



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/B.Tech (CT)/SEM-7/CT-702/2010-11**

**2010-11**

**ADVANCED 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.*

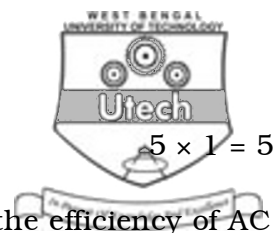
**GROUP – A**

**( Objective Type Questions )**

1. Answer the following questions :

A. Fill in the blanks : 5 × 1 = 5

- i) The capacitor's basic function is ..... storage.
- ii) Pyroelectrics develop ..... spontaneously and form permanent dipoles in the structure.
- iii) All ferro- and ferrimagnetic materials exhibit ..... effect.
- iv) Semiconducting  $\text{BaTiO}_3$  undergoes a tetragonal to cubic phase transformation at ..... °C.
- v) Sensors operating on electrochemical principles cannot tolerate electronic conduction but must exhibit .....



B. Write True or False :

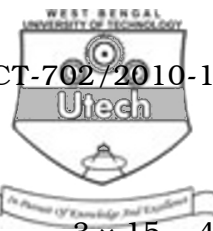
- vi) Insulation resistance measures the efficiency of AC blocking.
- vii) Dielectric strength values are very sensitive to specimen thickness.
- viii) Ferroelectric ceramics have high dielectric constant.
- ix) The spinel ferrites have the general formula of  $AB_2O_4$ .
- x) The magnetocrystalline anisotropy of hexagonal ferrites is low.

### GROUP – B

#### ( Short Answer Type Questions )

Answer any *three* of the following.  $3 \times 5 = 15$

- 2. What is disc capacitor ? What is the basic difference between a thick film capacitor and a thin film capacitor ? Explain Relaxator Dielectric.  $1 + 2 + 2$
- 3. Explain the reason of intrinsic breakdown of a dielectric material. What is piezoelectricity ?  $3 + 2$
- 4. Explain the effect of different dopant, modifier on lead zirconate titanate ceramics.
- 5. “Each type of sensor must satisfy certain criteria”. What are those criteria ? What is an intrinsic conductor ?  $2 + 3$



**GROUP – C**

**( Long Answer Type Questions )**

Answer any *three* of the following.  $3 \times 15 = 45$

6. What is dielectric strength ? Discuss the effect of different factors on dielectric strength. What is electronic polarization ? Discuss the corrective modifications required for practical application of barium titanate ceramic.

$2 + 3 + 3 + 7$

7. Explain the hysteresis loop behaviour for typical ferrite system. What is antiferromagnetism ? Give one example of Garnet. Discuss the phenomenon of optical phase retardation in an electro - optic ceramic.

$5 + 2 + 1 + 7$

8. Write short notes on the following :

$3 \times 5$

- i) Semiconducting gas sensors
- ii) Electrical properties of NTC thermistors
- iii) Applications of PTC thermistors.

9. What are the basic differences between hexagonal ferrite and spinel ferrite ? Write short note on alumina substrate. Write the advantages of ceramic membrane over polymeric membrane.

$5 + 6 + 4$

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