



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

**NATIONAL CERTIFICATE
BUILDING SCIENCE N1**

26 JULY 2018

This marking guideline consists of 8 pages.

QUESTION 1

- 1.1 1.1.1 $\text{Area} = \pi(\text{radius})^2 \checkmark$
 $= 3,142 \times (25)^2 \checkmark$
 $= 1\,963,50 \text{ cm}^2 \checkmark$ (3)
- 1.1.2 $\text{Volume} = \text{area of base} \times \text{height}$
 $= \pi \left(\frac{D}{4} \right)^2 \times h \checkmark$
 $= 3,142 \left(\frac{30}{4} \right)^2 \times 95 \checkmark$
 $= 16\,790,06 \text{ m}^3 \checkmark$ (3)
- 1.2 1.2.1 Kilogram per cubic metre (kg/m^3 or kg.m^{-3})
- 1.2.2 Pascal (Pa)
OR
Kilopascal (kPa)
- 1.2.3 Newton metre (N.m)
- 1.2.4 Kelvin (K)
- (4 × 1) (4)
[10]

QUESTION 2

- 2.1 The mass per unit volume of a substance is called its density and is expressed in g/cm^3 or kg/m^3 . (3)
- 2.2
 - Malthoid
 - PVC
 - Bitumen-impregnated
(3)

2.3 Volume = length × breadth × height ✓

$$= 4,2 \times 0,052 \times 0,215 \checkmark$$

$$= 0,047 \text{ m}^3 \checkmark$$

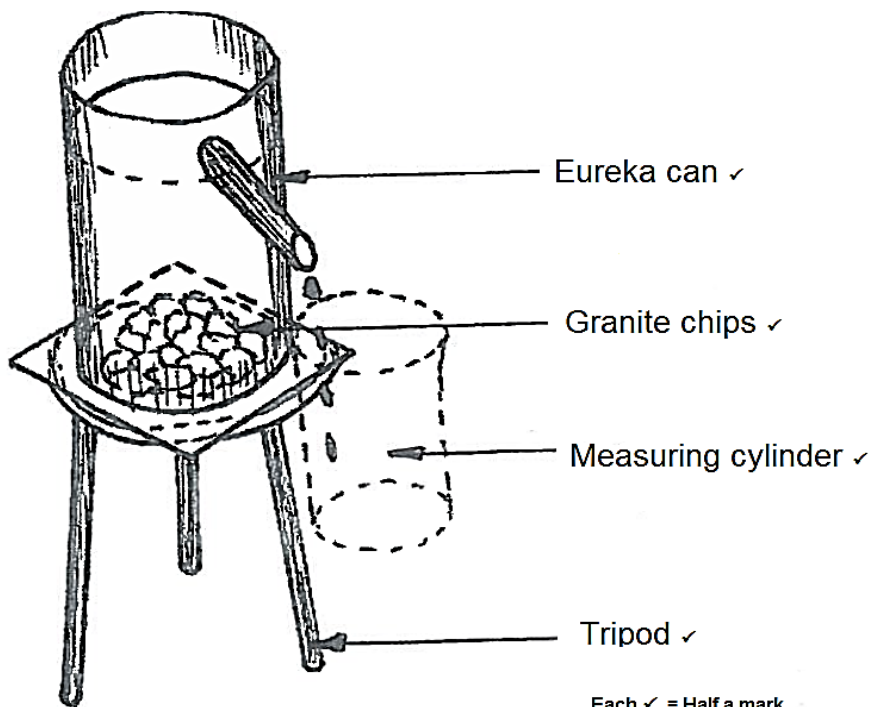
$$\text{Density} = \frac{\text{Mass}}{\text{Volume}} \checkmark$$

$$= \frac{51,6 \text{ kg} \checkmark}{0,047 \text{ m}^3}$$

$$= 1\,097,87 \text{ kg/m}^3 \checkmark$$

(6)

2.4



Place the Eureka can on a tripod and fill it with water up to the spout. Place the measuring cylinder under the spout and gently lower the granite chips into the water. The displaced water will begin to run down the spout into the measuring cylinder. The quantity of displaced water is measured in the cylinder and noted. This measurement will be the volume of the granite chips.

(6)
[18]

QUESTION 3

- 3.1
- Portland cement
 - Aggregate (fine and coarse)
 - Water

(3)

3.2 During wet weather especially it is difficult to obtain batches of concrete that are uniform when the fine aggregate is measured by volume due to the increase in volume, known as bulking of the sand, that occurs when it is in moist condition. (3)

3.3 1 litre of water = 1 kg

Therefore 50 litres = 50 kg✓

$$\text{Water-cement ratio} = \frac{\text{Mass of water}}{\text{Mass of cement}} \checkmark$$

$$= \frac{45 \text{ kg}}{50 \text{ kg}} \checkmark$$

$$= 0,9 \checkmark$$

(4)
[10]

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 $^{\circ}\text{C} = \text{K} - 273$

$$= 295 - 273 \checkmark$$

$$= 22 \text{ }^{\circ}\text{C} \checkmark$$

(2)

4.3 $P_1 V_1 = P_2 V_2 \checkmark$

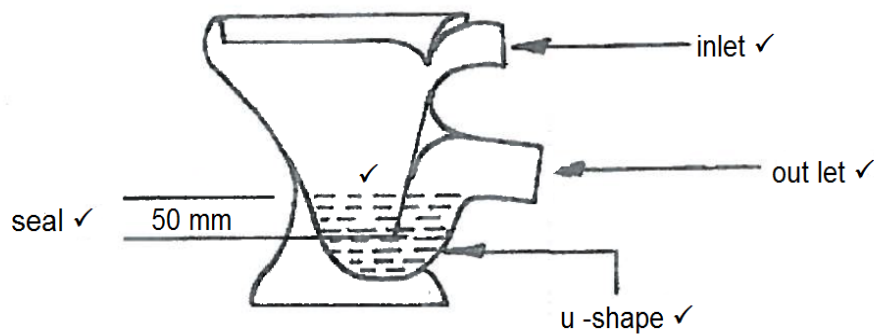
$$V_2 = \frac{P_1 V_1}{P_2} \checkmark$$

$$V_2 = \frac{(280)(7)}{650} \checkmark \checkmark$$

$$V_2 = 3 \text{ m}^3 \checkmark \checkmark$$

(6)

4.4

(5)
[16]**QUESTION 5**

5.1 5.1.1 Seasoning is the process of drying out a certain amount of moisture from cells and cell walls.

5.1.2 Conversion is the process of sawing logs into planks and boards.

5.1.3 Preservation is the poisoning of food on which fungi and insects live.

(3 × 2) (6)

- 5.2
- Sodium fluoride
 - Magnesium silicofluoride
 - Mercuric chloride
 - Zinc chloride
- (4)

5.3 Moisture content (%) = $\frac{\text{original weight} - \text{dry weight}}{\text{dry weight}} \times 100$ ✓

$$= \frac{985 - 814}{814} \times 100$$
✓✓

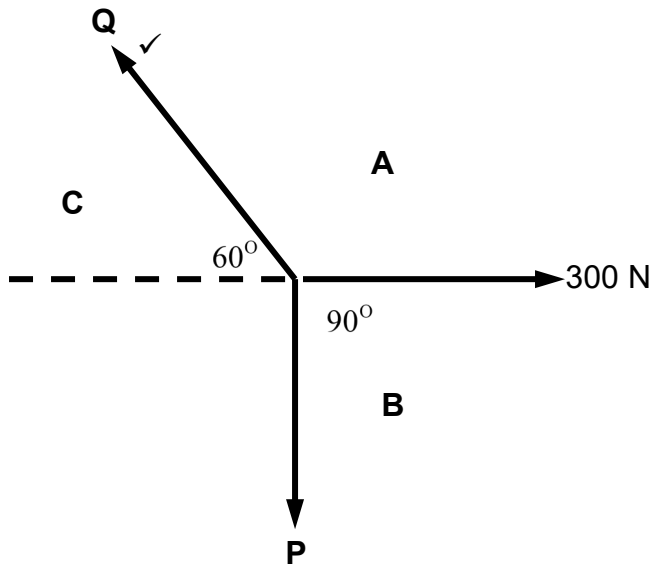
$$= 21\%$$
✓

(4)
[14]

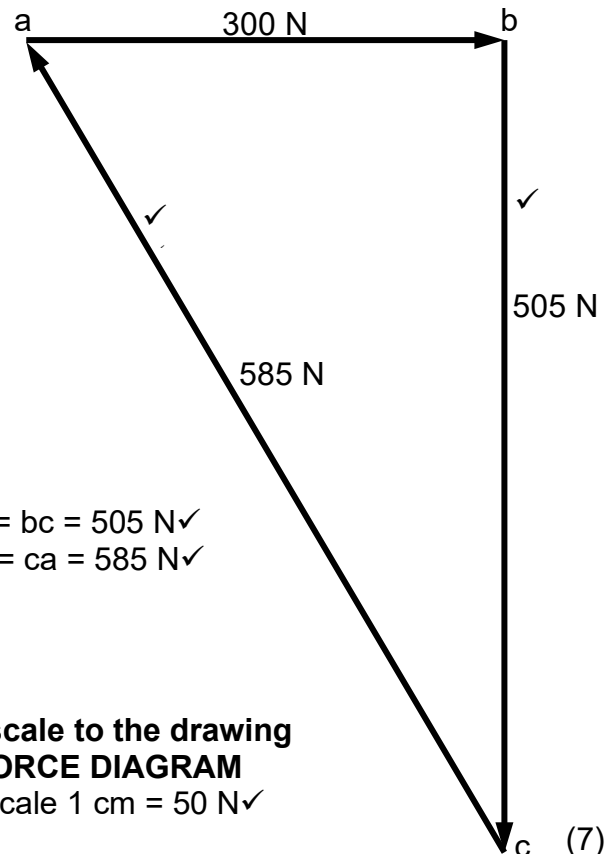
QUESTION 6

6.1 A number of forces lying on the same plane are called coplanar forces. (3)

6.2



SPACE DIAGRAM
No scale✓



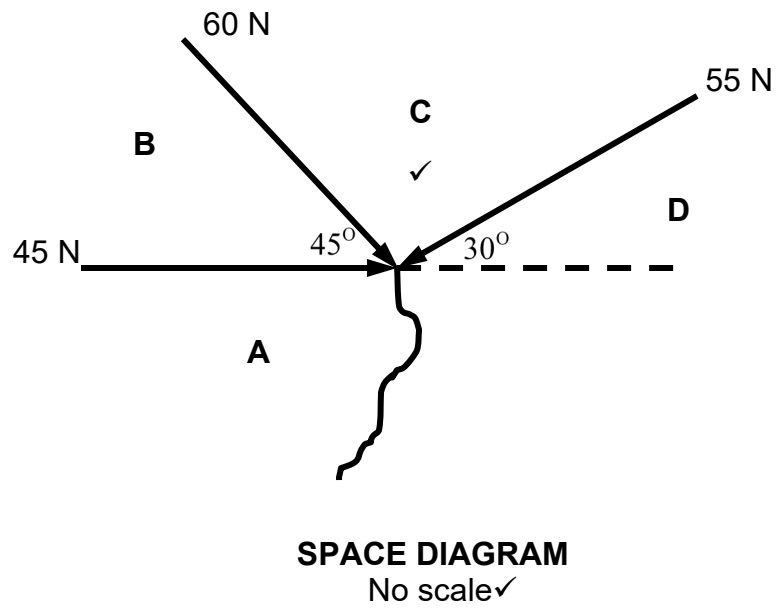
$$P = bc = 505 \text{ N}✓$$

$$Q = ca = 585 \text{ N}✓$$

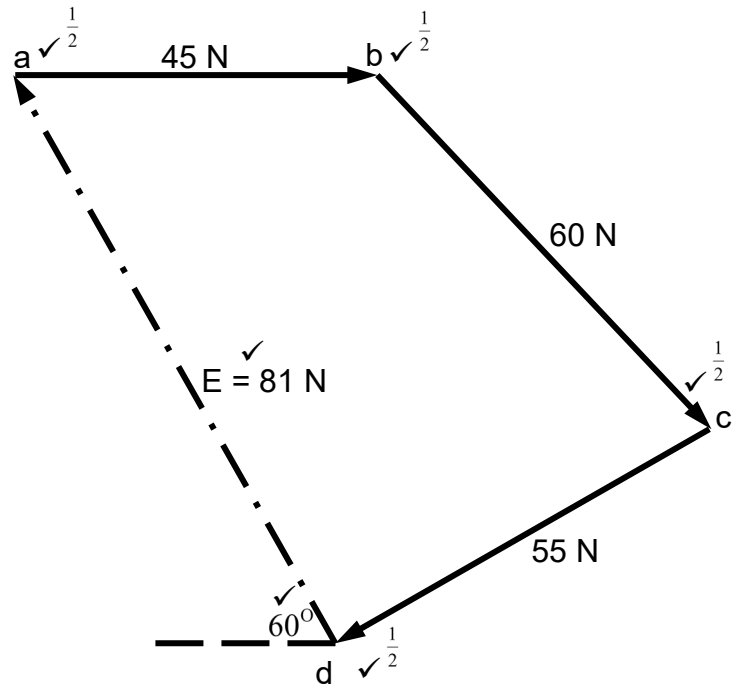
No scale to the drawing
FORCE DIAGRAM
Scale 1 cm = 50 N✓

(7)
[10]

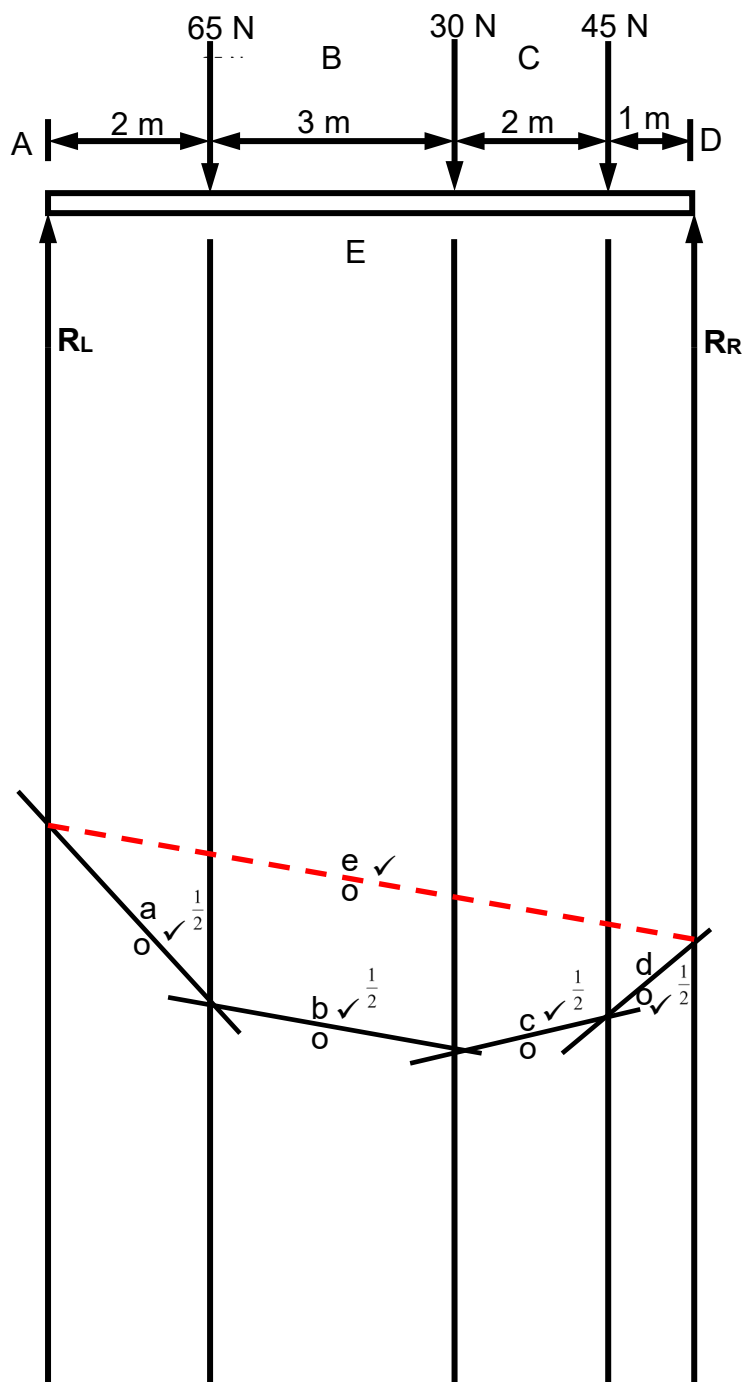
QUESTION 7



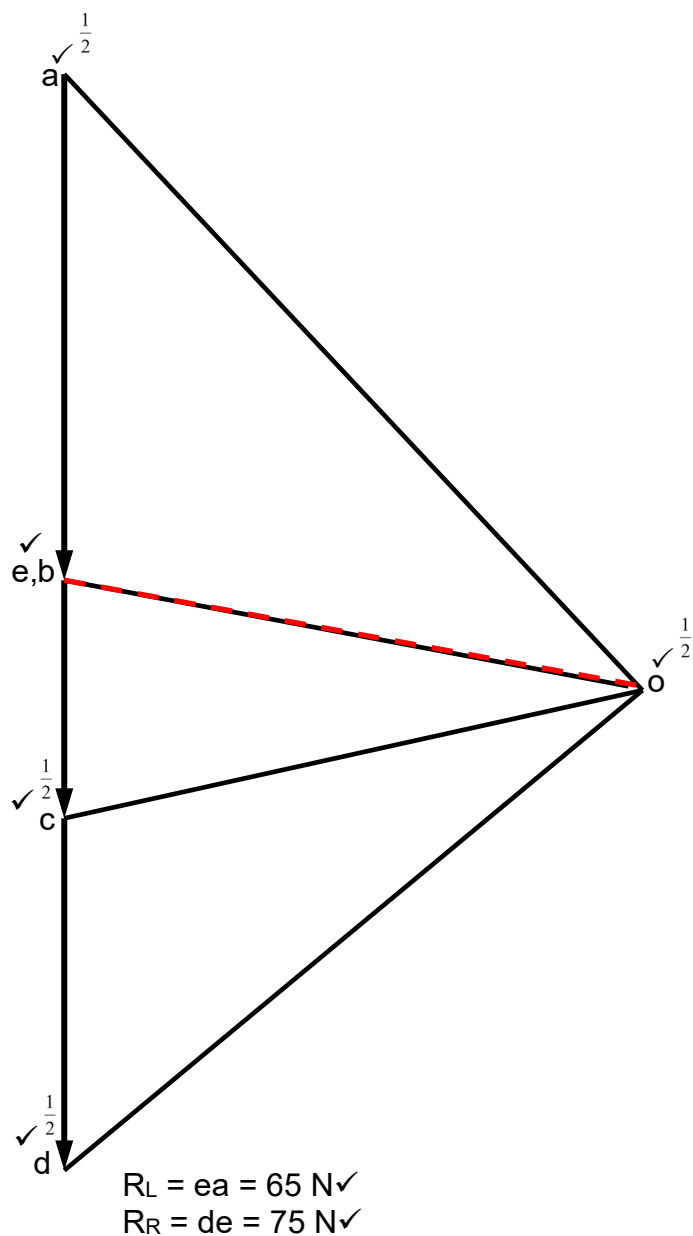
Equilibrant = 81 N at the 60° to the horizontal ✓



[12]

QUESTION 8

SPACE DIAGRAM
Scale 1 cm = 1 m✓



No scale to the drawing
POLYGON DIAGRAM

Scale 1 cm = 10 N✓

[10]

TOTAL : 100