higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

BUILDING SCIENCE N1

30 JULY 2019

This marking guideline consists of 7 pages.

QUESTION 1

1.1 Newton metre√ N.m√

1.2 Kelvin√ K√

1.3 Pascal√ Pa√

OR

Kilopascal√ kPa√

1.4 Square metre√ m^2√

OR

Square centimetre√ cm^2√

1.5 Kilogram√ kg√

OR

Gram√ g√

(10 × ½) **[5]**

QUESTION 2

2.1 Archimedes' principle states that the apparent loss of weight of a body when immersed in liquid is equal to the weight of the liquid displaced by the body. (3)

2.2 2.2.1

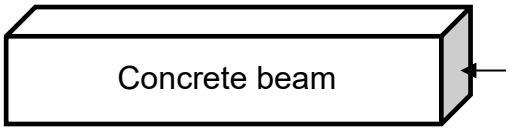
$$D = \frac{M}{V}$$

$$V = \frac{M}{D} \checkmark$$

$$V = \frac{850\,kg}{2550\,kg/m^3} \checkmark$$

$$V = 0{,}333\ m^3 \checkmark$$

2.2.2



Area of cross section = b × h√

Volume of beam = l × b × h

Therefore length of the beam = $\frac{V}{A}$ √

$= \frac{0.33}{0.2025}$ ✓

$= 1{,}63$ m✓

(2 × 3) (6)

2.3 $\text{Relative density} = \frac{density\ of\ a\ material}{density\ of\ water}$

(1)
[10]

QUESTION 3

3.1
- Cement
- Aggregate
- Water

(3)

3.2
- Composed of correct proportions of fine to coarse aggregates
- Correct cement-aggregate ratio
- Correct water-cement ratio
- Well-mixed
- Fully compacted
- Well-cured

(6)

3.3 3.3.1 Fine aggregate is the sand that will pass through a standard 5 mm sieve with square openings, e.g. river sand and crusher sand.

3.3.2 Coarse aggregate is crushed stone that must be clean, hard and strong and must not flake, disintegrate or expand when used in concrete.

(2 × 3) (6)

3.4 $\text{Water-cement ratio} = \frac{mass\ of\ water}{mass\ of\ cement}$ ✓

$= \frac{35}{50}$ ✓

$= 0{,}7$ ✓✓

(4)
[19]

QUESTION 4

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

4.2 $P_1V_1 = P_2V_2$ ✓

$P_2 = \frac{(6)(350)}{(3)}$ ✓

$P_2 = 700$ kPa✓ (3)

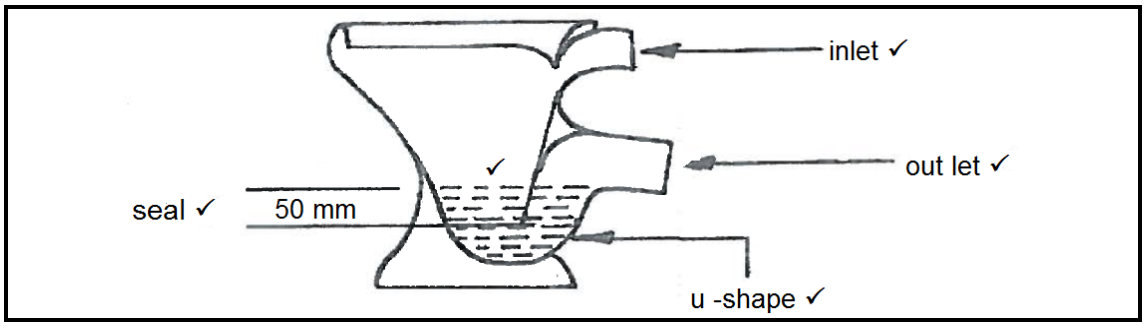
4.3 Density = R.D. × density of material

Density = 1,02 × 1 000 kg/m^3✓

= 1 020 kg/m^3✓

P = h × d × g
= 70 × 1 020 × 10✓
= 714 000 Pa✓
= 714 kPa✓ (5)

4.4



(5)
[16]

QUESTION 5

5.1
5.1.1 Medullary rays
5.1.2 Bark
5.1.3 Heartwood
5.1.4 Sapwood
5.1.5 Cambium layer
5.1.6 Pith
5.1.7 Growth rings
5.1.8 Outer bark

(8 × 1) (8)

5.2
- Food (either wood or some other organic substance)
- Moisture
- Oxygen
- Suitable temperature (4 × 2) (8)

[16]

QUESTION 6

6.1 The equilibrant of two or more forces is the single force that will bring these two or more forces to rest or balance them. (4)

6.2 6.2.1 Resultant = 550 N – 800 N✓
= -250 N downwards✓✓

6.2.2 Equilibrant = 550 N – 800 N✓
= +250 N upwards✓✓

(2 × 3) (6)

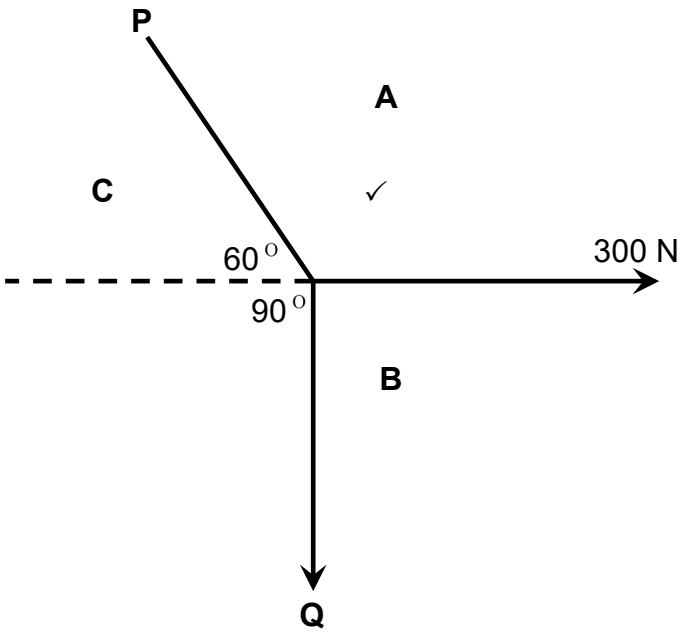
6.3 HC = Fcosθ✓ VC = Fsinθ✓

HC = 65cos30°✓ VC = 65sin30°✓

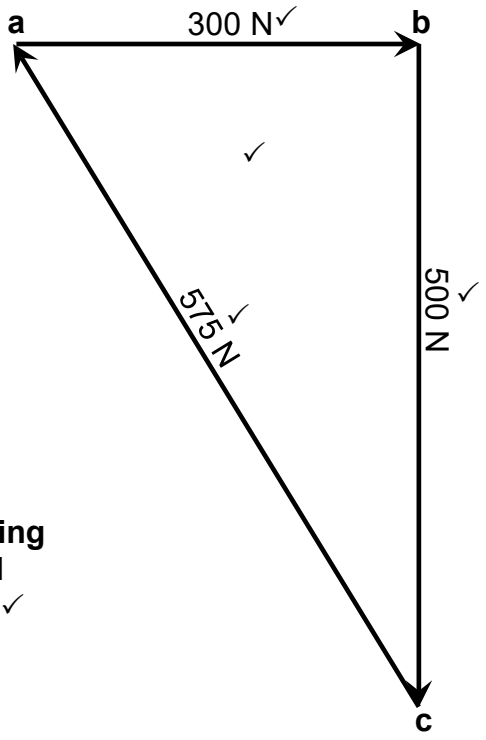
HC = 56,30 N✓ VC = 32,50 N✓ (6)

[16]

QUESTION 7



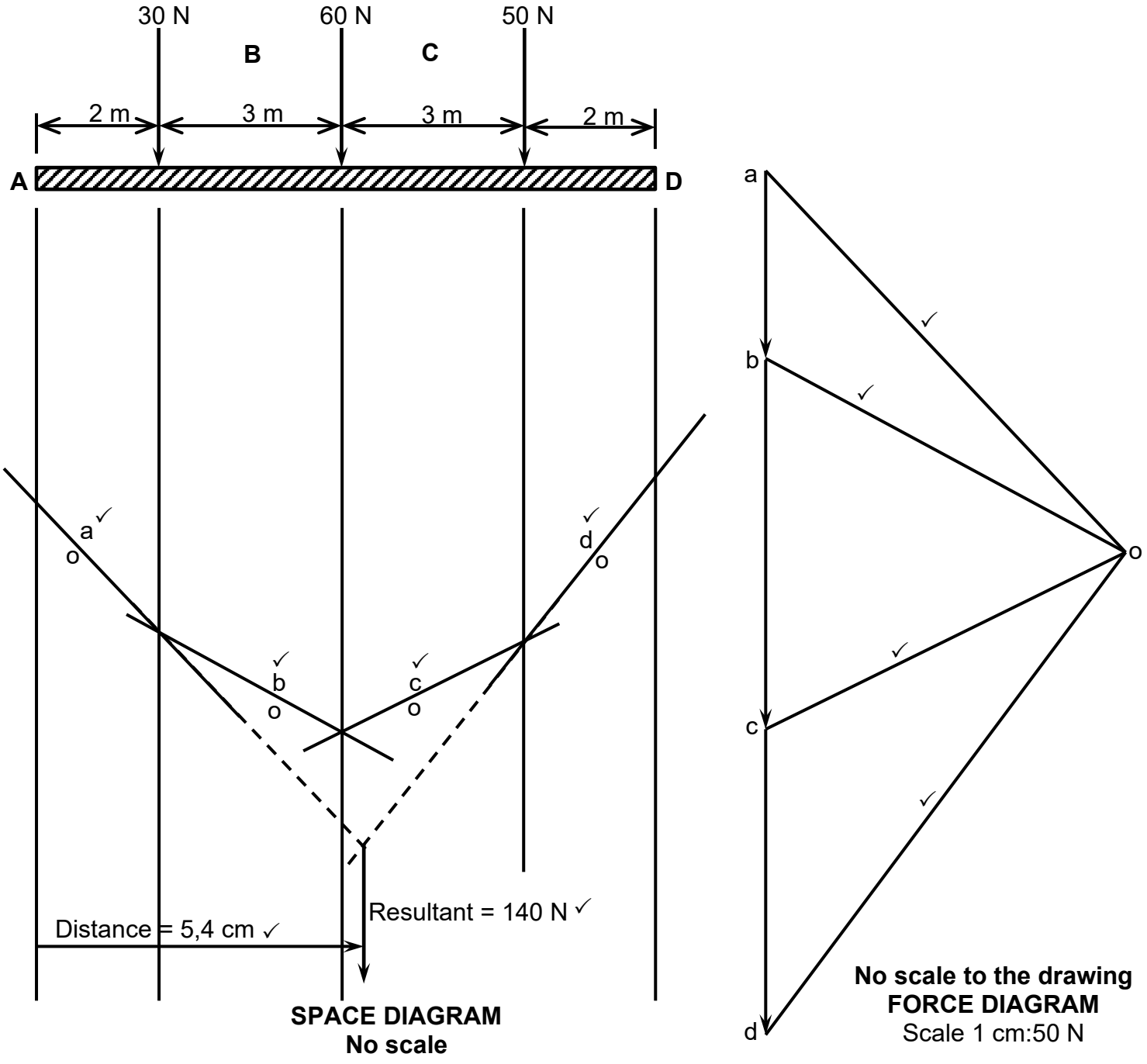
SPACE DIAGRAM
No scale ✓



No scale to the drawing
FORCE DIAGRAM
Scale 1 cm:50 N ✓✓

[8]

QUESTION 8



[10]

TOTAL: 100