Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
300 level 2nd Semester Examination – Dec/Jan 2018
SCT 356-2 Materials Characterization Techniques-II

Uva Wellassa University

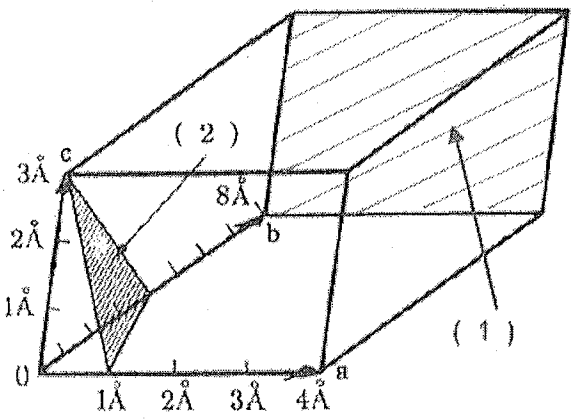
Instructions to candidates
Duration: 02 hour
Number of questions: 3 Essay Questions
Mark allocation: 400 marks
Answer all questions.
Scientific calculators are allowed. Index No:

1.

i. Calculate the d spacing of (020) planes in a cubic lattice with a unit cell parameter of 6.8 Å. [20 marks]

ii. Lattice type can be predicted (unit cell centring) by analysing the observed hkl values in a given XRD pattern. How do you distinguish four lattice types by those observations? [20 marks]

iii. Determine the miller indices of the two planes shown in the figure below. [20 Marks]



iv. In an XRF spectrum, there can be several types of peaks in addition to elemental peaks. Write four types of such additional peaks. [20 Marks]

v. Write four different applications of XRF. [20 Marks]

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2.

i. Rayleigh criterion explains the relationship between the wavelength of the radiation use to observe an object and the resolution of the image. Write the Rayleigh criterion equation and define the terms. [10 Marks]

ii. Write three advantages of the use of electrons in imaging processes. [30 Marks]

iii. What did you mean by "secondary electrons" and "back scatered electrons" in SEM? [20 Marks]

iv. TEM can be applied in imaging process as well as diffraction pattern analysis. Draw the schematic diagrams to differentiate the projection operation of two processes. [40 Marks]

3.

i. Describe the functions of Thermo Gravimetric Analyzer (TGA) and Differential Scanning Calorimeter (DSC). [100 marks]

ii. What kind of information we collect from DSC and TGA? Use relevant DSC and TGA curves in your answer. [60 Marks]

iii. How do we analyze gaseous products that produce from TGA? Your answer should include some examples. [40 Marks]