higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

NOVEMBER EXAMINATION

BUILDING SCIENCE N2

19 NOVEMBER 2014

This marking guideline consists of 8 pages.

QUESTION 1

1.1 Heat ✓

1.2 Heat capacity ✓

1.3 Temperature✓

1.4 Radiation✓

1.5 Conduction ✓

1.6 Coefficient of linear expansion ✓

1.7 Specific heat capacity ✓ or (SHC)

1.8 Convection ✓

(8 x 1) **[8]**

QUESTION 2

2.1 Efflorescence is a term used to describe crystallisation ✓
of soluble salts ✓ on building materials (2)

2.2 Surface tension ✓ (1)
If the liquid wets ✓ the tube, a film of liquid will form on the tube's inner ✓ surface.
This surface tension will make it contract ✓ and so the liquid will be drawn up ✓ the tube. (4)

2.3 2.3.1 The particles that make up this material have small ✓open spaces in it ✓ (2)

2.3.2 Bricks, concrete blocks, limestone, wood, etc. ✓ ✓
Glass, plastics, bitumen, slate, etc ✓✓ (Any 2 x 2) (4)

2.4 Absorption is the ability to fill and hold the pores with water. ✓
Permeability is the ability to allow water to move through the pores (capillary action).✓ (2)
[15]

QUESTION 3

3.1 Density is the mass per unit volume. ✓
Relative density is *its density compared to the density of water.* ✓ (2)

3.2 $RD = \frac{D \propto S}{D \propto W}$ ✓

RD = 7 800/1 000 ✓

= 7,8 ✓ **NB: No units** (3)
[5]

QUESTION 4

Roof covering	Heavy	Durable	Economical
Corrugated iron	Fair ✓	Yes ✓	Yes ✓
Glass-fibre sheets	No ✓	Fair ✓	No ✓
Cement-fibre sheet	Yes ✓	Yes ✓	Fair ✓
Copper sheets	Fair ✓	Yes ✓	No ✓
Lead plates	Yes ✓	Yes ✓	No ✓
Melthoid sheeting strips	No ✓	Fair ✓	Yes ✓

(18 x ½) **[9]**

QUESTION 5

5.1 5.1.1 Resultant = that single force that can replace the combined force action on a body ✓

5.1.2 Equilibrant = that single force that can balance the action of the resultant force ✓

5.1.3 Equilibrium = when all forces combined will not result in movement of a body ✓

5.1.4 Force = is that influence which changes or tends to change the state of rest or uniform motion of a body ✓

5.1.5 Coplanar forces = forces lying in the same plane of action ✓

5.1.6 Concurrent forces = forces acting to or from the same point ✓

5.1.7 Parallelogram of forces = when two forces acting on a point is drawn as a parallelogram to determine the resultant ✓

5.1.8 Space diagram = graphical representation of coplanar forces to demonstrate magnitude and direction of a system of forces acting on a single point ✓

5.1.9 Force diagram = graphical representation of a system of forces ✓

5.1.10 Triangle of forces = when three forces acting on a point is drawn as a triangle to determine equilibrium ✓

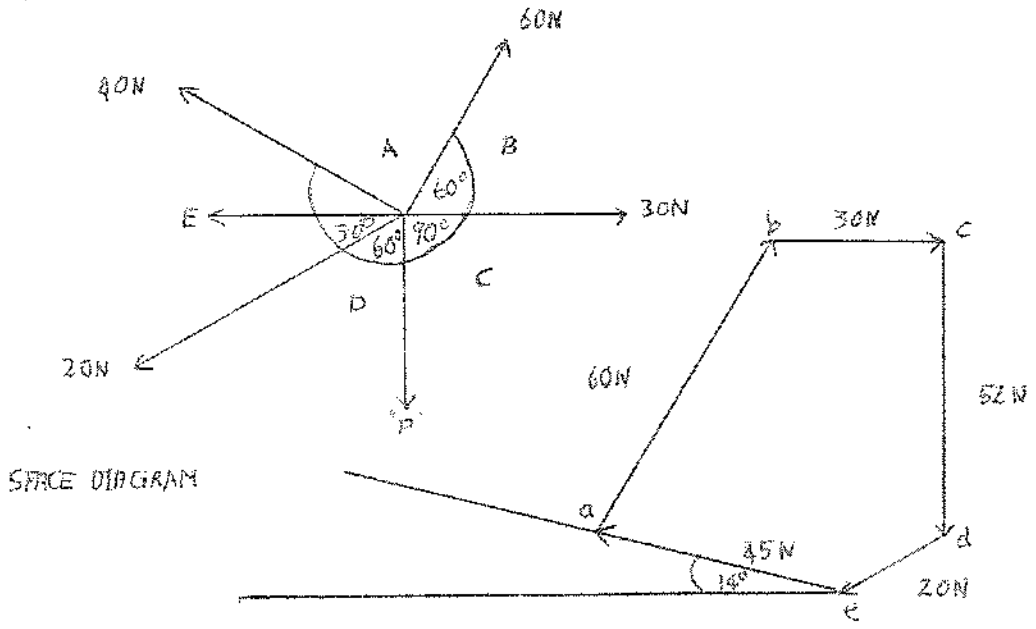
5.1.11 Polygon of forces = when more than three forces acting on a point is drawn as the sides of a polygon to determine equilibrium ✓

5.1.12 Bow's notation = a convention where capital letters are used to number the spaces between forces. Acting on a point is drawn as a triangle to determine equilibrium ✓ OR

A method of lettering the cells and outside spaces formed by the direction of the stresses in and loads on a framed structure that these stresses and loads can be traced by similar letters in the reciprocal diagram.

(Any 10 x 1) (10)

5.2 Space diagram sketch = 1
Space diagram labelling = 1
Scale = 1
Vector diagram sketch correctness = 2
Vector diagram sketch labelling = 2
Magnitude "P" = 1
Direction of 40 N = 1



VECTOR DIAGRAM
SCALE: 1mm = 1N
EQUILIBRANT "P" = 52N
a-e → 45N @ 14° NORTH OF WEST (8)
[18]

QUESTION 6

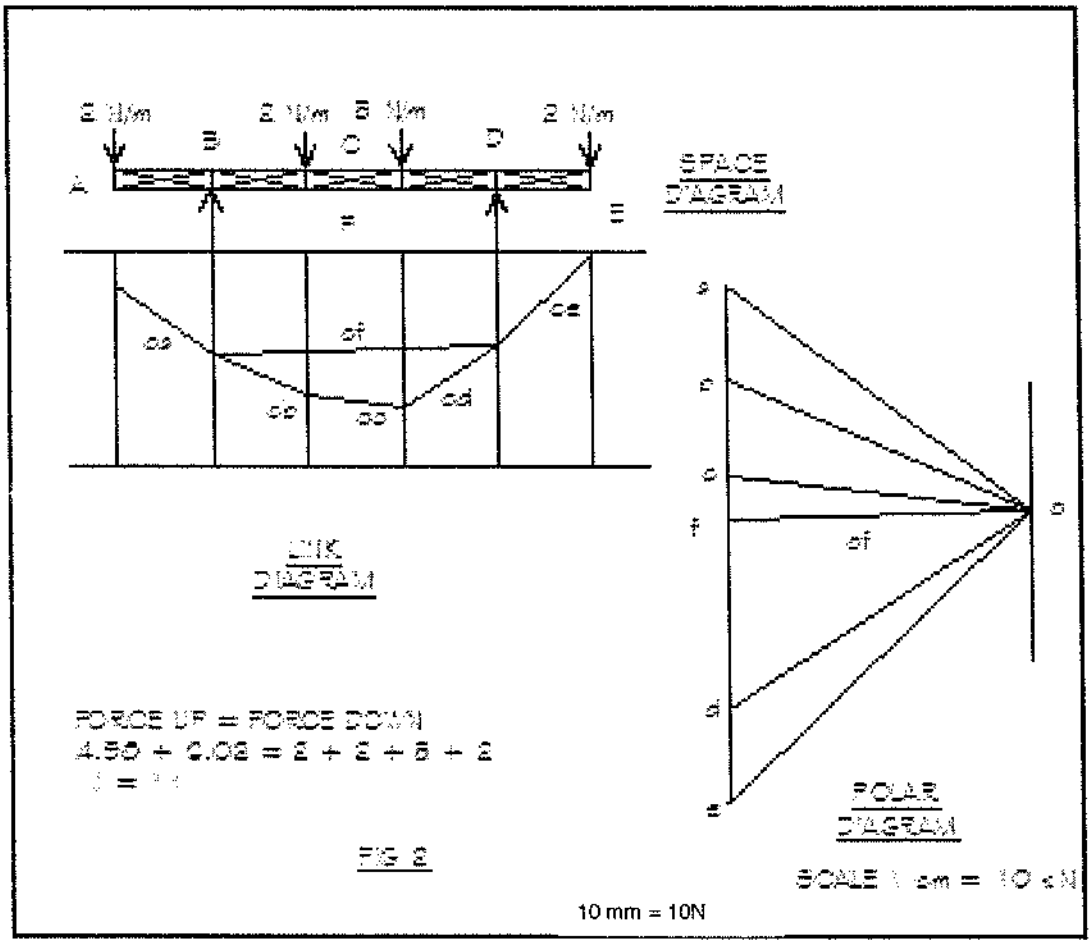


FIG 2

6.1 6.1.1 Draw space diagram accurately in proportion ✓
Project link polygon in line with space diagram ✓
Use an appropriate scale e.g 1 cm = 10 kN
Draw and measure – graphical drawing accurate to 5% of memo values will be acceptable.
Polar diagram: draw correctness ✓✓
Draw accuracy ✓✓
Logical labelling ✓✓
Accuracy of scale conversion to force magnitude ✓✓ (10)

6.1.2 $\sum\uparrow F = \sum\downarrow F$ ✓
ef + fa = ab + bc + cd + de
4.98 + 6.02 = 2 + 2 + 5 + 2 ✓
11 = 11 ✓ (3)

6.2 CENTROID of a body is the exact centre around a specific axes of rotation✓✓
Very thin plane (single area) figures called LAMINAS ✓ (3)

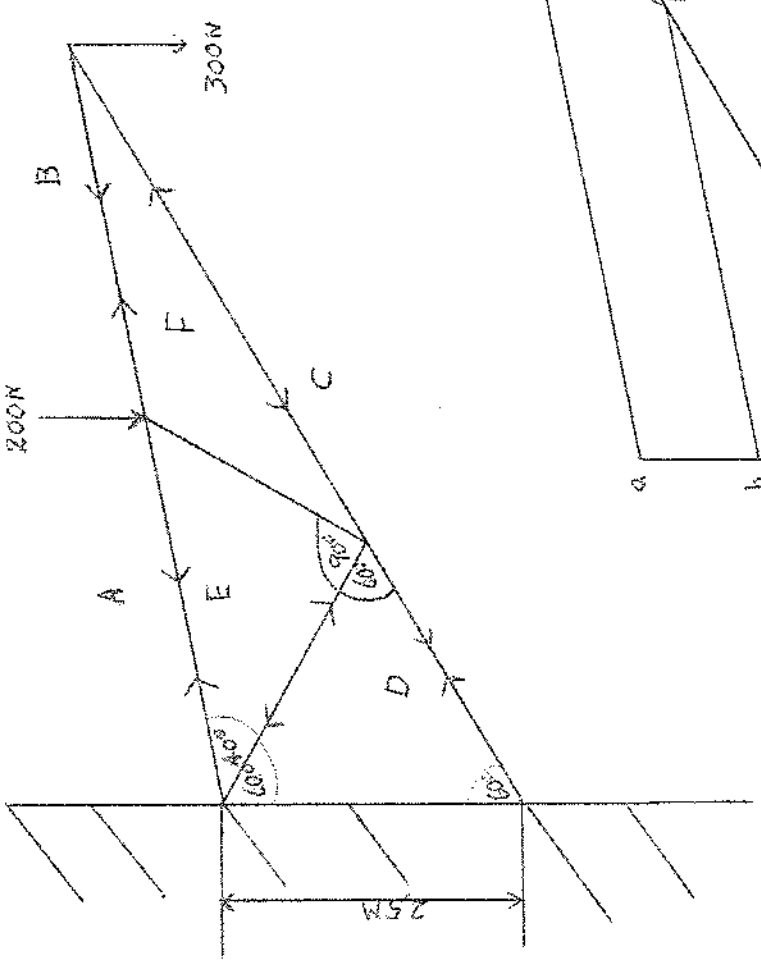
6.3 Examples of a couple = Wing nut
Cross-wheel spanner,
Stocks and dies,
Large gate-valve handle or any suitable alternative
(Any 2 x 1) (2)
[18]

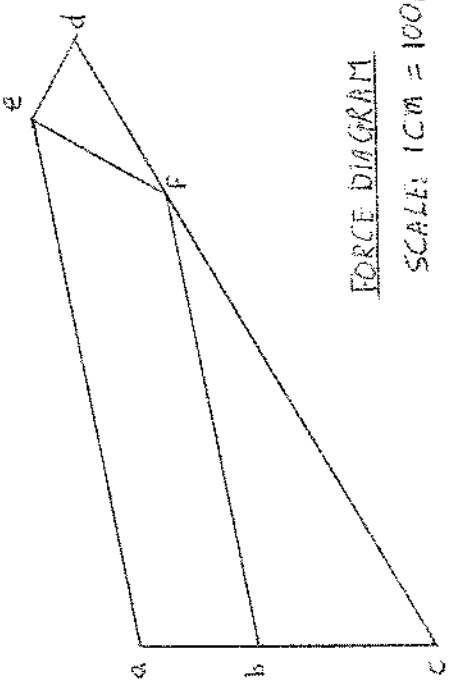
QUESTION 7

7.1 Use a scale of 1 mm = 100 N Draw and measure – graphical drawing accurate to 5% of memo values will be acceptable.
Force diagram: draw correctness ✓✓✓
Draw accuracy ✓✓✓
Logical labelling ✓✓✓
Head to tail vectors indicated ✓✓✓ (12)

7.2 Copy table and populate – point loads net required in table (18 x ½) (9)

QUESTION 7.1 and 7.2





MEMBER	MAGNITUDE N	NATURE TIE	NATURE STRUT
AE	890N	X	
BF	770N		X
CF	870N		X
CD	1170N	X	
DE	150N		X
EF	260N	X	

FIGURE 3

7.3 Use a scale of 1 mm = 100 N Draw and measure – graphical drawing accurate to 5% of memo values will be acceptable.
Force diagram: draw correctness ✓✓
Draw accuracy ✓
Head to tail vectors indicated ✓
Answer correctly tabulated ✓ ✓ (6)

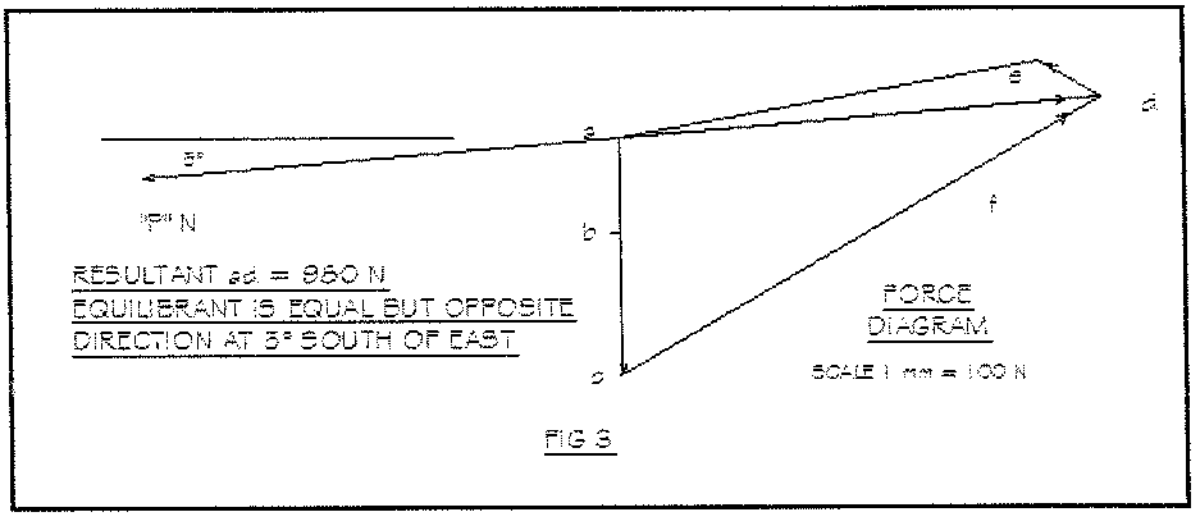


FIG 3

[27]

TOTAL: 100