



KENYATTA UNIVERSITY
UNIVERSITY EXAMINATIONS 2011/2012
SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR
OF SCIENCE
SCH 409: STRUCTURAL CHEMISTRY

DATE: TUESDAY 3RD MARCH 2012

TIME: 11.00 A.M. – 1.00 P.M.

INSTRUCTIONS

Answer ALL questions

1. a) How can you differentiate between calcite crystal and its glass model?
(3 marks)

 b) Briefly explain using simple diagrams:
 i) why atomic crystals are transparent;
 ii) Why ionic crystals are brittle and do not conduct current in their solid state;
 iii) Why metallic crystals have high plasticity and high electric and thermal conductivity?
(9 ½ marks)

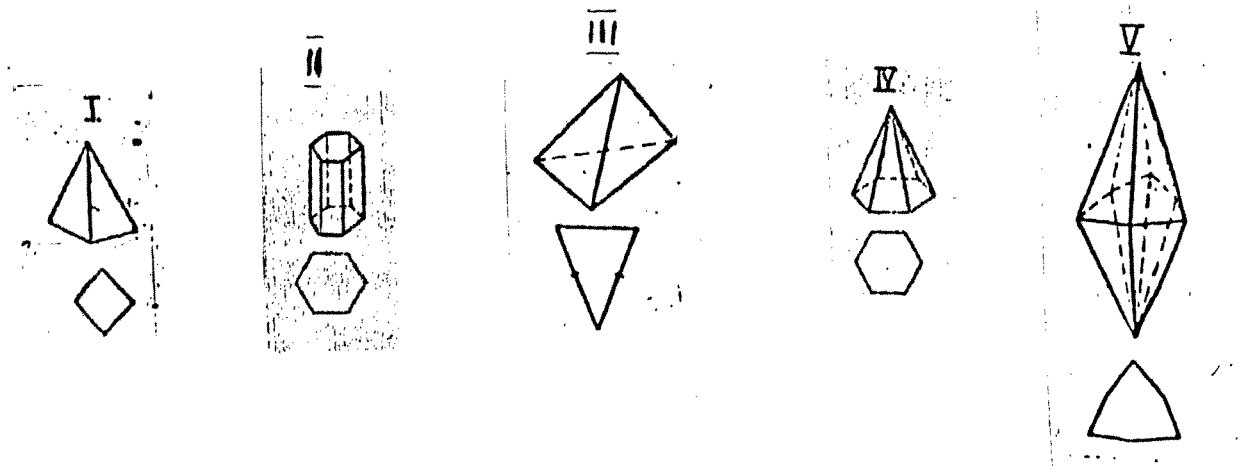
2. a) Construct the stereographic projection of the plane passing through directions D(120°, 112°) and E (70°, 120°). Determine the coordinates of the normal to this plane.
(6 marks)

 b) Determine the angle between adjacent faces 1 and 2 and faces 3 and 4 by using their stereographic projections if their coordinates are :
 face 1 (56°, 80°), face 2 (102°, 80°) , face 3 (132°, 122°) ,
 face 4 (210°, 122°)
(13 marks)

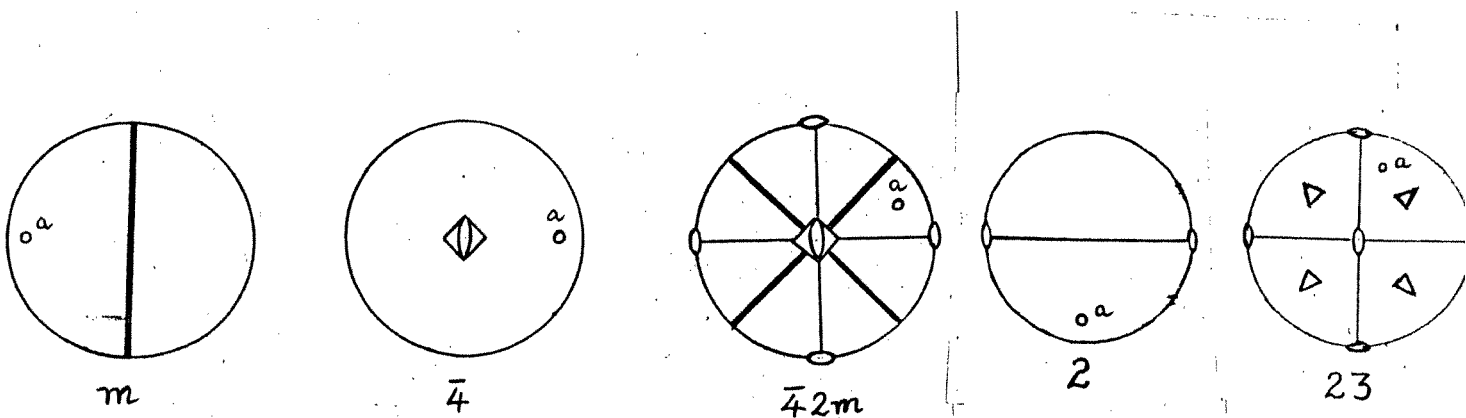
 c) Determine the angle between directions A (60°, 130°) and B (184°, 42°) by using their stereographic projections.
(4 ½ marks)

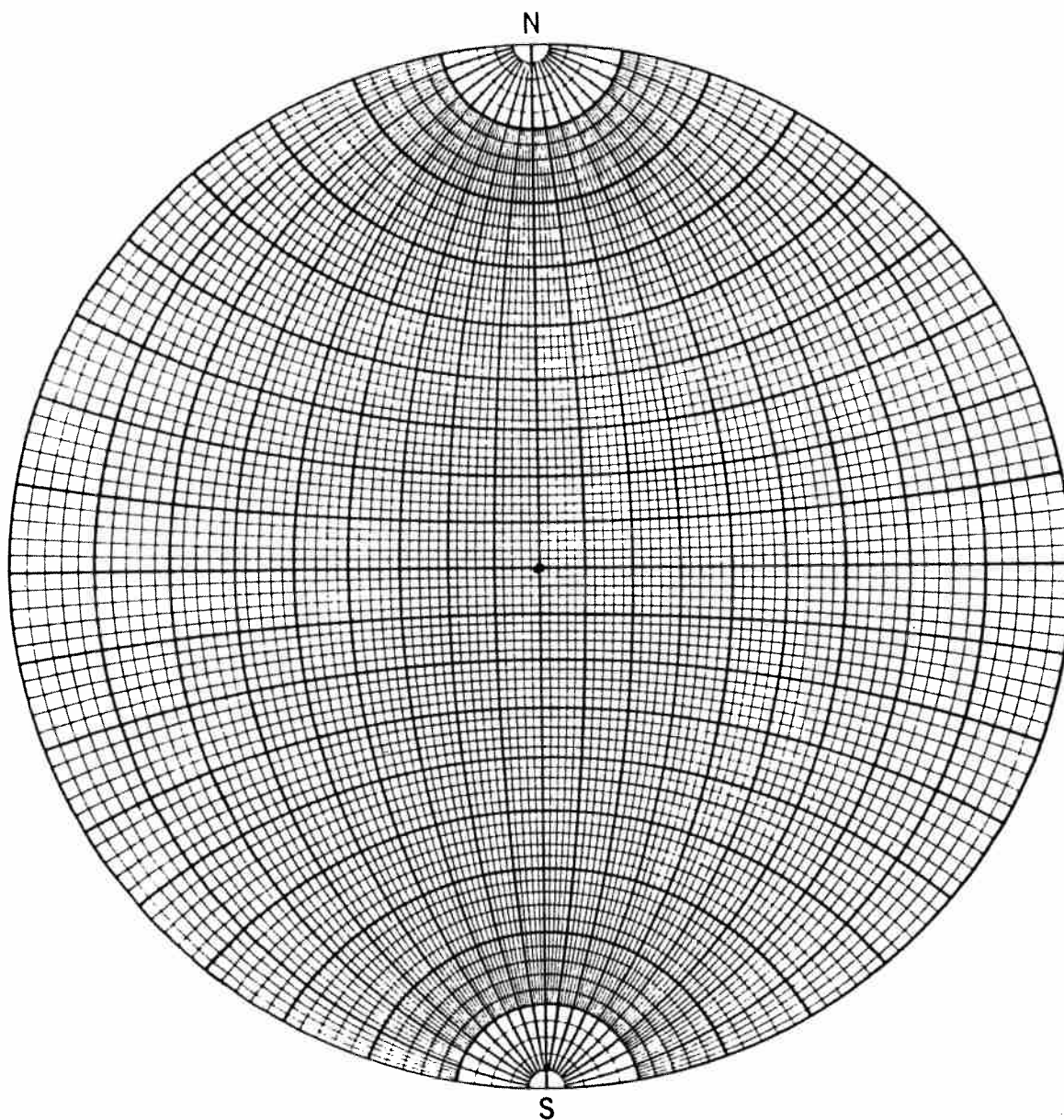
3. a) Which elements of symmetry are formed if
- to axis 4 is added a centre of inversion and plane m parallel to this axis;
 - to axis 1 is added a centre of inversion and plane m parallel to this axis
- (6 ½ marks)

- b) Which simple forms combine to produce the closed polyhedra, given below?
Determine the point group for I, II and IV. (11 marks)



- c) Which simple forms are obtained from face a in the stereographic projections of elements of symmetry for point groups m , $\bar{4}$, $\bar{4}2m$, 2 and 23 ?
Indicate with small letters the faces produced on the stereograms. Give the symbol of each face for point group $\bar{4}$. (16 ½ marks)





WULFF NET

Wulff net with 2° intervals.