higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

ENGINEERING PRACTICE AND MAINTENANCE
NQF LEVEL 3

8 December 2020

This marking guideline consists of 7 pages.

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SECTION A

QUESTION 1

1.1
1.1.1 D
1.1.2 B
1.1.3 D
1.1.4 B
1.1.5 C
1.1.6 D

(6 × 1) (6)

1.2
1.2.1 Design brief/Statement

1.2.2
- Questioning
- Direct observation
- Manufacturer's manuals
- Trial and error (Any ONE)

1.2.3
- Path faults
- Component failure faults (Any ONE)

1.2.4
- Worn bearing
- Broken gears
- Worn clutch
- A design fault
- A misalignment fault
- Lack of lubrication (Any ONE)

1.2.5
- Circulatory system
- 'One shot' total loss system (Any ONE)

1.2.6
- To provide for the health and safety of persons at work
- To provide for the protection and safety of visitors
- To establish an advisory council
- To provide for relative matters (Any ONE)

(6 × 1) (6)

1.3
1.3.1 I
1.3.2 E
1.3.3 A
1.3.4 K
1.3.5 G
1.3.6 C

(6 × 1) (6)

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1.4 1.4.1 True
1.4.2 True
1.4.3 True
1.4.4 False
1.4.5 True
1.4.6 False

(6 × 1) (6)

1.5 1.5.1 Internet
1.5.2 Dirt
1.5.3 Plan the repair
1.5.4 Pressure lubricating system
1.5.5 Suction lift pump.
1.5.6 The volume of liquid that is present in the cylinder with every stroke.

(6 × 1) (6)
[30]

TOTAL SECTION A: 45

SECTION B

QUESTION 2

2.1
- Simulation
- Virtual prototyping
- Rapid prototyping (3)

2.2
- An increase of effective communication.
- To decrease development time.
- To decrease costly mistakes.
- To minimise subsequent engineering changes.
- To extend product lifetime.
- To eliminate redundant features. (Any 4 × 1) (4)

2.3
- A conducive area.
- Enough time.
- All solutions and ideas suggested must be considered.
- Contributions must be treated with respect.
- A scribe must be appointed.
- Avoid an in-depth investigation.
- There should be an agreement about a few ideas at the end of the session.
- Do not reject out-of-hand ideas.
- Encourage parties to think deeply about solutions. (Any 3 × 1) (3)

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2.4
- Check all results.
- Make sure information is recorded and communicated.
- Advise and make recommendations.
- Verify specifications.
- Recommend modifications.
- Consider safety requirements. (Any 2 × 1) (2)

2.5
- Check all specifications.
- Ensure drawings are updated.
- Once modifications are completed, make the new product.
- Test and evaluate the new product.
- Record the findings. (Any 2 × 1) (2)

[14]

QUESTION 3

3.1 The half-cut method. (1)

3.2
- Time failure will be minimized if the process will be carried out on time.
- Regular maintenance will prevent breakdowns.
- Down-time will be minimised.
- Safety measures can be implemented.
- Machines end equipment will have longer life span.
- Production will be improved. (Any 2 × 1) (2)

3.3
- Unsafe techniques will cause damage.
- Irregular maintenance checks will cause break downs.
- Without planned maintenance, down time will increase.
- Poor maintenance will create shorter life spans.
- Increased down time will result in poor production.
- Production costs will increase. (Any 2 × 1) (2)

3.4
- Did the machine stop suddenly?
- Did the machine start to make noises, and if so, did you stop the machine immediately?
- Where did the noise came from?
- Has the fault occurred previously?
- Did the gauges indicate any abnormal readings?
- Was there any excessive amount of heat at the source of the noise?
- Were there any unusual smells?
- Were there any unusual vibrations?
- Have there been any recent modifications done? (Any 3 × 1) (3)

3.5
- The source of energy.
- The power transmission unit.
- The application to the load. (3)

3.6
- Burn marks around the socket holes.
- Burn marks around the plug pins.
- Burning smells when in use.
- Plug overheated when in use.
- Slow or intermittent operation of machine. (Any 3 × 1) (3)

[14]

QUESTION 4

4.1
- Diagnostic skill
- Knowledge
- Experience (3)

4.2
- Ellipse – It serves as the terminator shape, indicating the beginning and end of the flow chart.
- Rectangle – It serves as an instruction box.
- Diamond – It serves as the question box. (3)

4.3
- Temperature gauges
- Tachometer
- Dimensional measuring equipment
- Pressure gauges
- Vacuum gauges
- Stethoscope (Any 4 × 1) (4)

4.4 Last person:
Who was the last person to use the machine before it became faulty?

Consumables:
What consumables were used? (2 × 2) (4)

[14]

QUESTION 5

5.1
- General purpose grease
- Extreme pressure grease
- Axle grease
- High melting-point grease
- Graphite grease
- White oxide grease
- Water-pump grease
- Rubber grease (Any 4 × 1) (4)

5.2
- Oil can
- Covered oil cup
- Grease gun
- Grease nipple
- Manual grease cup (5)

5.3 5.3.1 Splash lubrication system
5.3.2 Pressure lubrication system
(2 × 1) (2)

5.4
- Incorrect type of lubricant
- Blocked or dirty filters
- Not enough lubricant in reservoir
- Too much lubricant in reservoir
- Too high operating temperature
- Leaking components
- Loose pipes
- Pump cavitation
- Motor damage (Any 3 × 1) (3)

[14]

QUESTION 6

6.1
- Cement plant
- Extraction plants
- Steel plant
- Power plant (Any 3 × 1) (3)

6.2 Engineering equipment includes any tool or equipment used in the plant or to carry out the function of the plant

- Tools
- Computers
- Safety equipment
- Processing equipment
- Production equipment
- Electrical equipment (Any 2 × 1) (4)

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6.3 It is not wasting money, time, resources and energy. (2)

6.4
- Record of regular routine checks of equipment
- Daily logbooks of equipment
- Weekly checklists of what checks being done on equipment
- Half-yearly reviews of the equipment (Any 3 × 1) (3)

6.5
- Asbestos
- Acetone
- Benzene
- Ammonia
- Cement
- Aluminium metal
- Lead (Any 3 × 1) (3)

[14]

TOTAL SECTION B: 70
GRAND TOTAL: 100

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