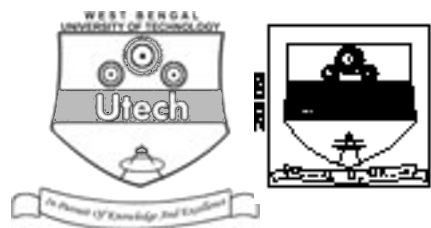


## CERAMIC RAW MATERIALS ( SEMESTER - 4 )

CS/B.TECH (CT)/SEM-4/CT-401/09



1. ....  
Signature of Invigilator

2. ....  
Signature of the Officer-in-Charge

Reg. No.

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Roll No. of the  
Candidate

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CS/B.TECH (CT)/SEM-4/CT-401/09  
ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE – 2009  
CERAMIC RAW MATERIALS ( SEMESTER - 4 )

Time : 3 Hours ]

[ Full Marks : 70

### INSTRUCTIONS TO THE CANDIDATES :

1. This Booklet is a Question-cum-Answer Booklet. The Booklet consists of **32 pages**. The questions of this concerned subject commence from Page No. 3.
2. a) In **Group – A**, Questions are of Multiple Choice type. You have to write the correct choice in the box provided **against each question**.  
b) For **Groups – B & C** you have to answer the questions in the space provided marked 'Answer Sheet'. Questions of **Group – B** are Short answer type. Questions of **Group – C** are Long answer type. Write on both sides of the paper.
3. **Fill in your Roll No. in the box** provided as in your Admit Card before answering the questions.
4. Read the instructions given inside carefully before answering.
5. You should not forget to write the corresponding question numbers while answering.
6. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.
7. **Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall.**
8. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, **which will lead to disqualification**.
9. Rough work, if necessary is to be done in this booklet only and cross it through.

**No additional sheets are to be used and no loose paper will be provided**

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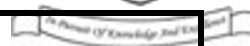
### FOR OFFICE USE / EVALUATION ONLY

Marks Obtained

	Group – A										Group – B					Group – C					Total Marks	Examiner's Signature
Question Number																						
Marks Obtained																						

.....  
Head-Examiner/Co-Ordinator/Scrutineer

4420 (04/06)



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## ENGINEERING &amp; MANAGEMENT EXAMINATIONS, JUNE – 2009

## CERAMIC RAW MATERIALS

## SEMESTER - 4



Time : 3 Hours ]

[ Full Marks : 70

## GROUP – A

## ( Multiple Choice Type Questions )

1. Choose the correct alternatives for the following :

10 × 1 = 10

i) Most stable form of  $\text{Al}_2\text{O}_3$  isa)  $\alpha\text{-Al}_2\text{O}_3$ b)  $\beta\text{-Al}_2\text{O}_3$ c)  $\gamma\text{-Al}_2\text{O}_3$ 

d) none of these.

ii) PSZ ceramics consists of

a) C –  $\text{ZrO}_2$ b) m & t- $\text{ZrO}_2$ c) t & C –  $\text{ZrO}_2$ 

d) none of these.

iii) Molecular formula of mullite is

a)  $\text{Al}_2\text{O}_3 \cdot \text{MgO}$ b)  $2\text{Al}_2\text{O}_3 \cdot \text{SiO}_2$ c)  $3\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$ 

d) none of these.

iv) Which of the following parameters is measured by XRD technique ?

a) Grain size

b) Crystallite size

c) Particle size

d) None of these.

v) Quartzite is used for making

a) Silica bricks

b) Basic bricks

c) H. A. bricks

d) None of these.

vi) No. of endothermic peaks of DTA study of dolomite is

- te is
- of these.
- 

11/11/2019

**( Short Answer Type Questions )**

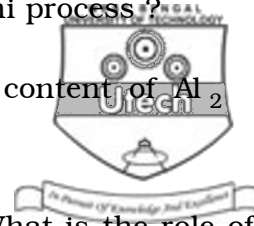
$$3 \times 5 = 15$$

- $$2 + 1\frac{1}{2} + 1\frac{1}{2}$$



5

4. How is nanosized  $\text{BaTiO}_3$  obtained by modified Pechini process ? 5
5. Discuss the role of mineralisers to reduce the soda content of  $\text{Al}_2\text{O}_3$  in Bayer process. 5
6. How is  $\text{Y}_2\text{O}_3$  stabilized  $\text{ZrO}_2$  powder prepared ? What is the role of mineraliser to increase the C/t  $\text{ZrO}_2$  phase ? 3 + 2



### GROUP – C

#### ( Long Answer Type Questions )

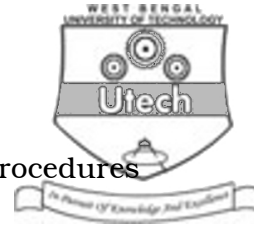
Answer any *three* of the following questions.

3 × 15 = 45

7. a) Define primary and secondary clays with examples. Draw the atomic arrangement of 2 : 1 clay mineral. Briefly describe the different clays under Kandite group.  $2 + 2\frac{1}{2} + 3\frac{1}{2}$
- b) How does muscovite differ from montmorillonite ? What is exfoliation ? Which is known as brittle mica and why ? 3 + 1 + 3
8. a) Briefly describe the displasive and reconstructive transformation of silica. Flint with low iron content is preferred to quartz in whiteware production. Why ? Discuss the role of silica in whiteware body. What are silica gel and vitreous silica ? 3 + 2 + 2 + 3
- b) How is bone ash prepared ? Name the main chemical constituents of bone ash. 3 + 2
9. Give a descriptive flowchart for the manufacturing of silica glass fibre from TEOS by sol-gel route. Mention the process variables for gelation behaviour, particle size and micro-structure of gel powder. 5 + 10
10. Discuss the preparation of magnesio-aluminate hydrate ( MAH ) powder from different precursors by solution / precipitation technique. Discuss the effect of calcination temperature and seeding technique on spinelization. 10 + 5



11. Write short notes on any *three* of the following :



- i) Sillimanite group of minerals
- ii) Cation exchange capacity and its measurement procedures
- iii) Massive and friable variety of chromite and their applications
- iv) Co-precipitation technique for manufacturing of synthetic raw materials
- v) Generalized idea about grain particle and crystallite.

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END