



# higher education & training

Department:  
Higher Education and Training  
**REPUBLIC OF SOUTH AFRICA**

## **MARKING GUIDELINE**

### **NATIONAL CERTIFICATE MECHANOTECHNOLOGY N3**

**5 April 2023**

**This marking guideline consists of 6 pages.**

**QUESTION 1: POWER TRANSMISSION, COUPLING OF SHAFTS, AND CLUTCHES**

1.1 1.1.1 Service factor = 1,3 (1)

1.1.2 
$$N_{RATIO} = \frac{N_{MOTOR}}{N_{COMPRESSOR}}$$
  

$$N_{RATIO} = \frac{1500}{570} \checkmark$$
  

$$= 2,632: 1 \checkmark$$
 (2)

1.1.3  $D = 212 \text{ mm} \checkmark \checkmark$  (2)

1.1.4 
$$P = \frac{2\pi NT_q}{60}$$
  

$$T_q = \frac{60 \times 10^3 \times 60}{2\pi \times 1500} \checkmark$$
  

$$= 381,972 \text{ N.m} \checkmark$$
 (2)

- 1.2
- Lubrication cools the chain.
  - It cleans the chain.
  - It absorbs shocks.
  - It decreases friction by separating pins from rollers.
- (4)

- 1.3
- The friction generated by the gear system causes great wear.
  - Worm-wheel to worm drive is not possible.
  - The gear system uses a lot of power.
- (3)

- 1.4
- Bibby flexible coupling
  - Pin-type flexible coupling
  - Flexible tyre coupling
- (3)

1.5 1.5.1 B

1.5.2 A

1.5.3 C

(3 × 1) (3)  
[20]

**QUESTION 2: BRAKES**

- It is easy to inspect and maintain.
  - It can be adjusted without removing the drum.
  - Dust and water are easily thrown off by the centrifugal force.
  - It is easy to cool the drum.
- (4)  
[4]

### QUESTION 3: BEARINGS

- 3.1
- It operates on a sliding friction principle.
  - There is sliding movement between the shaft and the bearing.
  - It is aided by a lubricant to separate these two surfaces.
- (3)
- 3.2
- A – Outer ring
  - B – Cage
  - C – Inner ring
  - D – Ball
- (4)
- 3.3
- |       |      |
|-------|------|
| 3.3.1 | 3 mm |
| 3.3.2 | 629  |
| 3.3.3 | 626  |
- (3 × 1) (3)

[10]

### QUESTION 4: WATER PUMPS, COOLING, AND LUBRICATION

- 4.1
- A – Gland
  - B – Stuffing box
  - C – Shaft/rod
- (3)
- 4.2
- To extend the oil life
  - To remove oil-deterioration products (dirt)
  - To prevent clogging of oil
  - To prevent sticking of oil
  - To prevent wear on moving parts
- (5)
- 4.3
- Impeller-assisted cooling system
  - Thermosyphon cooling system
- (2)
- 4.4
- To remove heat
  - To lubricate the moving parts
  - To absorb vibration and shocks
  - To prevent metal on metal contact
  - To prevent rusting of highly finished tooth surfaces.
- (Any 2 × 1) (2)
- 4.5
- |       |       |
|-------|-------|
| 4.5.1 | True  |
| 4.5.2 | False |
| 4.5.3 | True  |
- (3 × 1) (3)

[15]



- 7.2
- The speed ratio can be regulated and controlled.
  - Heavier loads can be lifted without using greater power.
  - Operating costs are minimised.
- (Any 2 × 1) (2)

- 7.3
- To move/displace heavy loads from one point to another.
  - To lift loads that are difficult to handle due to size
- (2)  
[7]

### QUESTION 8: MATERIAL AND MATERIAL PROCESSES

- 8.1
- |       |   |  |  |
|-------|---|--|--|
| 8.1.1 | C |  |  |
| 8.1.2 | D |  |  |
| 8.1.3 | A |  |  |
| 8.1.4 | B |  |  |
- (4 × 1) (4)
- 8.2
- |       |                   |  |  |
|-------|-------------------|--|--|
| 8.2.1 | Waxy              |  |  |
| 8.2.2 | Dull when dropped |  |  |
| 8.2.3 | Dull when dropped |  |  |
| 8.2.4 | Sweet             |  |  |
- (4 × 1) (4)  
[8]

### QUESTION 9: INDUSTRIAL ORGANISATION AND PLANNING

- 9.1 Technology and human factors (2)
- 9.2
- It shows when excess funds must be invested.
  - It provides the basis to obtaining credit.
  - It shows the amount of cash available at a given moment.
  - Managers can determine the amount of cash available to finance specific projects.
  - It gives an indication of potential cash surplus and shortages.
  - Managers can determine if cash will be available on an ongoing basis.
- (Any 2 × 1) (2)
- 9.3
- |       |  |  |  |
|-------|--|--|--|
| 9.3.1 | <ul style="list-style-type: none"> <li>• To record hourly paid employee working hours in order to determine their wages/salaries</li> <li>• To assist management in the application of budget control</li> <li>• To keep record of the number of hours worked on a specific job</li> <li>• Controls employee punctuality</li> <li>• To indicate the specific job that an employee is working on</li> </ul> |  |  |
|-------|--|--|--|
- (Any 2 × 1) (2)

- 9.3.2
- To ensure that the entire manufacturing process is recorded
  - To list the different elements in an operation
  - To summarise all operations in a single reference
  - To record the complete history of the work
  - To maintain consistency with the actual production route
- (Any 2 × 1) (2)
- 9.3.3
- To specify the work to be done by the operator
  - To specify the area/section where the work is to be done
- (2)
- 9.3.4
- To provide the correct materials in correct quantities at the right place at the right time
- Assist on when and by whom are the items needed
- (2)  
**[12]**

### QUESTION 10: ENTREPRENEURSHIP

- 10.1
- The undertaking whereby the owner of the business is also the manager who provides his/her own capital for the business. This business owner is solely responsible for the business risks, failure and/or success.
- (4)
- 10.2
- Shopping around
  - Observing media
  - Talking to others (networking)
  - Holidays
  - Travelling
  - Transport business
  - Entertainment
  - Sports
  - Hobbies
  - Housekeeping activities
  - Observing children and babies' behaviour
- (Any 4 × 1) (4)  
**[8]**

**TOTAL: 100**