



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE BUILDING SCIENCE N1

2 April 2020

This marking guideline consists of 7 pages.

QUESTION 1

1.1 Volume = Area of base \times height

$$= 3,142 (r)^2 \times h \checkmark$$

$$= 3,142 (22.5)^2 \times 120 \checkmark$$

$$= \underline{190\,876.5\text{ mm}^3} \checkmark \quad (3)$$

1.2 Area = $3,142 \times (r)^2 \checkmark$

$$= 3,142 \times (80)^2 \checkmark$$

$$= \underline{20\,108.80\text{ mm}^2} \checkmark \quad (3)$$

1.3 1.3.1 Metre per second
Or
Kilometre per hour

1.3.2 Newton

1.3.3 Degrees Celsius

1.3.4 Pascal
Or
Kilopascal

(4 \times 1) (4)
[10]

QUESTION 2

2.1 True

2.2 True

2.3 False

2.4 False

2.5 False

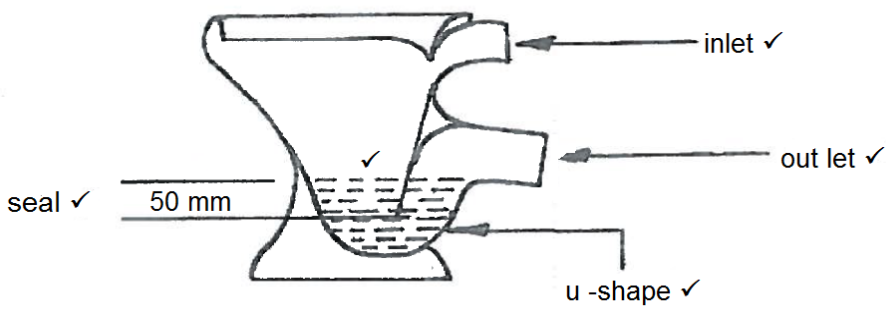
(5 \times 2) **[10]**

QUESTION 3

3.1 The volume of a gas varies directly✓ as its absolute temperature changes✓ if the pressure is kept constant.✓ (3)

3.2 $K = 50^{\circ}C + 273$ ✓
 $= 323 K$ ✓ (2)

3.3 $P_1 = 420 \text{ kPa}$
 $V_1 = 12 \text{ m}^3$
 $P_2 = 950 \text{ kPa}$
 $V_2 = ?$
 $P_1V_1 = P_2V_2$ ✓
 $\therefore V_2 = P_1V_1 \div P_2$ ✓
 $V_2 = [(420)(12)] \div (950)$ ✓
 $V_2 = [5\,040 \div 950]$ ✓
 $V_2 = 5.31 \text{ m}^3$ ✓✓ (6)

3.4  (5)
[16]

QUESTION 4

4.1 The relative density (r.d.) of a substance is the density of the substance compared with the density of water or the mass of any volume of the substance compared with the mass of an equal volume of water. (3)

4.2 Mass of paint = Empty container and paint – empty container✓
 $= 98 \text{ g} - 55 \text{ g}$
 $= 43 \text{ g}$ ✓
 Density of paint = $\frac{M}{V}$ ✓
 $= \frac{43}{75}$
 $= 0.57 \text{ g/cm}^3$ ✓✓ (5)

4.3 $D = \frac{\text{Density of timber block}}{\text{Density of water}}$

$$0,8 = \frac{\text{Density of timber block}}{1000 \text{ kg / m}^3} \checkmark$$

$$\text{Density of timber} = 0,8 \times 1\,000 \text{ kg/m}^3 \checkmark$$

$$\text{Density of timber} = \underline{800 \text{ kg/m}^3} \checkmark \rightarrow$$

$$\text{Density} = \frac{\text{Mass}}{\text{Volume}}$$

$$\text{Mass} = \text{Density} \times \text{volume} \checkmark$$

$$= 800 \text{ kg/m}^3 \times [4,5 \times 0,5 \times 0,8] \checkmark$$

$$= 800 \text{ kg/m}^3 \times 1,8$$

$$\text{Mass} = \underline{1\,440 \text{ kg}} \checkmark \rightarrow$$

(6)
[14]

QUESTION 5

- 5.1
- Softwoods
 - Hardwoods
- (2)

- 5.2 To prevent the timber from insect attack, fungi and decay. (2)

- 5.3
- | | | |
|-------|--------------------|--|
| 5.3.1 | Furniture beetle | |
| 5.3.2 | Powder-post beetle | |
| 5.3.3 | Longhorn beetle | |
| 5.3.4 | Termites | |
- (4 × 1½) (6)

5.4 $\%MC = \frac{IW - DW}{DW} \times 100 \checkmark$

$$\%MC = \frac{450 \text{ g} - 350 \text{ g}}{350 \text{ g}} \times 100 \checkmark$$

$$\%MC = \frac{100 \text{ g}}{350 \text{ g}} \times 100 \checkmark$$

$$\%MC = \underline{28,57\%} \checkmark \checkmark \rightarrow$$

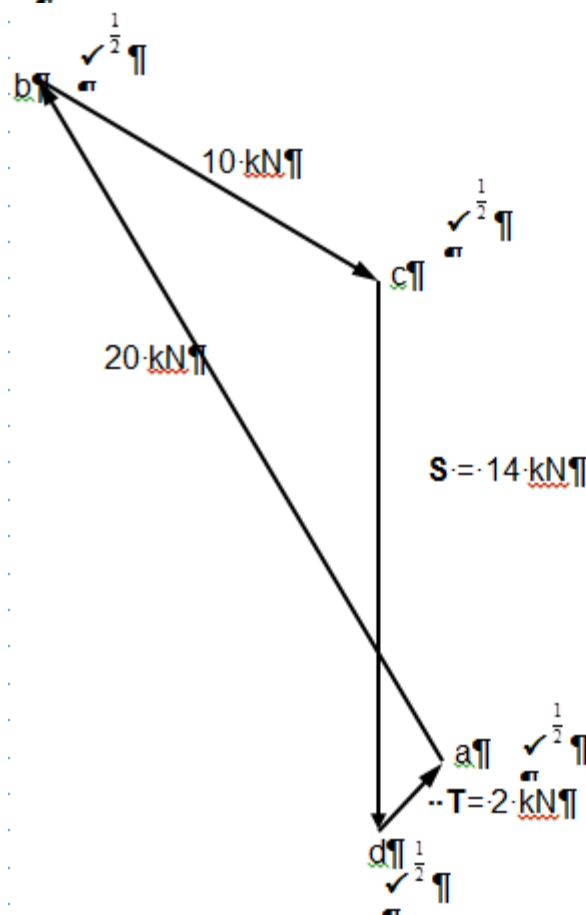
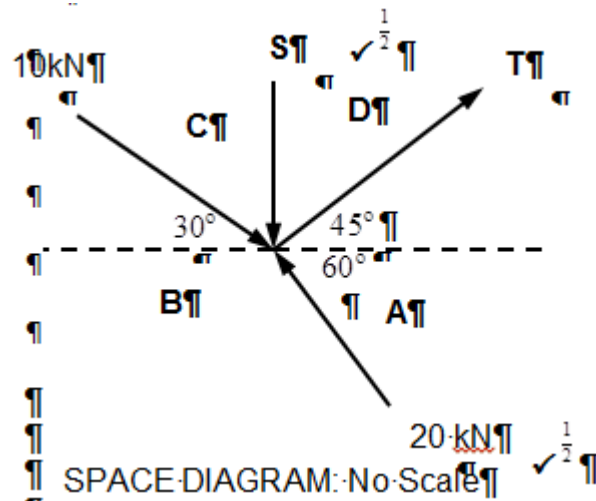
(5)
[15]

QUESTION 6

6.1 A number of forces lying on the same plane

(3)

6.2



$$\text{Force 'S'} = cd \sqrt{\frac{1}{2}}$$

$$cd = 7 \text{ cm} \sqrt{\frac{1}{2}}$$

$$\therefore S = 14 \text{ kN}$$

$$\text{Force 'T'} = da \sqrt{\frac{1}{2}}$$

$$da = 1 \text{ cm} \sqrt{\frac{1}{2}}$$

$$\therefore T = 2 \text{ kN}$$

No Scale to the Drawing
FORCE DIAGRAM
Scale $1 \text{ cm} = 2 \text{ kN}$

(8)

6.3 $HC = F \cos 45^\circ$

$$= 2 \text{ kN} \cos 45^\circ \checkmark$$

$$= \underline{1,41 \text{ kN}} \checkmark$$

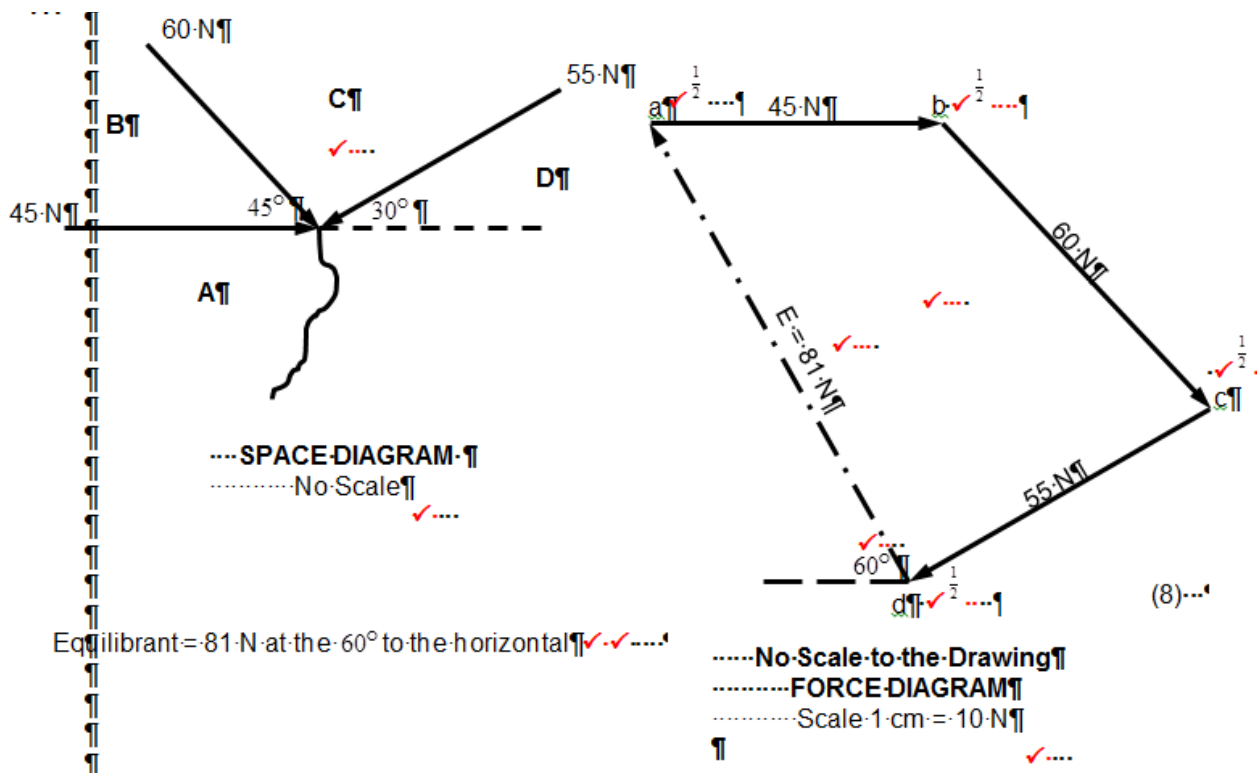
$VC = F \sin 45^\circ$

$$= 2 \text{ kN} \sin 45^\circ \checkmark$$

$$= \underline{1,41 \text{ kN}} \checkmark$$

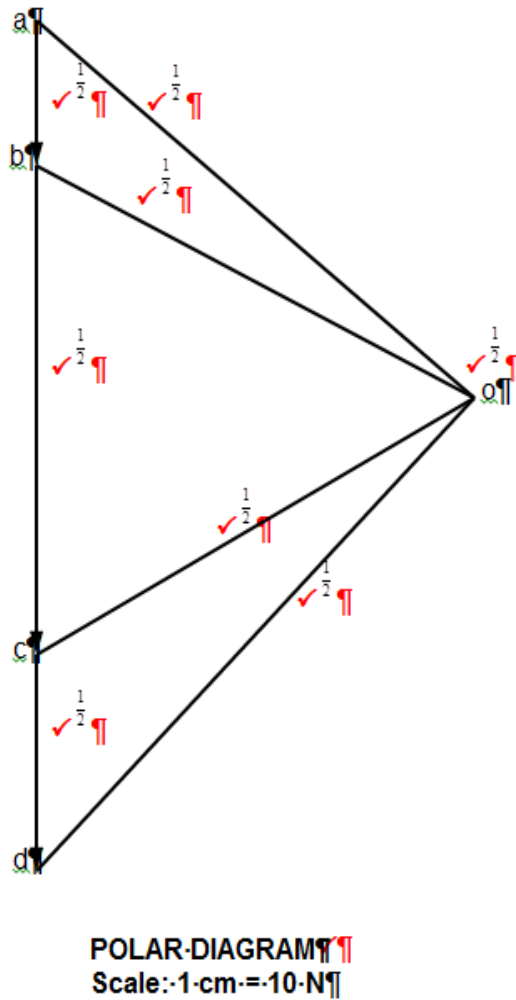
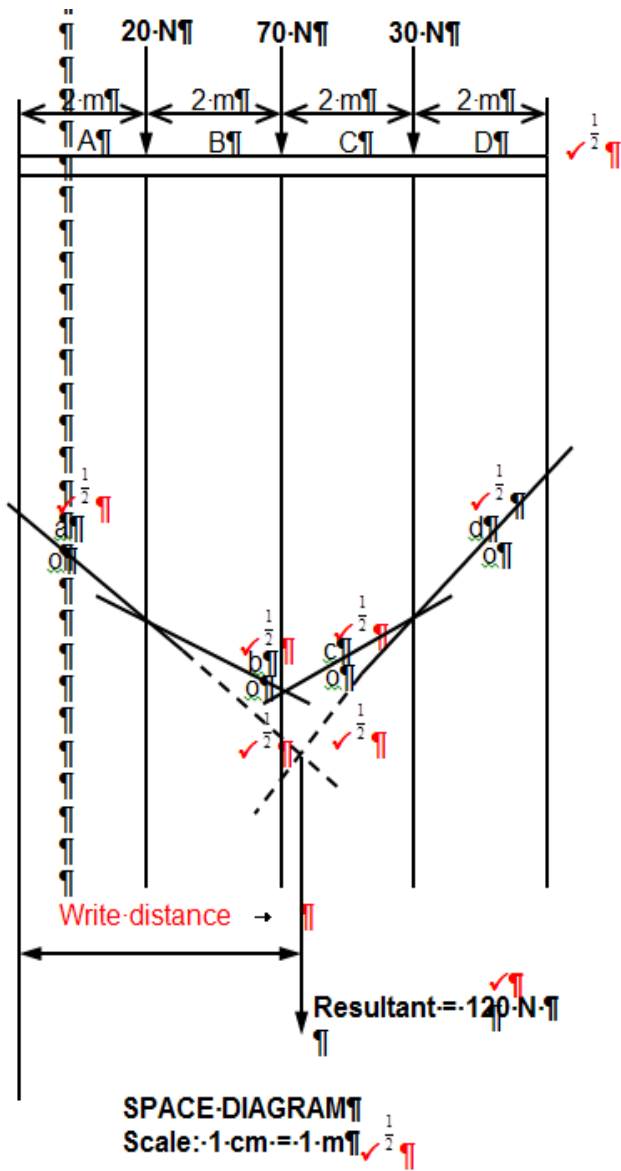
(4)
[15]

QUESTION 7



[10]

QUESTION 8



[10]

TOTAL: 100