higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

ENGINEERING PRACTICE AND MAINTENANCE
NQF LEVEL 3

(6021003)

20 November 2024 (Y-paper)
13:00–16:00

This question paper consists of 5 pages.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
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ENGINEERING PRACTICE AND MAINTENANCE
NQF LEVEL 3
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 black or blue pen.
5. Write neatly and legibly.

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QUESTION 1

1.1 Choose an item from COLUMN B that matches a description in COLUMN A. Write only the letter (A–L) next to the question number (1.1.1–1.1.10) in the ANSWER BOOK.

COLUMN A		COLUMN B	
1.1.1	Step-by-step set of instructions to solve a particular engineering problem	A	public libraries
1.1.2	Information and instructions from makers on how to use a particular piece of machinery	B	drawings
1.1.3	Legal right given to a person or company for an idea or information	C	textbooks
1.1.4	General collection of books	D	upgrades
1.1.5	More creative solutions to a problem	E	patent
1.1.6	Publish the patent journal	F	manuals
1.1.7	Visual information showing and explaining an idea	G	special libraries
1.1.8	Information written by engineers explaining how a particular problem was solved	H	manufacturer specifications
1.1.9	Provide theoretical or academic information about specific engineering problems	I	technical reports
1.1.10	Support the research and development work carried out by institutions and corporations	J	Government Printer
		K	create engineering drawings and designs
		L	academic magazines in which specialists publish
		M	information and instructions from the place of work

(10 × 1) (10)

1.2 Some existing engineering products and solutions have several problems.

Briefly discuss the following design problems:

1.2.1 Reliability problems

1.2.2 Maintenance problems

1.2.3 Performance problems

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1.2.4 Operating problems

1.2.5 Safety problems

(5 × 2) (10)
[20]

QUESTION 2

2.1 Name FIVE fault-finding techniques. (5)

2.2 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.2.1–1.2.6) in the ANSWER BOOK.

2.2.1 A ruler and measuring tape measures length in kilometres.

2.2.2 A multimeter measures electric current in amperes.

2.2.3 A thermometer measures distance in degrees.

2.2.4 A scale or spring balance measures density.

2.2.5 A voltmeter measures resistance in ohms.

2.2.6 An ammeter measures current in a circuit.

(6 × 1) (6)

2.3 The best source of information about a fault is the last user of a machine.

List NINE questions that must be posed to the last user of a machine. (9)
[20]

QUESTION 3

3.1 TEN faults are listed below.

State whether each fault is a Mechanical fault (M), an Electrical fault (E), a Pneumatic fault (P) or Hydraulic fault (H). Choose the answer and write only M, E, P or H next to the question number (3.1.1–3.1.10) in the ANSWER BOOK.

3.1.1 Worn bearings

3.1.2 Short circuit

3.1.3 Misalignment

3.1.4 Broken gears

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3.1.5 Broken electrical supply

3.1.6 Blown fuse

3.1.7 Worn clutch

3.1.8 No air supply to the actuator

3.1.9 Leaking air hose couplings

3.1.10 Cylinder losing oil

(10 × 1) (10)

3.2 An electrical fault has brought a machine to a halt.

List FOUR rules to be followed to locate the faulty component. (4)

3.3 State SIX steps to follow during the systematic collection of evidence to rectify a fault. (6)

[20]

QUESTION 4

4.1 Temperature reduction by means of lubricants is essential in a machine operating at a high temperature.

Discuss SIX reasons for temperature reduction by means of a lubricant. (12)

4.2 A lubrication system must be inspected to ensure that the correct lubricant is used.

Name FIVE requirements a lubricant must meet. (5)

4.3 List THREE steps to follow when faults on a lubrication system are diagnosed. (3)

[20]

QUESTION 5

5.1 Each time maintenance is carried out on a piece of equipment, record must be kept for future reference.

State EIGHT bits of information that must be recorded. (8)

5.2 List SIX safety requirements that must be met when chemicals are stored. (6)

5.3 Name SIX steps that must be followed when rigging equipment is used. (6)

[20]

TOTAL: 100

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