



Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech (CT)/SEM-7/CT-703C/2010-11

2010-11

OXIDE CERAMICS

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.*

Answer any *five* questions.

5 × 14 = 70

1. What do you mean by pure oxide ? How are pure oxides classified ? State some important properties of pure oxide. Describe in short the general methods of fabrication of pure oxide body.

1 + 3 + 4 + 6

2. Write short notes on the following :

4 × 3 $\frac{1}{2}$

- a) Berillia
- b) Thoria
- c) Tin dioxide
- d) Mechanical properties of pure oxide.



3. Why ZrO_2 and ZrO_2 bearing oxides are used in metallurgical and high temperature chemical industries ? What are the structures exhibited by ZrO_2 and in what temperature are they stable ? In what ways are toughened ceramics developed ? Write in brief the properties of toughened ceramics.

2 + 3 + 4 + 5

4. How ZrO_2 is partially stabilized and why ? What are the applications of Zirconia ceramics ?

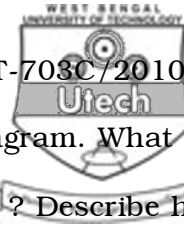
3 + 4 + 7

5. Discuss briefly how low soda containing (< 0.1 wt% Na_2O) alumina powders can be prepared in Bayer's process. What are reactive aluminas ? How do they differ from metallurgical grade technical alumina powders ? Discuss how technical alumina can be processed to make reactive alumina powders ?

5 + 2 + 3 + 4

6. What are the stoichiometric and non-stoichiometric magnesium aluminate spinels ? Discuss briefly how chemically pure (wt% $\text{MgAl}_2\text{O}_4 > 99.8\%$) magnesium aluminate spinel bodies can be made in the laboratory.

2 + 2 + 10



7. Discuss briefly Al_2O_3 – MgO binary phase diagram. What are the important characteristics of this diagram? Describe how this diagram can be utilised to make pure phase of MgAl_2O_4 – Al_2O_3 composition in the laboratory. 4 + 3 + 7

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