Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH (CT)/SEM-6/CT-604/2012

2012

ADVANED CERAMICS-II

Time Allotted : 3 Hours *Full Marks :* 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives from the following : $10 \times 1 = 10$

   i) White graphite is

   a) TiC b) WC

   c) ALN d) BN.

   ii) Mechanical properties of graphite improved at elevated temperature because of

   a) Reduction

   b) Oxidation

   c) increased orderness

   d) increased disorderness.

   iii) In graphite % of disordered carbon is

   a) 5% b) 10%

   c) 15% d) 25%.

iv) Sic is used as lightening arrester because of

a) High conductivity at r.t

b) Resistivity falls at high voltage

c) High insulator

d) None of these .

v) Selection criteria of binder for graphite processing is of

a) Higher coking value

b) High softening point

c) High m.p.

d) High in V.M.

vi) What is the crystal structure of cubic ZrO_2

a) Fluorite b) Rutile

c) Wurtzite d) None of these.

vii) Which ceramic is used in MHD power generating system

a) SiC b) Si_3N_4

c) ZrB_2 d) None of these

viii) For metallization of ceramic at normal temperature Which of the following metal is used.

a) Ni b) CO

c) Ag d) Ti.

ix) Which one is a machinable glass ceramics

a) Corundum b) Mica

c) SiALON d) None of these.

x) Which ceramic is known as Inorganic Graphite

a) HfC b) BN

c) B_4C d) TiC.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Explain the advantages of UO_2 over *U* as nuclear fuel.

3. Explain the advantages and disadvantages of SiO_2 for use as ceramic membrane.

4. Explain the advantages of 'Bottom up' approach over 'Top Down' approach for the synthesis of Nano Ceramics.

5. What do you mean by graphite Carbon ? Thermal expansion coefficient (α) is higher in *C*-axis but low in *AB*-plane where as electrical and thermal conductivity show the reverse result in graphite — Why ?

6. What do you mean by cermet ? How cermets differ from the traditional refractories ? 2 + 3

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. Explain the difference between 'Metallized Ceramics and cermets. Give some applications of Metallized ceramics. Discuss about the 'low temperature' and 'high temperature' fabrications of metallized ceramics, Why Mn-powder is used for the metallization of Al_2O_3 by MO ? 2 + 4 + 1 + 5 + 3

8. Discuss the advantages and disadvantages of ceramic membrane over polymeric membrane. Explain the separation mechanisms of microporous ceramic membrane and dense ceramic membrane with examples. Which is used for the fabrication of dense ceramic membrane ? 5 + 7 + 3

9. What are the methods used for synthesis of nitride ? Why greany feel appear in Boron nitride ? How commercially very pure Boron nitride is prepared ? Discuss the methods for manufacturing Silicon nitride products and their applications.

10. "Silicides are closely related to inter-metallic compound". Explain. Discuss the method of fabrication of $MoSi_2$ including the thermal nature of the process. Write the important application and limitation of metal Silicide . Why direct reaction process yields a more sinterable powder than does the thermit process ?

11. Why Sialon ceramics developed ? How many types of Sialon exist ? What are the difference between the different forms of Sialons ? What are the methods used for consolidation of Sialon ? What are the sintering aid used ? 2 + 2 + 5 + 4 + 2