higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

APPLIED ENGINEERING TECHNOLOGY
NQF LEVEL 4

10 November 2022

This marking guideline consists of 6 pages.

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QUESTION 1

1.1
1.1.1 A
1.1.2 D
1.1.3 B
1.1.4 B
1.1.5 B
1.1.6 B
1.1.7 B
1.1.8 C
1.1.9 D
1.1.10 B

(10 × 1) (10)

1.2
- Brushes
- An axle
- A commutator
- Armature or rotor
- Solenoid or an electromagnet (5)

1.3
- Strictly follow the company safety rules and procedures
- Report unsafe or dangerous conditions
- Keep workplace clean
- Be aware of your own and your fellow workers' health and safety
- Report incidents that occurred during your shift (5)

[20]

QUESTION 2

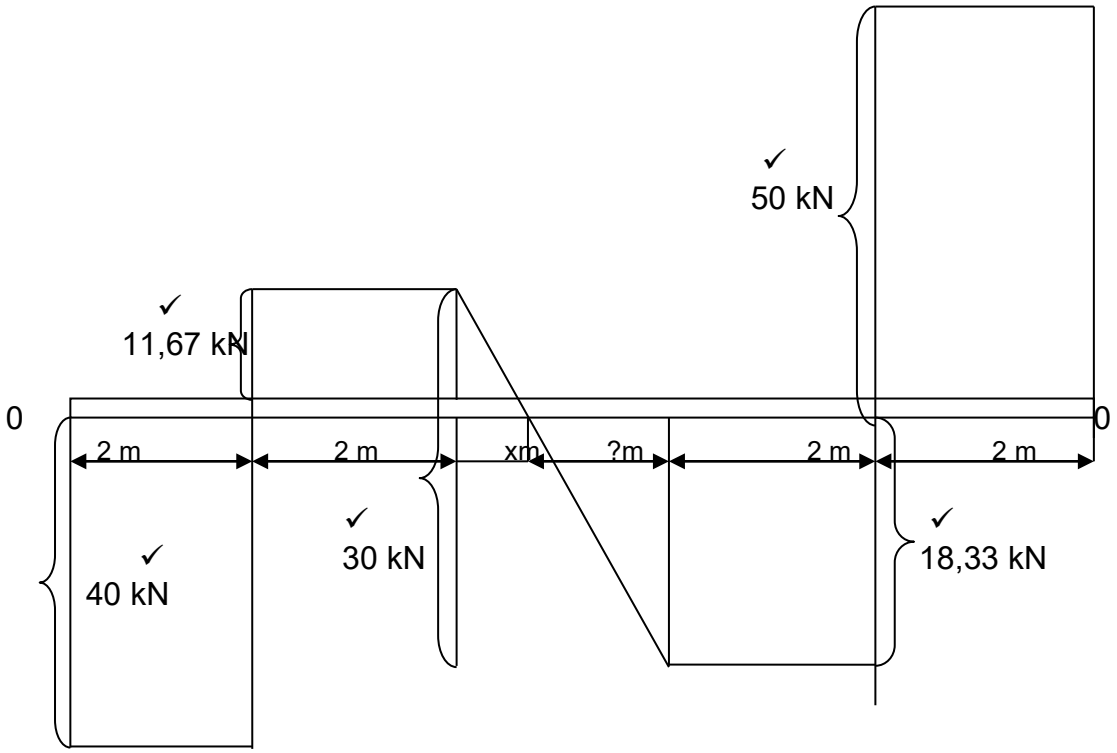
2.1 (a) Take moments about support: L
Sum of Clockwise moments = Sum of Anti-Clockwise moments
✓ ✓
$30 \times 3 + 50 \times 8 = 40 \times 2 + R \times 6$
$90 + 400 = 80 + 6R$
$410 = 6R$
R = 68,33 kN✓ (3)

(b) Take moments about support: R
Sum of clockwise moments = Sum of Anti-Clockwise moments
✓ ✓
$50 \times 2 + L \times 6 = 30 \times 3 + 40 \times 8$
$100 + 6L = 90 + 320$
$6L = 310$
L = 51,67 kN✓ (3)

2.2 Upwards =120 kN
Downwards = 120 kN (2)

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2.3 SFD



(5)

2.4 2.4.1 A = 0 kNm
2.4.2 L = 40 × 2 = 80 kNm
2.4.3 R =50 × 2 = 100 kNm
2.4.4 D = 0 kNm

(4 × 1) (4)

2.5.1 A cantilever is a beam that is held and supported at one end only

2.5.2 A force tending to produce movement in the opposite direction

2.5.3 A load acting over a length or area (3 x 1) (3)
[20]

QUESTION 3

3.1
3.1.1 J
3.1.2 E
3.1.3 F
3.1.4 A
3.1.5 C
3.1.6 K
3.1.7 H
3.1.8 B
3.1.9 M
3.1.10 G

(10 × 1) (10)

3.2
- Rigid coupling
- Flange coupling (2)

3.3
- Controlling the flow of fluids
- Opening and closing the path of flow
- Regulating the speed of fluid flow in a pipe
- Regulating the pressure inside the pipe carrying fluid (Any 3 × 1) (3)

[15]

QUESTION 4

4.1
- It causes wear and tear on parts that are rubbing
- It generates unnecessary heat
- It causes energy loss (3 × 2) (6)

4.2 Solution:

W or N.R = mxg
= 60 × 9,81 ✓
= 588,6N✓ (2)

Force to keep block moving:
$F\mu_k = \mu_k \times W$ or $\mu_K \times N.R$
=0,29 × 588,6✓
=170,69N✓ (2)

Force needed just before motion starts:
$F\mu_s = \mu_s$ x N.R
= 1,05 × 588,6✓
= 618,03N✓

(2)

4.3 $F_1 / A_1 = F_2 / A_2$

Where $A_1 = \pi d^2/4 = \pi \times 1,5^2/4 = 1,77$ ✓
$A_2 = \pi d^2/4 = \pi \times 5^2/4 = 19,63$ ✓

$F_1 = 600 \times 1,77/19,63$ ✓

Therefore: F_1 =54,1 N ✓ ✓ (5)

4.4
- Liquid lubricants
- Semi-solid lubricants
- Solid lubricants (3)

[20]

QUESTION 5

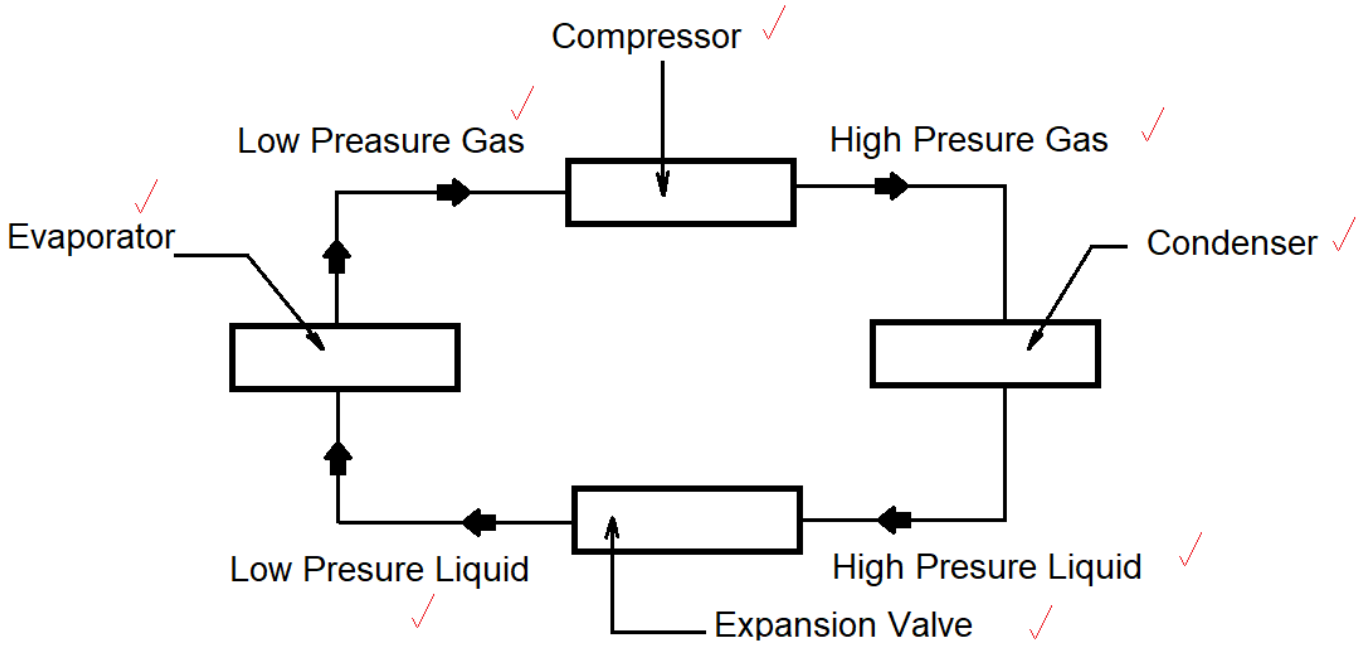
5.1 5.1.1
- Open-loop control system
- Closed-loop control system (2)

5.1.2 Block diagram (1)

5.1.3
- Mechanical
- Electrical
- Hydraulic
- Pneumatic (4)

5.2
- Man
- Machine
- Method
- Material
- Measurement
- Mother nature (Any 4 × 1) (4)

5.3
5.3.1 True
5.3.2 True
5.3.3 False
5.3.4 False
5.3.5 False
5.3.6 True (6 x 1) (6)



(8 × 1)

[25]

TOTAL: 100