

Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/B.TECH (CT)/SEM-7/CT-703C/2011-12**

**2011**

**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

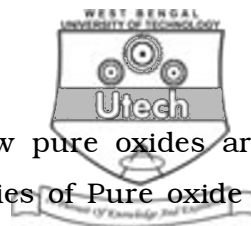
1. Why  $\text{ZrO}_2$  and  $\text{ZrO}_2$ -bearing oxides are used in metallurgical and high temperature Chemical Engineering industries ? What are the structures exhibit of  $\text{ZrO}_2$  and in what temperature they are stable ? In what process toughened ceramics are developed ? Write in short the properties of toughened ceramics.

2 + 3 + 4 + 5

2. Write shot notes on the following :

4 × 3  $\frac{1}{2}$

- a) Tin dioxide
- b) Berillia
- c) Thoria
- d) Mechanical Properties of Pure Oxide.



3. What do you mean by pure oxide ? How pure oxides are classified ? State some important properties of Pure oxide ? Write in short the general methods of fabrication of pure oxide body ? 2 + 2 + 4 + 6
4. How is  $ZrO_2$  partially stabilized and why ? What are the application of Zirconia Ceramics ? 3 + 4 + 7
5. Name different polymorphic form of alumina available in nature. Discuss briefly the structure of any one form. What are the differences between reactive and non-reactive alumina ? Discuss briefly the application of both form of aluminas in ceramic products. 2 + 4 + 4 + 4
6. Define magnesium aluminate spinel. Discuss its structure. Discuss briefly about pure phase spinel bodies preparation in the laboratory for different advanced applications. 3 + 3 + 8
7. Why is DBM produced from sea water contain  $SiO_2$  ? How is  $SiO_2$  present in DBM detrimental in refractories ? Discuss the structure of MgO. Explain how can magnesia bricks having following properties be produced in the plant ?

MgO	—	98 wt% ( min )	
$SiO_2$	—	0.1 wt% ( max )	
B.D.	—	3.00 gms/cc ( min )	
% A.P.	—	18 ( max )	
RUL ( ta )	—	+ 1700°C ( min. )	2 + 3 + 3 + 6