (4)

1.2 The two main types of pollutants are bio-degradable and non-degradable waste.

1.2.1 Explain the difference between *bio-degradable* and *non-degradable pollutants.* (4)

1.2.2 Name FOUR bio-degradable pollutants. (4)

1.2.3 Name TWO non-degradable pollutants. (2)

1.3 Workers that have a positive attitude towards others contribute largely to a healthy work environment.

Briefly discuss the following positive behaviour attitudes that workers should have:

1.3.1 Empathy

1.3.2 Helpfulness

1.3.3 Friendliness

1.3.4 Recognition

(4 × 2) (8)

1.4 State THREE advantages of lead free petrol. (3)

[25]

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QUESTION 2

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

2.1.1 The design brief is a statement of intent.

2.1.2 A design proposal should include any legal requirements.

2.1.3 During the feasibility study of the design brief, detail drawings of the design concept are produced.

2.1.4 An action plan is time related, and indicates specific target dates that the design team must adhere to.

2.1.5 Layout drawings are one way of communicating design solutions to customers.

(5 × 1) (5)

2.2 A template of a concept selection matrix is supplied below, as well as information concerning a specific design. Consider the template and the information supplied, and answer the questions.

CRITERIA	VALUE	CONCEPT 1		CONCEPT 2	
Total					

Criteria: Cost, Safety and Durability
Weighting: Cost = 5, Safety = 8 and Durability = 6
Rating factors (Concept 1): Cost = 4, Safety = 7 and Durability = 3
Rating factors (Concept 2): Cost = 3, Safety = 9 and Durability = 7

2.2.1 Neatly redraw the template in your examination ANSWER BOOK. (1)

2.2.2 Using the information supplied, fully complete the template that you have drawn in QUESTION 2.2.1. (8)

2.2.3 From the completed template, which concept would you choose as the best one? (1)

2.2.4 Supply a reason for your answer in QUESTION 2.2.3. (1)

2.3 Name FOUR drawings that are usually required to fully explain and communicate a design concept. (4)

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2.4 When strength calculations and detail drawings are completed, a prototype of the design concept is built to be tested.

Fully explain why it is necessary to test the prototype. (5)
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QUESTION 3

3.1 Complete the following sentences by using the words in the list below. Write only the missing word next to the question number (3.1.1–3.1.5) in the ANSWER BOOK.

layout; isometric; CRS; program; dimensions; physical; deviation; CSK; ID

3.1.1 Tolerance is known as the permissible amount of … allowed in a specific dimension of a component.

3.1.2 The … of a drawing indicates the way the drawing is set out.

3.1.3 The abbreviation for 'between centres' on an engineering drawing is …

3.1.4 … on a drawing tells the engineer what the size of an object is.

3.1.5 … projection uses 30° angles at the edges.

(5 × 1) (5)

3.2 Simple models can be made cheaply by using paper or cardboard.

Name each step (in the correct order) that must be followed in constructing a paper model. (6 × 1) (6)

3.3 Various options are given as possible answers to the following questions. Choose the correct answer and write only the letter (A–D) next to the question number (3.3.1–3.3.5) in the ANSWER BOOK.

3.3.1 The … section follows the conclusion section in a technical report.

A introduction
B summary
C body
D recommendations

3.3.2 Which ONE of the following does NOT appear on the cover page of a technical report?

A Title of the report
B Name of company
C Date on which the report was completed
D What the report is about

3.3.3 In which section of a technical report would we recognise the sources from which information was obtained?

A References
B Recommendations
C Conclusions
D Introduction

3.3.4 Using another person's work in a technical report is called …

A innovation.
B craftsmanship.
C plagiarism.
D acknowledgement.

3.3.5 Any information that supplements a report, but is not directly relevant to the report, will be found in the … section of a technical report.

A references
B introduction
C appendices
D conclusion

(5 × 1) (5)

3.4 Draw a block diagram to represent the following process:

- Turn shaft on lathe to specified diameter
- Measure diameter of shaft
- If the diameter of the shaft is correct, send shaft to stockpile
- If the diameter of the shaft is too small, scrap shaft
- If the diameter of the shaft is too large, send back to lathe (9)

[25]

QUESTION 4

4.1 Choose a description from COLUMN B that matches a word/phrase in COLUMN A. Write only the letter (A–M) next to the question number (4.1.1–4.1.10) in the ANSWER BOOK.

COLUMN A		COLUMN B	
4.1.1	Modem	A	input pictures to the computer
4.1.2	Mouse	B	large storage capacity and housed permanently inside computer
4.1.3	Monitor	C	can receive sound input
4.1.4	Optical disc	D	memory that cannot be changed by program instructions
4.1.5	Hard disk	E	this type of memory is lost when computer is switched off
4.1.6	Random Access Memory	F	obsolete, holds less data than CD-ROM
4.1.7	Read Only Memory	G	an electronic, non-volatile computer storage medium
4.1.8	Keyboard	H	QWERTY
4.1.9	Scanner	I	displays output information from a computer onto a screen
4.1.10	Flash memory	J	sound output device
		K	allows computers to communicate with other computers through telephone lines
		L	small, hand-held input device
		M	electronic data storage medium that can be written to and read using a low powered laser beam

(10 × 1) (10)

4.2 The spreadsheet below indicates the final points standing for the six teams in the Curry Cup Rugby League in South Africa. Analyse the spreadsheet below, and answer the questions.

	B	C	D	E	F	G	H	I	J
1									
2		South African Curry Cup Rugby League points standing							
3									
4	*Team*	*Games played*	*Won*	*Drawn*	*Lost*	*Points for*	*Points against*	*PD*	*Points*
5									
6	Sharks	10	8	1	1	358	59	299	34
7	Bulls	10	7	0	3	261	105	156	28
8	Griquas	10	6	1	3	202	142	60	26
9	Cheetahs	10	5	0	5	197	201	-4	20
10	Lions	10	2	1	7	102	260	-158	12
11	W Province	10	0	1	9	55	408	-353	2
12						1175	1175		
13						358	408		
14						55	59		

4.2.1 In total, 30 matches were played in this competition. How many matches were drawn? (1)

4.2.2 What is the total number of points scored by all teams in this competition? (1)

4.2.3 The data in cell G14 are 55.

Explain fully what information this data supplies to the reader of this spreadsheet. (2)

4.2.4 The data in cell H13 is 408, and indicates to the reader of this spreadsheet what the highest 'points against' total was for any team in this competition.

Write down a Microsoft Excel range formula for cell H13 that will input the data (408) into cell H13. (2)

4.2.5 For winning a match, a team received 4 points and 2 points for drawing a match.

Write down a Microsoft Excel formula for cell J6 to calculate the data found in cell J6. (3)

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4.3 In structured programming, loops are structures that allow the same instruction to be repeated until a specified condition is met.

Explain the difference between the *for loop* and the *while loop.* (2 × 1) (2)

4.4 Name FOUR high level computer languages used in the industry. (4)

[25]

TOTAL: 100

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