higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

ENGINEERING PRACTICE AND MAINTENANCE
NQF LEVEL 3

(6021003)

8 December 2020 (Y-paper)
13:00–16:00

This question paper consists of 9 pages.

415Q1N2008

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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. Start each question on a new page.
5. Use only a black or blue pen.
6. Write neatly and legibly.

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SECTION A

QUESTION 1

1.1 Various options are given as possible answers to the following questions or statements. Choose the answer and write only the letter (A–D) next to the question number (1.1.1–1.1.6) in the ANSWER BOOK.

1.1.1 … is a method of communication whereby a type of machine scans a document and send it digitally through a telephone line to another machine, which decodes the signal and print the document.

A E-mails
B Video conferencing
C Internet
D Facsimiles

1.1.2 … is a method of communication whereby people have direct connection with each other in a way that they can hear and see each other without the need to travel to a venue.

A E-mails
B Video conferencing
C Internet
D Facsimiles

1.1.3 … is a positive aspect of fault finding techniques.

A Irregular maintenance checks
B Poor maintenance on a machine
C Higher production costs
D To implement safety measures

1.1.4 … is the ability to recognise a fault of machine components.

A Knowledge
B Diagnostic skill
C Experience
D Application

1.1.5 … are used, due to its characteristic properties, like acid and heat resistance.

A Semi-solid lubricants
B Liquid lubricants
C Solid lubricants
D Gaseous lubricants

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1.1.6 A lever (e.g.: crow bar), relates to a …, due to the type of work you can execute with it.

A compressor
B generator
C pump
D lifting plant

(6 × 1) (6)

1.2 Complete the following sentences by filling the missing word or words. Write only the word or words next to the question number (1.2.1–1.2.6) in the ANSWER BOOK.

1.2.1 During the developing process for a solution of a design problem, you need to set a … that spells out what is required to solve the problem.

1.2.2 … is a principal method of identifying a symptom of a fault.

1.2.3 … is a category of techniques used to locate an electrical and mechanical fault.

1.2.4 … is an example of a mechanical fault.

1.2.5 … is an example of an automatic lubrication system.

1.2.6 … is a purpose of the Occupational Health and Safety act.

(6 × 1) (6)

1.3 Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–L) next to the question number (1.3.1–1.3.6) in the ANSWER BOOK.

COLUMN A		COLUMN B	
1.3.1	Structured collection of information on a computer that can be searched systematically	A	manufacturer's manual
		B	valves
		C	pump
1.3.2	It describes changes in the functioning of a machine, indicating a malfunction	D	viscosity index
		E	symptom
1.3.3	Specifications and drawings for the machine or assembly	F	maintenance schedule
1.3.4	Detailed records of past breakdowns.	G	viscosity
		H	job card
1.3.5	It describes the stickiness of a substance	I	database
1.3.6	Devices that convert mechanical energy into hydraulic energy, either fixed or variable	J	fault
		K	maintenance record
		L	hyperlink

(6 × 1) (6)

1.4 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.4.1–1.4.6) in the ANSWER BOOK.

1.4.1 No organisation or government owns the internet. There is also no regulation and censorship of the internet.

1.4.2 Modern machinery are equipped with a computer that is not only used to control the machine but also to analyse the operation of the machine

1.4.3 Communication helps to get a job done by testing understanding.

1.4.4 Checks for damages on hydraulic systems, such as broken pipes, leaking joints etc., should only be inspected once every month.

1.4.5 Human errors are the main cause for typical faults in lubrication systems.

1.4.6 The physical size of a generator is vital for generating power.

(6 × 1) (6)

1.5 Choose the correct word or words from the list below, to complete the statement. Write only the word or words next to question number (1.5.1–1.5.6) in the ANSWER BOOK.

pressure lubricating system; manual application system; dirt; lack of lubrication; plan the repair; prepare for the repair; suction lift pump; flooded suction pump; internet; mobile phones; the volume of liquid that is present in the cylinder with every stroke; twice the amount of liquid that is present in the cylinder with every stroke

1.5.1 The … is a connection by means of telephone cables, fibre optic cables, satellites and wireless connections.

1.5.2 … is a possible cause of excessive noise in a system.

1.5.3 … is the first step involved in carrying out a repair.

1.5.4 When lubricating the bearings and shafts of a sealed gearbox, the most effective method will be the …

1.5.5 When a pump is installed above the level of the feed water, it is classified as a …

1.5.6 A single acting pump delivers …

(6 × 1) (6)
[30]

TOTAL SECTION A: 30

SECTION B

QUESTION 2

2.1 List the THREE main design solution techniques. (3)

2.2 List FOUR advantages of Rapid prototyping. (4)

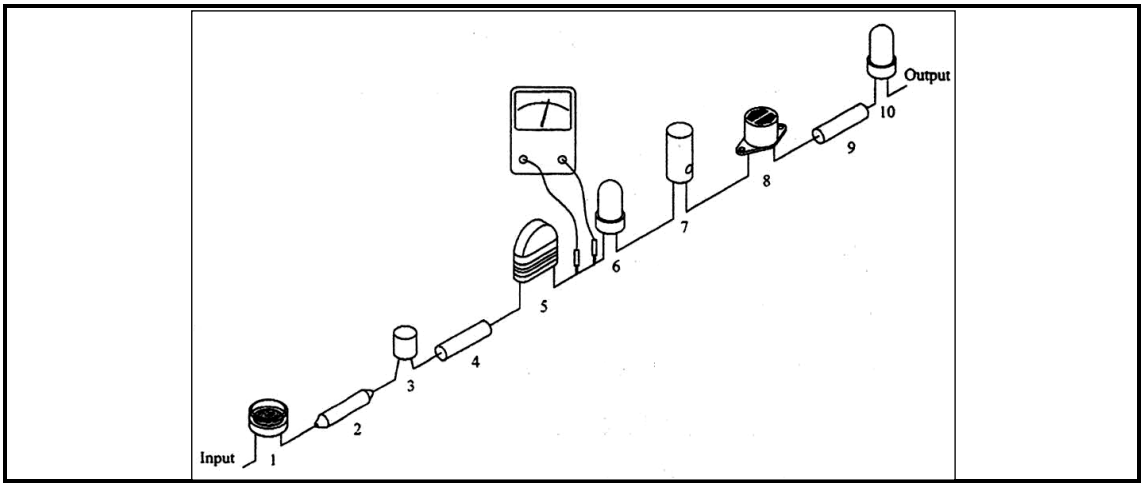
2.3 List THREE guidelines that can assist with brainstorming. (3)

2.4 Name TWO factors that should be considered regarding testing and evaluation information against the given specifications of a design problem. (2)

2.5 Name TWO factors that should be considered during the modification of a design problem (2)
[14]

QUESTION 3

3.1 Identify the method illustrated in the figure below when used for testing a circuit.



(1)

3.2 Name TWO positive aspects of different fault-finding techniques. (2)

3.3 State TWO negative aspects of different fault-finding techniques. (2)

3.4 When identifying symptoms, customer questioning and direct observation of the system is essential.

List THREE examples of questions that can be directed to a customer to assist in identification of a fault. (3)

3.5 List the THREE essential basic parts by which machines are governed. (3)

3.6 List THREE examples of *signs* of common electrical faults. (3)
[14]

QUESTION 4

4.1 State the THREE principals of fault finding diagnostics. (3)

4.2 The systematic investigation of symptoms, faults and causes and their effects guided by a step by step approach, controlled by a direct line flow chart showing the flow of information in a logical way.

The flow chart consists of several shapes; like ellipses, rectangles and diamonds. Each representing a different action during the investigation.

Briefly describe what the purpose of each of above mentioned shapes are. (3)

4.3 Name FOUR fault detecting equipment that can be used to identify the location of a fault. (4)

4.4 Safe storage of maintenance records is essential. Information like 'The fault identification details' must appear in the record.

Which TWO points of information can be detected by using the following TWO key words:

'Last person' and 'consumables'? (2 × 2) (4)

[14]

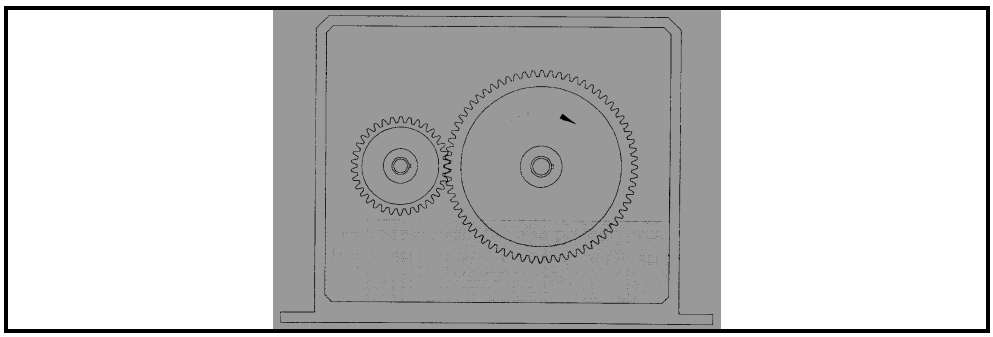
QUESTION 5

5.1 List FOUR types of lubrication grease. (4)

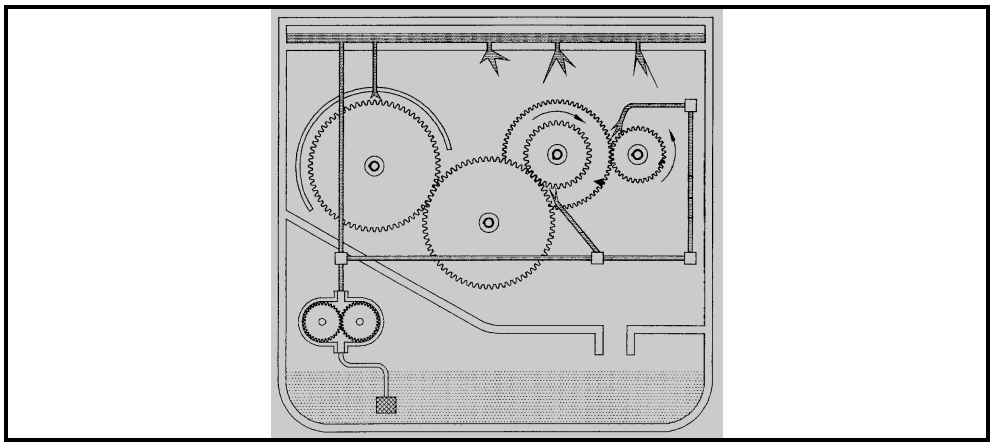
5.2 List FIVE manual lubrication systems used in general. (5)

5.3 Name the following lubrication systems, by only writing the answer next to the question number (5.3.1–5.3.2) in the ANSWER BOOK.

5.3.1



5.3.2



(2 × 1) (2)

5.4 List THREE typical faults related to lubrication systems. (3)
[14]

QUESTION 6

6.1 Name THREE of the different plants/factories handled in the Plant Maintenance and Equipment module. (3)

6.2 Define, in the term *Engineering Equipment* and give TWO examples of these equipment. (2 × 2) (4)

6.3 Give a description of the term *cost-effective*. (2)

6.4 Each time maintenance is done on equipment, records must be kept.

Name TWO additional records that can also be kept, depending on the policies of the company. (2)

6.5 Name THREE of the most common dangerous/hazardous chemical substances found in the workplace. (3)
[14]

TOTAL SECTION B: 70
GRAND TOTAL: 100

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