



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

BUILDING SCIENCE N2

31 July 2026

This marking guideline consists of 7 pages.

QUESTION 1

- 1.1 E
- 1.2 J
- 1.3 G
- 1.4 A
- 1.5 I
- 1.6 B
- 1.7 F
- 1.8 D
- 1.9 H
- 1.10 C

(10 × 1) [10]

QUESTION 2

2.1 2.1.1 The rising of liquids, such as water and oil, through the fine pores of certain solid substances.

2.1.2 A state in which all the pores or voids of a material are filled with water.

(2 × 2) (4)

- 2.2
- Rustproof
 - Lightweight
 - Fireproof
 - Flexible
 - Hail-resistant
 - Low coefficient of expansion

(Any 3 × 1) (3)

- 2.3
- Durable
 - Waterproof if laid correctly
 - Non-corrosive
 - Fire-resistant
 - Attractive
 - Rustproof
 - Fairly hail-resistant

(Any 3 × 1) (3)

[10]

QUESTION 3

3.1 Mass of liquid = $60 - 32 \text{ g}$
 $= 28 \text{ g} \checkmark$
 Mass of water = $63,58 - 32 \text{ g}$
 $= 31,58 \text{ g} \checkmark$

Relative density = $\frac{\text{Mass of liquid}}{\text{Mass of an equal volume of water}} \checkmark$
 $= \frac{28 \text{ g}}{31,58 \text{ g}} \checkmark$
 $= 0,88 \checkmark$

(5)

- 3.2
- Conduction
 - Convection
 - Radiation

(3)

3.3 Heat required = $m \times \text{s.h.c} \times t_c \checkmark$

$\text{s.h.c} = \frac{\text{heat required}}{m \times t_c} \checkmark$

$= \frac{101,2}{10 \times (32 - 10)} \checkmark$

$= \frac{101,2 \text{ kJ}}{10 \text{ kg} \times 22 \text{ }^\circ\text{C}} \checkmark$

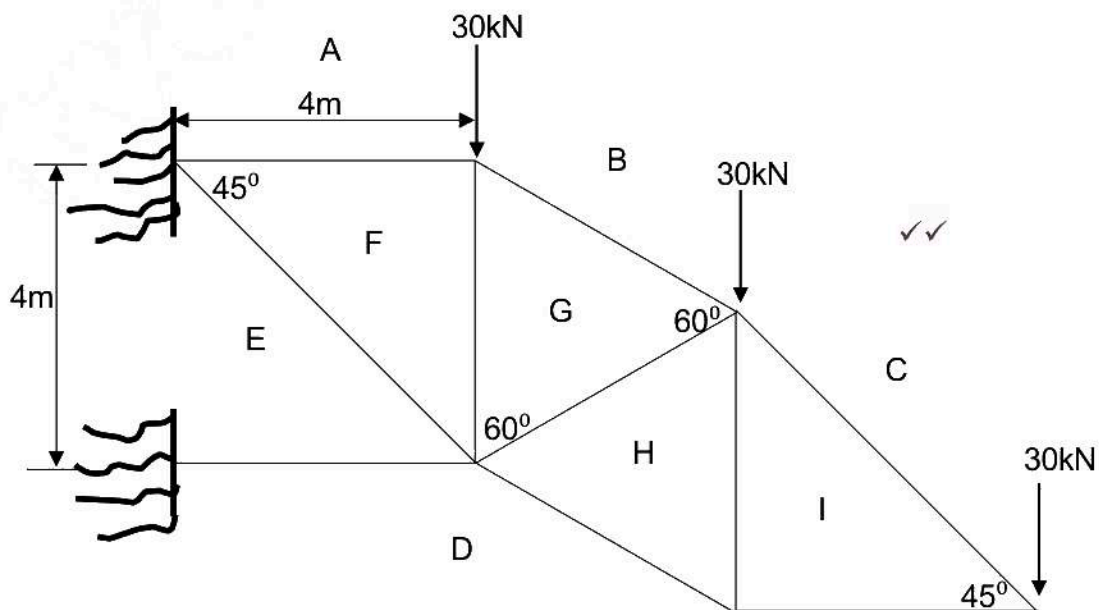
$= 0,460 \text{ KJ / kg } ^\circ\text{C} \checkmark \checkmark$

(6)

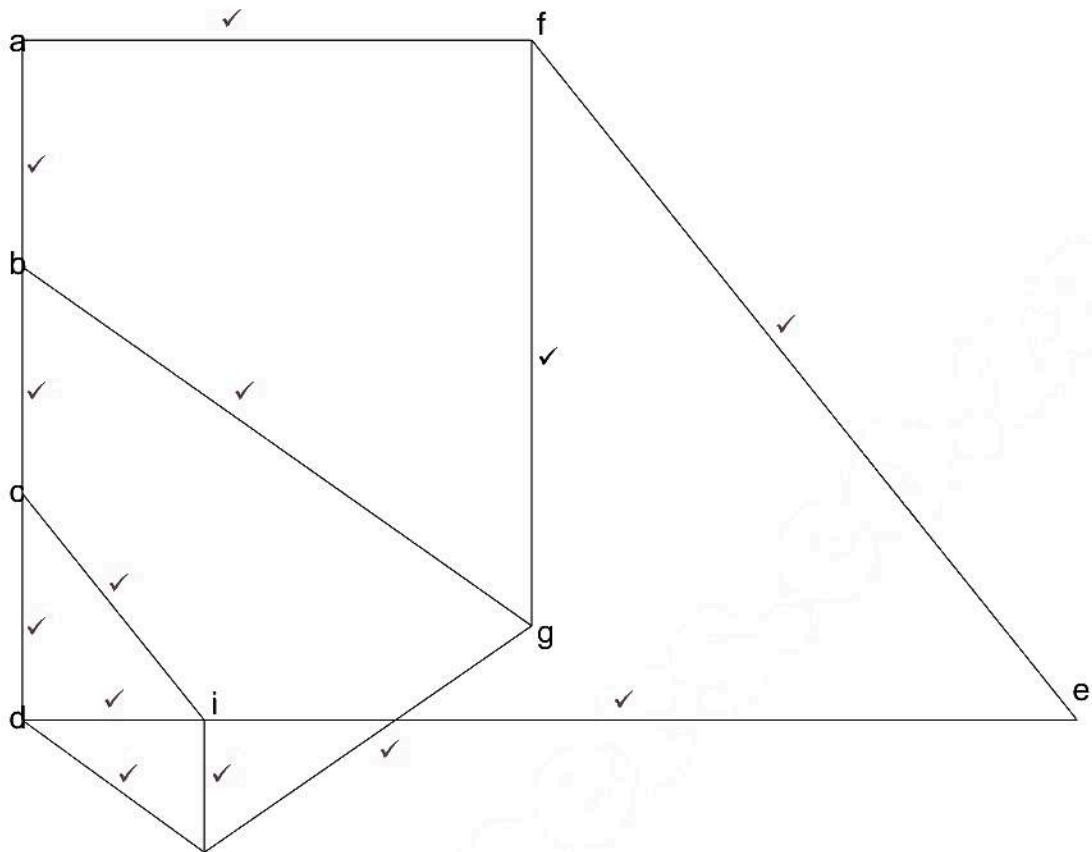
[14]

QUESTION 4

4.1



4.2



(13)

4.3

MEMBER	MAGNITUDE	NATURE
BG	9 6kN✓	Tie✓
GF	77,5 kN✓	Strut✓
CI	43 kN✓	Tie✓
IH	17,5 kN✓	Tie✓
HG	62,5 kN✓	Strut✓
DH	35 kN✓	Strut✓
DE	174 kN✓	Strut✓
EF	127 kN✓	Tie✓
FA	84 kN✓	Tie✓
DI	30 kN✓	Strut✓

(20 × ½)

(10)
[25]

QUESTION 5

5.1

	5.1	5.2	5.3
MEMBER	AREA	DISTANCE	AREA × DISTANCE
1	$80 \times 40 = 3\,200 \text{ mm}^2 \checkmark$	$40 \text{ mm} \checkmark$	$3\,200 \text{ mm}^2 \times 40 \text{ mm} = 128\,000 \text{ mm}^3 \checkmark$
2	$\pi r^2 = \pi (10)^2 = -314,159 \text{ mm}^2 \checkmark$	$30 \text{ mm} \checkmark$	$-314,159 \text{ mm}^2 \times 30 \text{ mm} = -9\,424,77 \text{ mm}^3 \checkmark$
3	$\frac{1}{2} \times 40 \times 30 = 600 \text{ mm}^2 \checkmark$	$90 \text{ mm} \checkmark$	$600 \text{ mm}^2 \times 90 \text{ mm} = 54\,000 \text{ mm}^3 \checkmark$
TOTAL	$= 3\,485,841 \text{ mm}^2 \checkmark$		$= 172\,575,23 \text{ mm}^3 \checkmark \checkmark$

OR

Total area of the compound section:

5.1 Area 1 $80 \times 40 = 3\,200 \text{ mm}^2 \checkmark$

Area 2 $= \pi r^2 = \pi (10)^2 = -314,159 \text{ mm}^2 \checkmark$

Area 3 $= \frac{1}{2} \times 40 \times 30 \checkmark = 600 \text{ mm}^2 \checkmark$

(4)

5.2 D1 Distance of the centroid:
 $40 \text{ mm} \checkmark$

D2 $30 \text{ mm} \checkmark$

D3 $90 \text{ mm} \checkmark$

(3)

5.3 Sum of the moments of the section:

Area 1 X distance
 $3\,200 \text{ mm}^2 \times 40 \text{ mm} = 128\,000 \text{ mm}^3 \checkmark$

Area 2 $-314,159 \text{ mm}^2 \times 30 \text{ mm} = -9\,424,77 \text{ mm}^3 \checkmark$

Area 3 $600 \text{ mm}^2 \times 90 \text{ mm} = 54\,000 \text{ mm}^3 \checkmark$

Therefore:

Total area × distance $= 172\,575,23 \text{ mm}^3 \checkmark \checkmark$

(5)

5.4 $y = \frac{(\text{Total area} \times \text{Distance})}{\text{Total area}}$ ✓

$y = \frac{172\,575,23 \text{ mm}^3}{3\,485,841 \text{ mm}^2}$ ✓

$y = 49,507 \text{ X-X}$ ✓✓

(4)
[16]

QUESTION 6

6.1

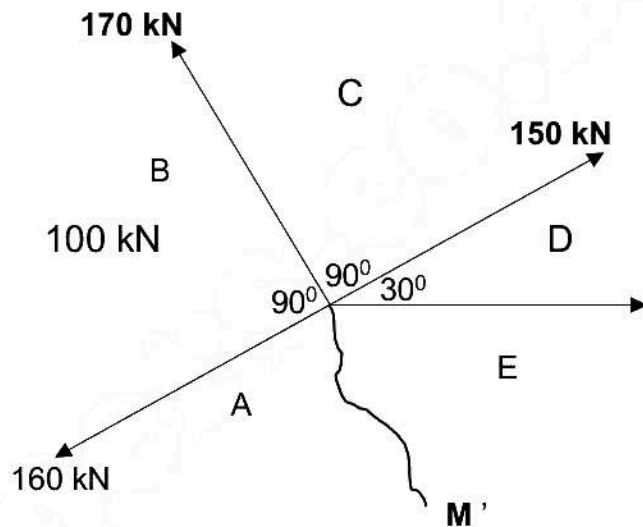
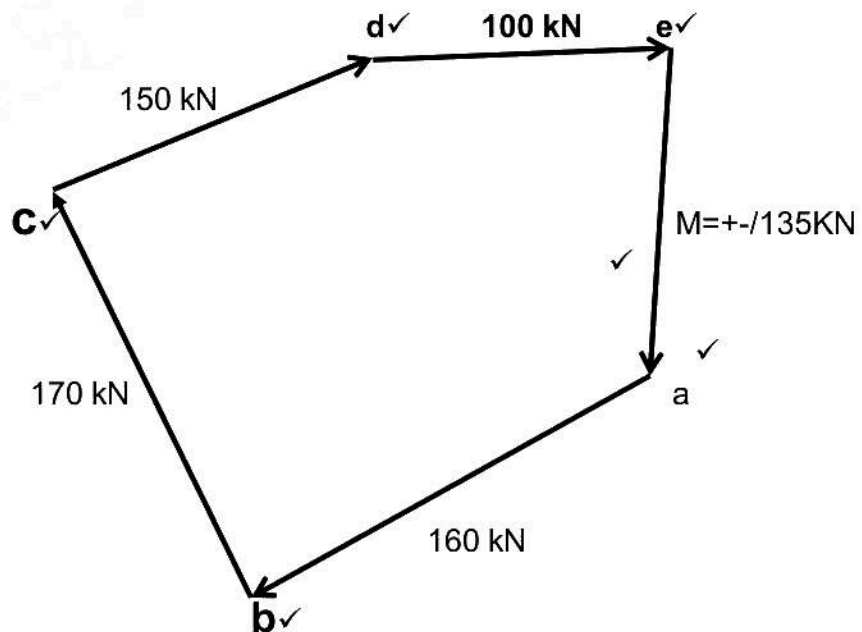


FIGURE 3

Bow's notation ✓✓
Space diagram ✓

(3)

6.2



$M = 138 \text{ kN}$ ✓ @ 87° ✓ south of west ✓

(1)

QUESTION 7

7.1 Taking moments about R_R to calculate the magnitude of R_L :

$$\sum \text{CW Moments} = \sum \text{ACW Moments} \checkmark$$

$$(R_L \times 8) = (65 \times 9) + (15 \times 4 \times 7) + (42 \times 3) + (40 \times 3 \times 1,5) \checkmark$$

$$(R_L \times 8) = 585 + 420 + 126 + 180 \checkmark$$

$$R_L = \frac{1\,311}{8} \checkmark$$

$$R_L = 163,875 \text{ kN} \checkmark \quad (5)$$

7.2 Take moments about R_L to calculate the magnitude of R_R :

$$\sum \text{ACW Moments} = \sum \text{CW Moments} \checkmark$$

$$(R_R \times 8) + (65 \times 1) = (15 \times 4 \times 1) + (42 \times 5) + (40 \times 3 \times 6,5) \checkmark$$

$$(R_R \times 8) = 60 + 210 + 780 - 65 \checkmark$$

$$R_R = \frac{985}{8} \checkmark$$

$$R_R = 123,125 \text{ kN} \checkmark \quad (5)$$

7.3 Test the answer to prove equilibrium:

$$\sum \text{Upwards forces} = \sum \text{Downwards forces}$$

$$(163,875 \text{ kN} + 123,125 \text{ kN}) \checkmark = (65 \text{ kN} + 60 \text{ kN} + 42 \text{ kN} + 120 \text{ kN}) \checkmark$$

$$287 \text{ kN} = 287 \text{ kN} \checkmark \quad (3)$$

[13]

TOTAL: 100