higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

BUILDING SCIENCE N1

17 November 2022

This marking guideline consists of 7 pages.

MJ

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QUESTION 1

1.1 Length
1.2 Force
1.3 Pressure
1.4 kPa
1.5 Square metre
1.6 Thermodynamic temperature
1.7 K
1.8 Litre
1.9 l
1.10 N.m

(10 × 1) **[10]**

QUESTION 2

2.1 The mass per unit volume of a substance/material and is expressed in g/cm^3 or kg/m^3.

OR

The quantity of matter packed together in a volume and is expressed in g/cm^3 or kg/m^3. (3)

2.2
$$D=\frac{M}{V} \checkmark$$
$$D\times V=\frac{M}{V}\times V \checkmark$$
$$M=D\times V \checkmark$$
$$=13,8\,g/cm^3\times 15\,cm^3 \checkmark$$
$$=207\,g$$
$$=0,207\,kg \checkmark\checkmark$$
(6)

2.3
$$R.D=\frac{Density\ of\ a\ Material}{Density\ of\ Water} \checkmark$$
(1)
[10]

QUESTION 3

3.1

$$Water:Cement\ Ratio = \frac{Mass\ of\ Water}{Mass\ of\ Cement}\ \checkmark$$

$$Mass\ of\ Water = Water:Cement\ Ratio \times Mass\ of\ Cement\ \checkmark$$

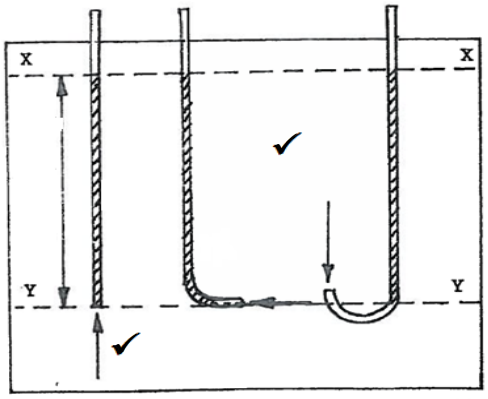
$$= 0,04 \times 100\ kg\ \checkmark$$

$$= 4\ kg$$

$$\therefore Amount\ of\ Water = 4\ litres\ \checkmark$$

(4)

3.2



Method

Pour coloured liquid into the three glass tubes until the liquid is the same height in all three.✓ Then place the tubes in the large glass container with water, so that their openings are all the same depth.✓
If the difference in height between X and Y is measured for each tube, it will be found that it is the same in all three tubes.✓ This proves that the upward, downward and sideways pressure in liquids is the same at the same depth.✓

(6)

3.3 Good quality of the materials
Correct proportions of fine to coarse aggregates
Correct cement/aggregate ratio
Correct water/cement ratio
Well mixed
Fully compacted
Well cured

(7 × 1) (7)

[17]

QUESTION 4

4.1 The volume of a given mass of gas is inversely proportional to the pressure exerted on it, provided that the temperature remains constant.

OR

If the temperature of a given mass of gas is kept constant, then the volume of a gas is inversely proportional to its pressure. (4)

4.2 $P_1V_1 = P_2V_2$ ✓

$V_2 = \frac{P_1V_1}{P_2}$ ✓

$= \frac{(280)(6)}{400}$ ✓ ✓

$= 4,2\,m^3$ ✓✓ (6)

4.3 $K = {}^\circ C + 273$

$= 75 + 273$ ✓

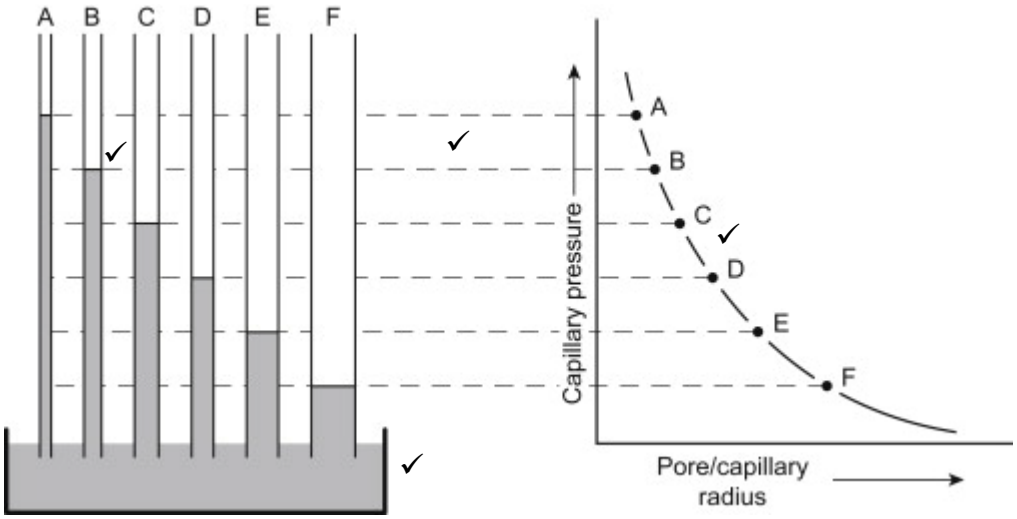
$= 348\,K$ ✓ (2)

[12]

QUESTION 5

5.1 A material is said to be porous when its mass is not solid throughout, but contains a certain amount of air space. (3)

5.2



Method
The glass tubes are placed in order of bore size, through a supporting stand, with one end of each tube in the bowl of coloured water. Provided the inside of the tube is perfectly clean, it will be observed that the water rises some distance up each tube.✓✓✓✓ (8)

5.3 $$Percentage\ Porosity = \frac{Wet\ Block - Dry\ Block}{Dry\ Block} \times 100$$ ✓

$$= \frac{5,5 - 4,8}{4,8} \times 100$$ ✓

$$= \frac{0,7}{4,8} \times 100$$ ✓

$$= 15\%$$ ✓

(4)
[15]

QUESTION 6

6.1 $6,3\,kN \times 1000 = 6300\,N$

6.1.1 Resultant

$6300\,N - 3150\,N$ ✓

$= 3150 \leftarrow$ ✓

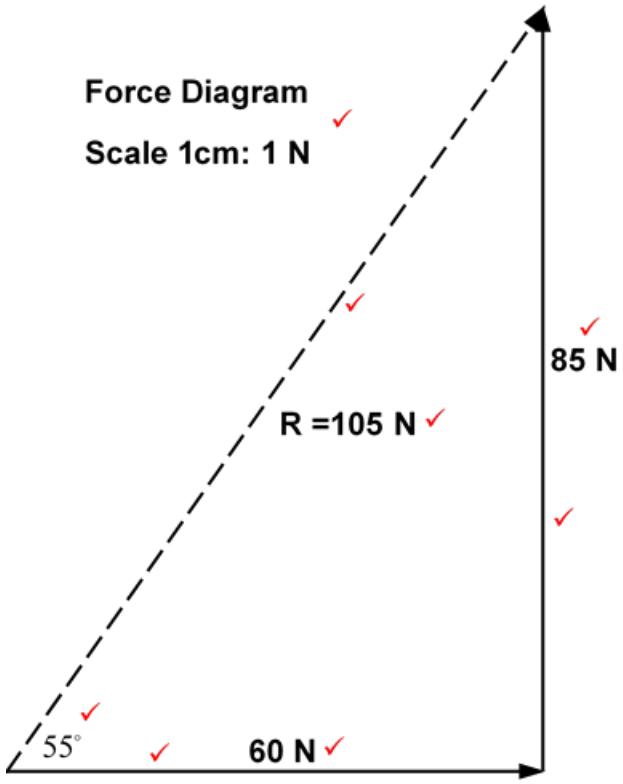
6.1.2 Equilibrant

$6300\,N - 3150\,N$ ✓

$= 3150 \rightarrow$ ✓

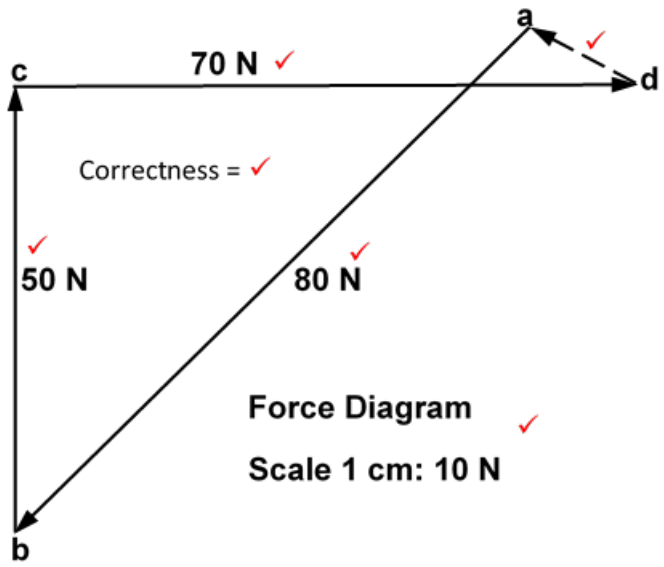
(2 × 2) (4)

6.2



(8)
[12]

QUESTION 7



Equilibrant = da =14 N at 30° N of W ✓✓

$HC = F \cos \theta$

$= 14 \cos 30^\circ$ ✓

$= 12,12\ N$ ✓

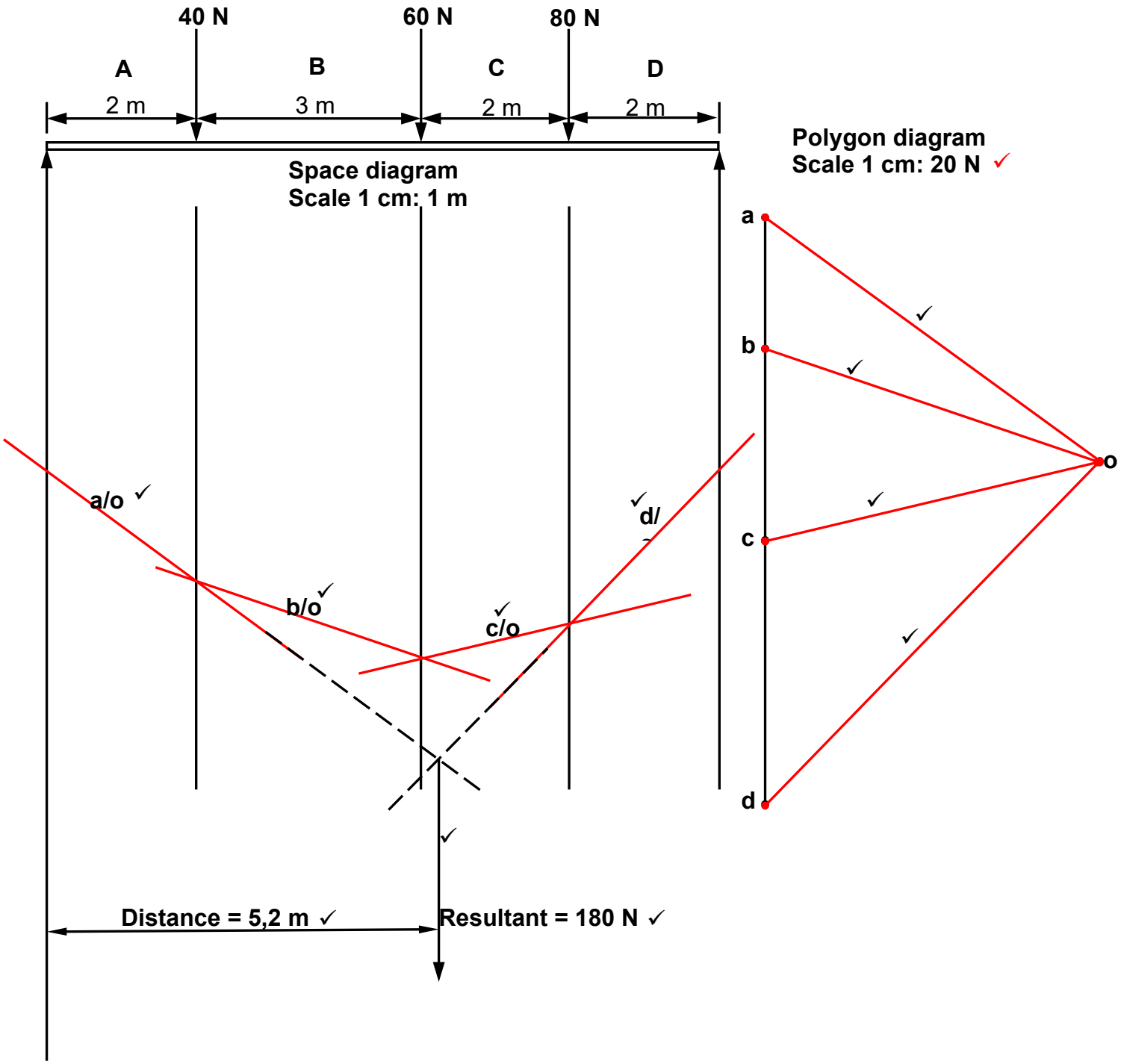
$VC = F \sin \theta$

$= 14 \sin 30^\circ$ ✓

$= 7\ N$ ✓

[12]

QUESTION 8



[12]

TOTAL: 100

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