POSSIBLE ANSWERS FOR / MOONTLIKE ANTWOORDE VIR :

WELDING AND METALWORKING SG 716-2/0
SWEIS- EN METAALBEWERKING SG 716-2/0

1.1.1	TRUE	WAAR
1.1.2	TRUE	WAAR
1.1.3	FALSE	ONWAAR
1.1.4	TRUE	WAAR
1.1.5	TRUE	WAAR
1.1.6	FALSE	ONWAAR
1.1.7	FALSE	ONWAAR
1.1.8	TRUE	WAAR
1.1.9	TRUE	WAAR
1.1.10	TRUE	WAAR
1.1.11	FALSE	ONWAAR
1.1.12	FALSE	ONWAAR
1.1.13	FALSE	ONWAAR
1.1.14	TRUE	WAAR
1.1.15	FALSE	ONWAAR
1.1.16	FALSE	ONWAAR
1.1.17	FALSE	ONWAAR
1.1.18	TRUE	WAAR
1.1.19	FALSE	ONWAAR
1.1.20	TRUE	WAAR

20 X 1= [20]

1.2.1	K
1.2.2	O
1.2.3	A
1.2.4	L
1.2.5	B
1.2.6	C
1.2.7	E
1.2.8	D
1.2.9	M
1.2.10	F
1.2.11	H
1.2.12	I
1.2.13	N
1.2.14	J
1.2.15	G
1.2.16	T
1.2.17	S
1.2.18	P
1.2.19	Q
1.2.20	R

20 X 1= [20]

QUESTION 2.1

FOR RR

$(R \times 10m) = (20N \times 2,5m) + (10N \times 5m) + (20N \times 7,5m)$ ✓

$10mR = 250Nm$

$R = 25N$ ✓

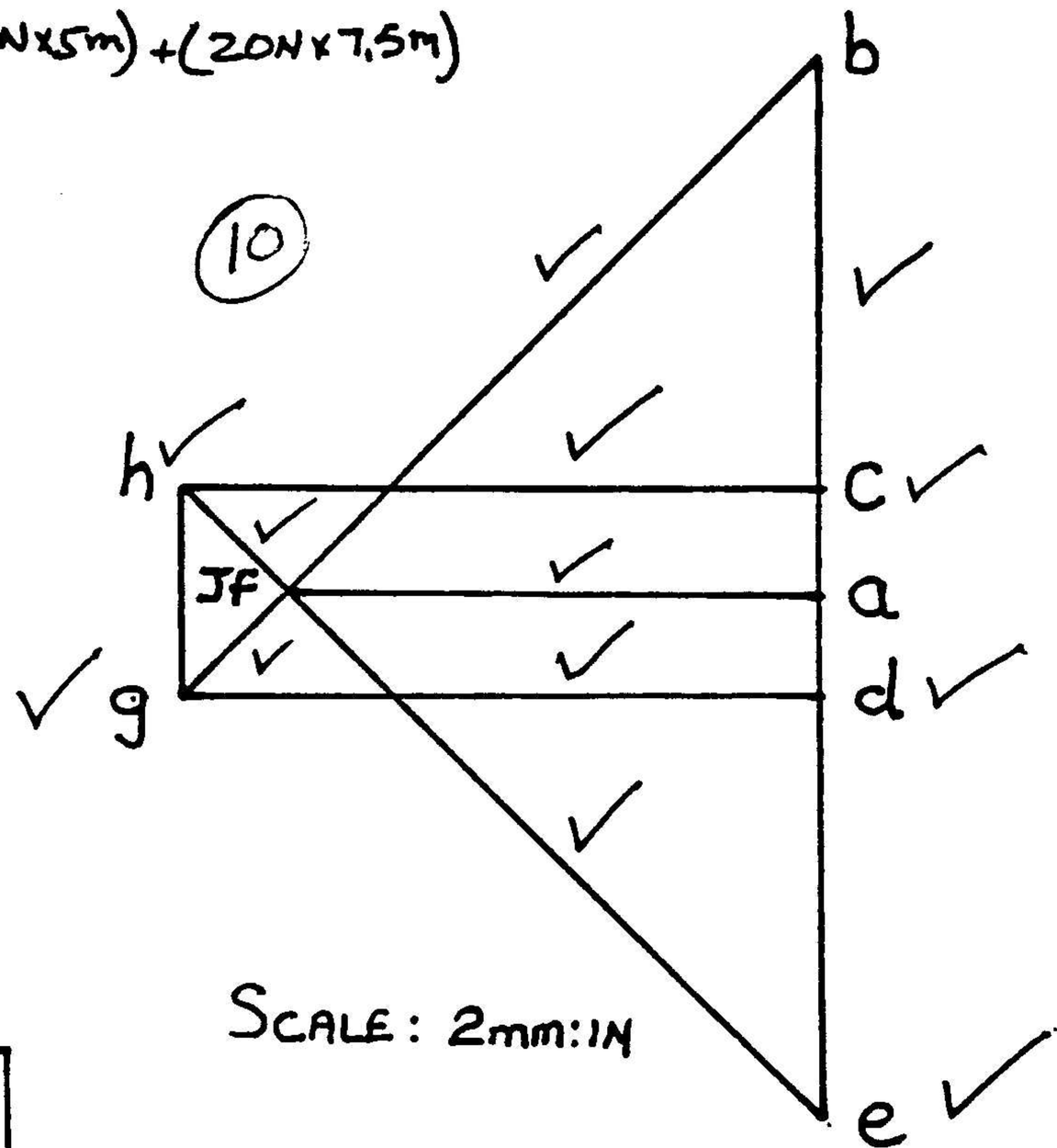
FOR LR

$(L \times 10m) = (20N \times 2,5m) + (10N \times 5m) + (20N \times 7,5m)$ ✓

$10mL = 250Nm$

$L = 25N$ ✓

(10)

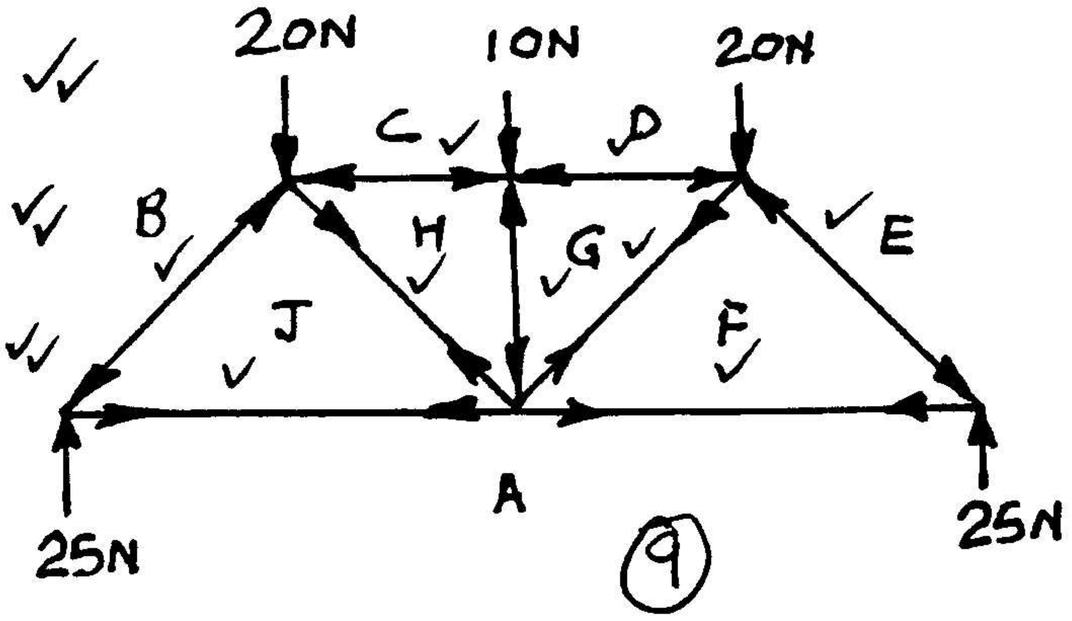


(13)

MEMBER	MEAS.	TURN SCALE ROUND	F	STRUT or TIE
BJ	$\frac{70mm}{1}$	$\frac{1N}{2mm}$	35N	S
JA	$\frac{50mm}{1}$	$\frac{1N}{2mm}$	25N	T
CH	$\frac{60mm}{1}$	$\frac{1N}{2mm}$	30N	S
HG	$\frac{20mm}{1}$	$\frac{1N}{2mm}$	10N	S

✓✓ ✓✓ ✓✓

(8)



(9)

QUESTION .3.

3.1.1. TRUE LENGTH (BC) / WARE LENGTE (BC)

$$\cos\theta = \frac{FC}{BC}$$

$$\cos 60^\circ = \frac{100}{BC} \checkmark$$

$$BC = \frac{100}{\cos 60^\circ} \checkmark\checkmark$$

$$BC = 200\text{ mm} \checkmark$$

FOR FC

$$FC = (DC - AB) \div 2 \checkmark$$

$$FC = (300 - 100) \div 2 \checkmark$$

$$FC = 100\text{ mm} \checkmark\checkmark$$

(8)

3.1.2. FOR BF / VIR BF.

$$\tan\theta = \frac{BF}{FC} \checkmark$$

$$\therefore BF = \tan\theta \times FC \checkmark$$

$$BF = \tan 60^\circ \times 100 \checkmark$$

$$BF = 173{,}2\text{ mm} \checkmark\checkmark$$

(5)

3.1.3 FOR R(EC)

$$\cos 60^\circ = \frac{GC}{EC(R)} \checkmark$$

$$\therefore R(EC) = \frac{150}{\cos 60^\circ} \checkmark\checkmark$$

$$R(EC) = 300\text{ mm} \checkmark\checkmark$$

(5)

3.1.4 FOR r(EB)

$$\cos 60^\circ = \frac{\frac{1}{2}AB}{EB(r)} \checkmark$$

$$r = \frac{50}{\cos 60^\circ} \checkmark\checkmark$$

$$r = 100\text{ mm} \checkmark\checkmark$$

(5)

3.1.5. CIRC. OF. DC.

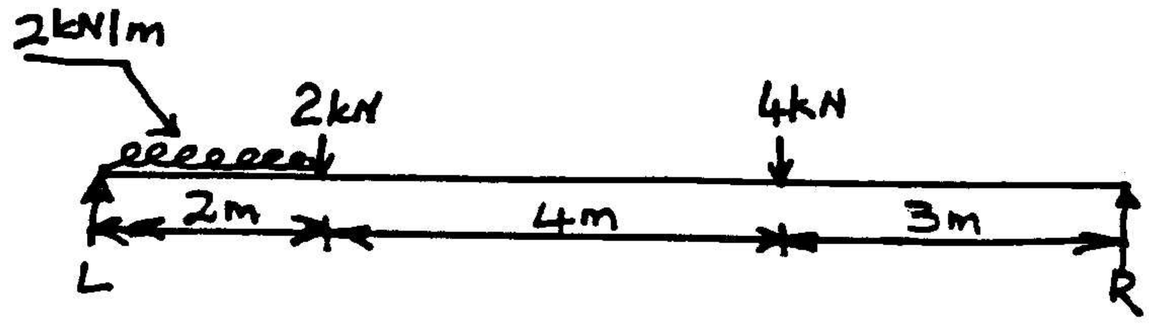
$$\text{CIRC} = \pi D \checkmark$$

$$\text{CIRC} = \pi \times 300 \checkmark$$

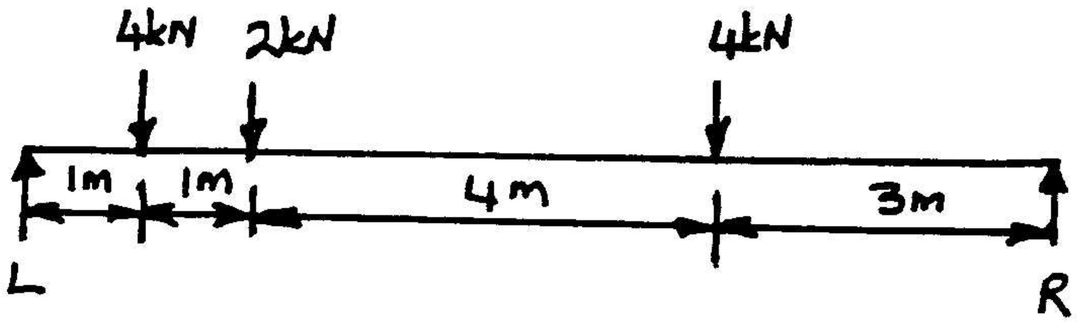
$$\text{CIRC} = 942{,}5\text{mm} \checkmark\checkmark$$

(4)

3.2



CONVERT DISTRIBUTED LOAD TO POINT LOAD



$\frac{2kN}{m} \times \frac{2m}{1}$

$= 4kN.$ ✓ (1)

$(R \times 9m) = (4kN \times 6m) + (2kN \times 2m) + (4kN \times 1m)$

$9mR = 32kNm$

$R = 3,5kN \rightarrow$ (6)

$(L \times 9m) = (4kN \times 3m) + (2kN \times 7m) + (4kN \times 8m)$

$L = 6,5kN \rightarrow$ (6)

QUESTION 4 / VRAAG 4

4.1.1. $a = \frac{\pi D^2}{4}$ ✓

$\frac{25mm}{1000} = ,025m$ ✓

$a = \frac{\pi (,025)^2}{4}$ ✓

$a = 490,87 \times 10^{-6} m^2$ ✓✓ (5)

4.1.2. $\sigma = \frac{F}{A}$ ✓ $\sigma = \frac{Belasting}{AREA}$

$\sigma = \frac{150 \times 10^3 N}{490,87 \times 10^{-6} m^2}$ ✓ ✓

$\sigma = 305,58 \times 10^6 Pa$ ✓✓ (5)

4.1.3. $E = \frac{\sigma}{\varepsilon}$ ✓

$\varepsilon = \frac{\sigma}{E}$

$\varepsilon = \frac{305,58 \times 10^6 Pa}{70 \times 10^9 Pa.}$ ✓ ✓

$\varepsilon = 4,365 \times 10^{-3}$ ✓✓ (5)

4.1.4. $\varepsilon = \frac{\Delta L}{OL}$ ✓

$\Delta L = \varepsilon \times OL$ ✓ ✓

$\Delta L = 4,365 \times 10^{-3} \times 250mm$

$\Delta L = 1 mm$ ✓✓ (5)

4.2. $a = 1800mm^2$

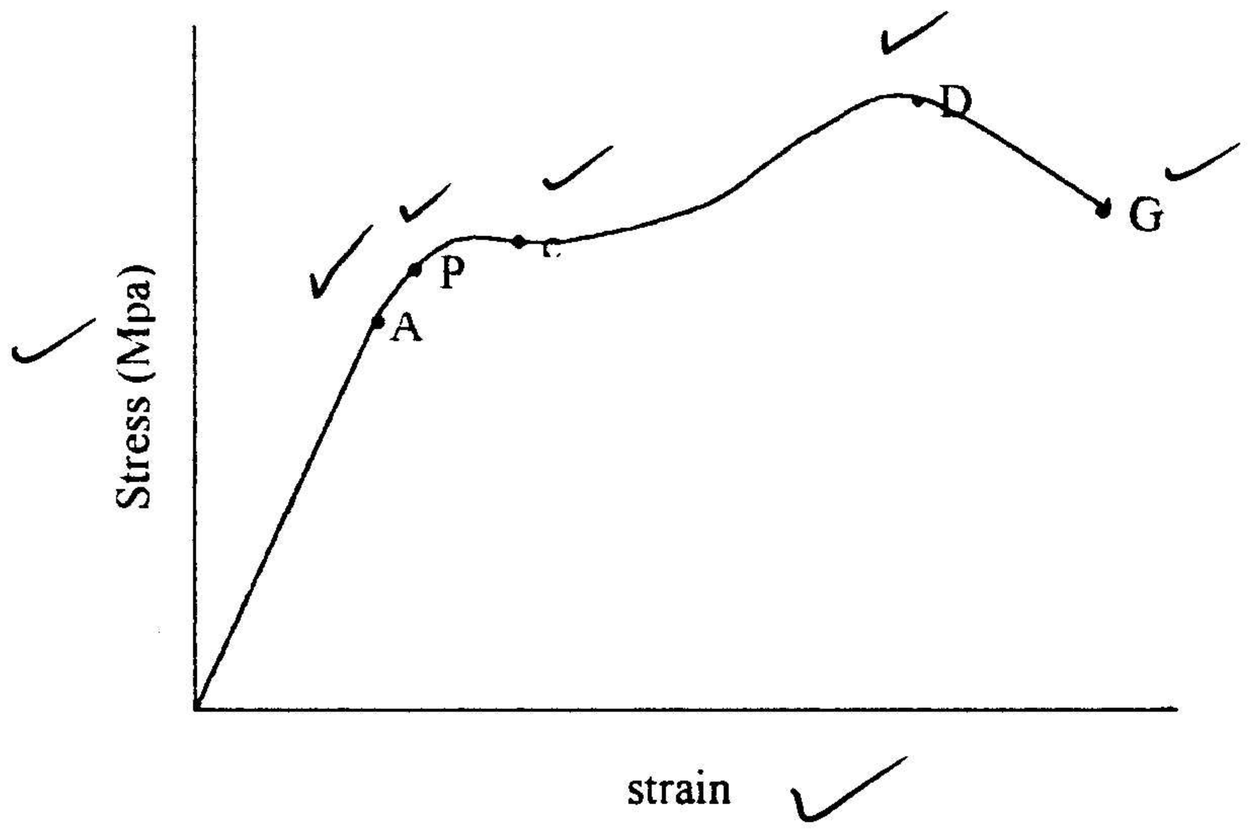
$a = \frac{1800}{1000 \times 1000} = 1800 \times 10^{-6} m^2$ ✓✓

$\sigma = \frac{F}{A}$ ✓ $\therefore \sigma = \frac{60 \times 10^3}{1800 \times 10^{-6}}$ ✓ = $33,3 MPa$ ✓✓ (7)

4.3 the surface is cleaned[1] and the dye penetrant fluid is painted or sprayed on[1]. The fluid is allowed to penetrate[1] in the defects and the surplus is removed[1]. A developer powder is sprayed on to the surface[1] and soaks up the penetrant leaving a stain indicating the defect[1].

Die oppervlakte moet eers skoon gemaak[1] word waarna die kleurstofdeurdringensvloeistof aangeverf of aangespuit word[1]. Die vloeistof word dan genoeg tyd toegelaat om die defekte binne te dring[1]. Die oortollige vloeistof word dan verwyder[1] en 'n ontwikkellaar word toegedien wat 'n vlek sal agterlaat wat dan die defek sigbaar sal maak gedurende die inspeksie[1].

4.4



Question 5 / Vraag 5

Mark	Quantity	Length needed	Mass/m length	Tariff R/kg	Total mass (kg)	Amount
A	1	2,5m	3.77kg/m	R2.5/kg	9.43kg ✓	R23.58 ✓
B	2	1,386m	3.77kg/m	R2.5/kg	10.45kg ✓	R26.13 ✓
C	1	0,6m	3.77kg/m	R2.5/kg	2.26kg ✓	R5.65 ✓
D	2	0,693m	3.77kg/m	R2.5/kg	5.23kg ✓	R13.08 ✓
					Cost of steel	R68.44 ✓
					Welding material	R125.00 ✓
					Total material cost	R193.44 ✓

(11)

5.1.1 ARBEID KOSTE / LABOUR COST (LC)

(LC) = TARRIF PER HOUR X TOTAL HOURS WORKED ✓
(LC) = R85.00/HOUR x 9HOURS ✓✓
(LC) = R765.00 ✓✓

(5)

5.1.2 OORHOOFSE KOSTE/ OVERHEAD COST (OC)

(OC) = ALLOWED % x MATERIAL KOST ✓
(OC) = 55% x R193.44 ✓✓
(OC) = R106.39 ✓✓

(5)

5.1.3 TOTALE KOSTE / TOTAL COST (TC)

(TC) = MATERIAL COST + OVERHEAD COST + LABOUR COST ✓
(TC) = R193.44 + R765.00 + R106.39 ✓✓
(TC) = R1064.83 ✓✓

5.2 Spaar tyd
saves money

Spaar geld
saves money

ENIGE TWEE
ANY TWO

✓✓

Voorkom herhaling van afmetings
Prevent repetitive measurements

Baie akkuraat
Very accurate

Verminder afval van materiaal
Reduces wastage of material

5.3 thin plate, template paper, card board, wood, Perspex **ENIGE DRIE ANY THREE**

dun plaat, maatvorm papier, harde bord, hout, Perspex

5.4 Job number
type of material to be used
quantity to be manufactured
size of drills to be used
this side up
thickness of material **ENIGE VIER ANY FOUR**

werks-nommer
tipe material wat gebruik moet word
hoeveelheid wat vervaardig moet word
grootte van die gate wat geboor moet word
hierdie kant na bo
dikte van die material

5.5 Las ✓
peilpuntlyn ✓
verwysingslyn ✓
afmetings ✓
sweissimbool ✓

joint
arrow line
reference line
dimentions
weld symbol

QUESTION 6 VRAAG 6

6.1 VIR RL / FOR RL

(L x 10m) = (10kN x 2m) + (5kN x 5m)
10mL = 45kNm
L= 45kNm ÷ 10m
L = 4.5kN. (5)

VIR RR / FOR RR

(R x 10m) = (5kN x 5m)+(10kN x 8m)
10mR = 105kNm
R = 105kNm ÷ 10m
R = 10.5kN (5)

6.2 FOR BENDING MOMENT / VIR BUIGMOMENTE

BM d = (+10.5kN x 0m) = 0kNm

BM c = (+10.5kN x 2m) = 21kNm

BM b = (+10.5kN x 5m) + (-10kN x 3m) = +22.5kNm

BM a = (+10.5kNm x 10m) + (-10kN x 8m) + (-5kN x 5m) = 0kNm (8)

6.3 SHEAR FORCES / SKUIFKRAGTE

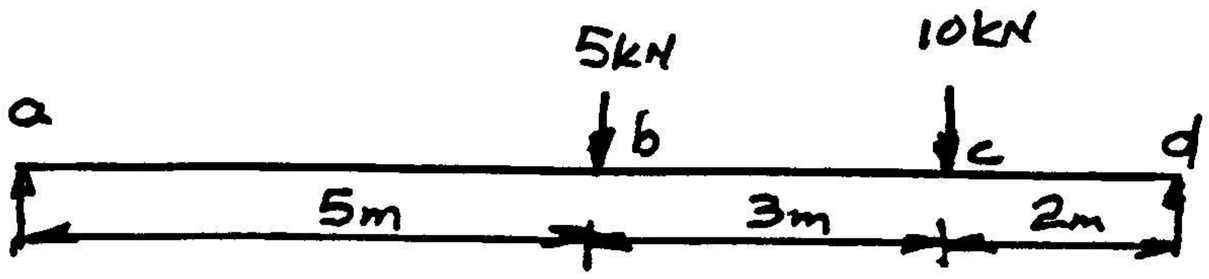
SF a = +4,5kN

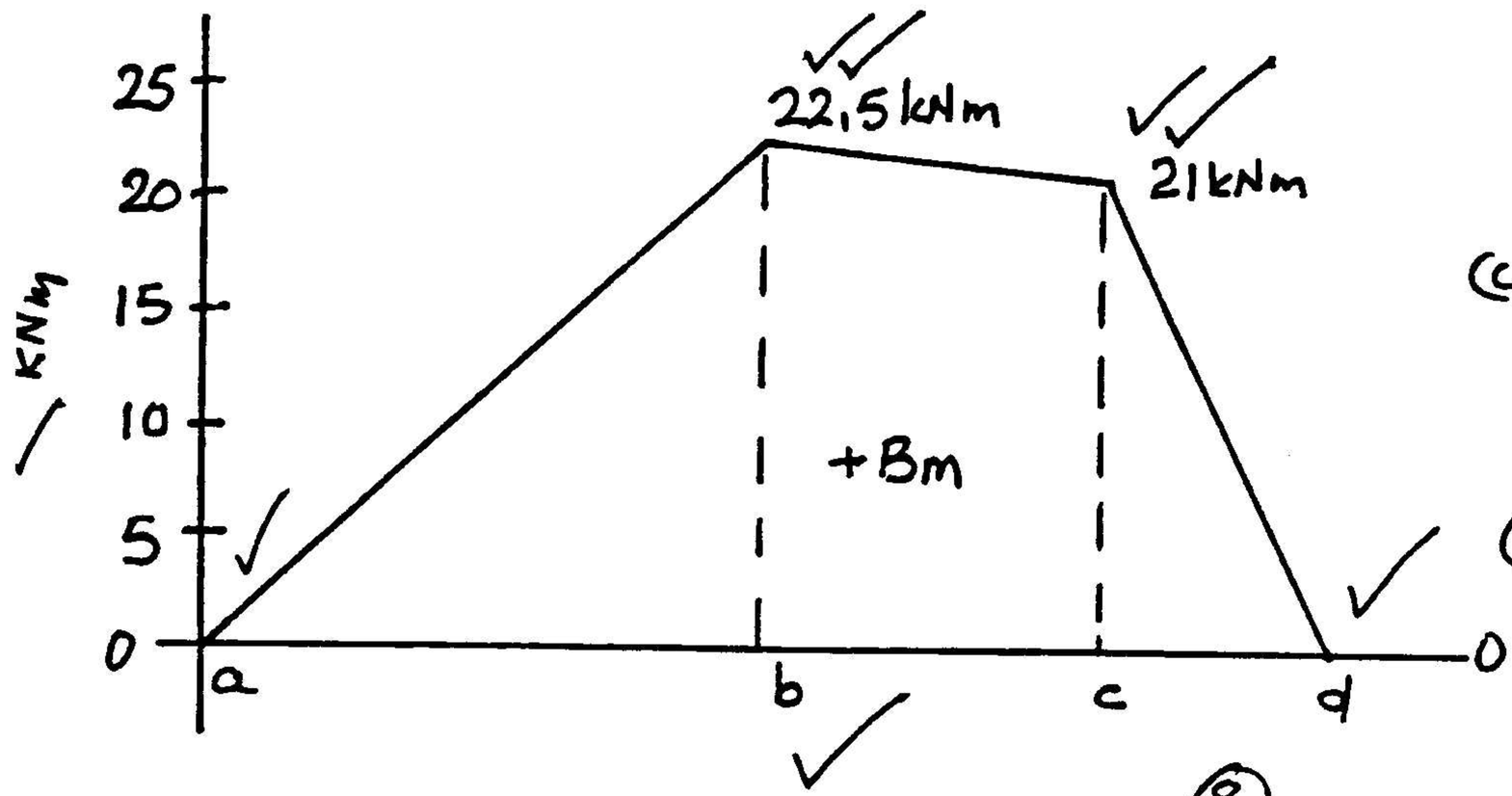
SF b = 4.5kN + (–5kN) = -0.5kN

SF c = 4.5kN + (-5kN) + (-10kN) = -10.5kN

SF d = +4.5kN + (-5kN) + (-10kN) + (+10.5kN) = 0kN (8)

QUESTION. 6.





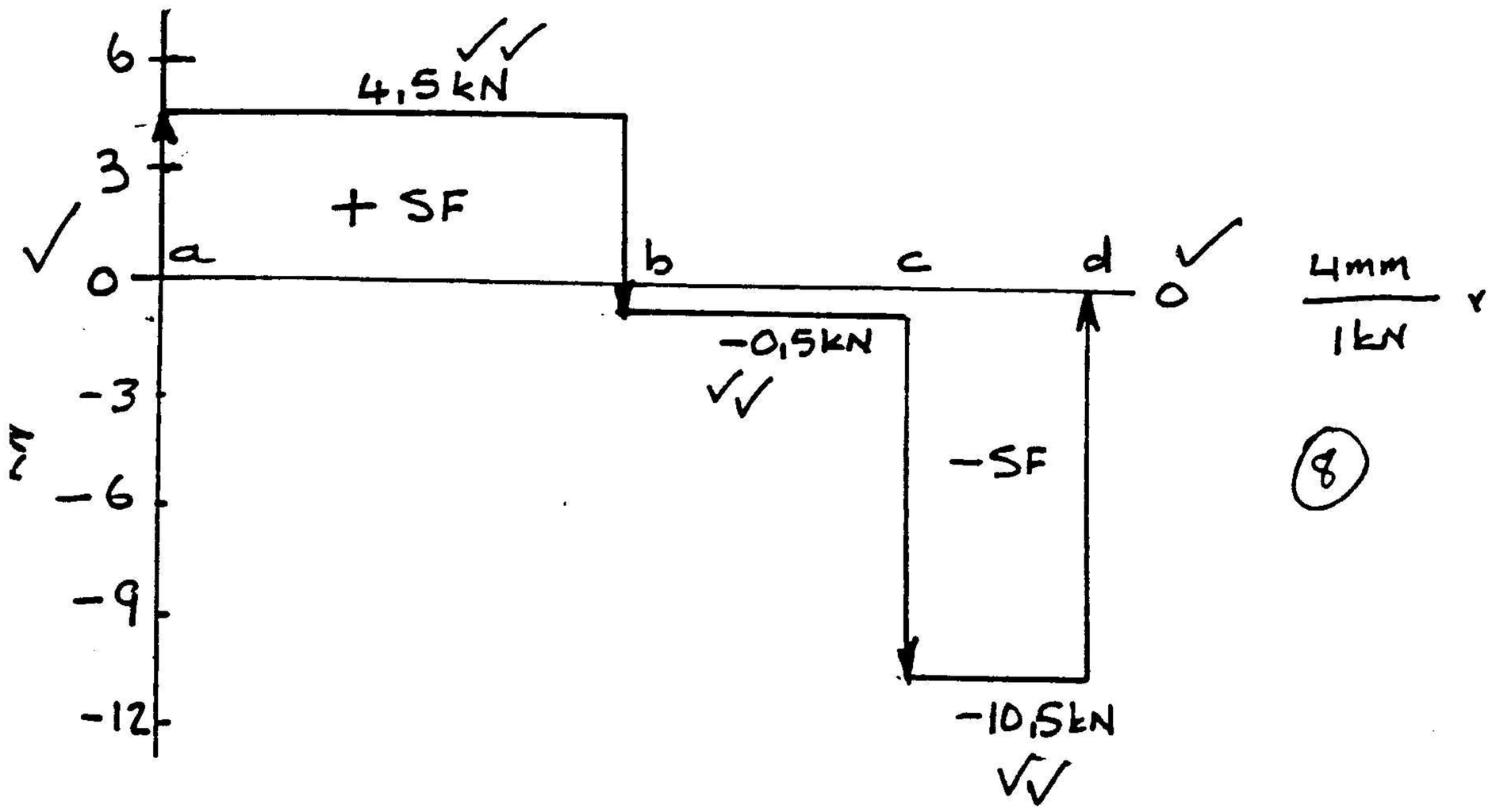
$(c) = \frac{2mm}{1kN} \times \frac{21kN}{1}$

$= 42mm \rightarrow$

$(b) = \frac{2mm}{1kN} \times \frac{22,5kN}{1}$

$= 45mm \rightarrow$

(8)



(8)