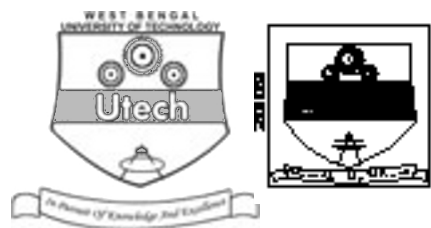


PROCESS CERAMICS-I ( SEMESTER - 4 )

CS/B.TECH (CT)/SEM-4/CT-402/09



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-402/09  
ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE – 2009  
PROCESS CERAMICS-I ( 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**

**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

4480 (08/06)



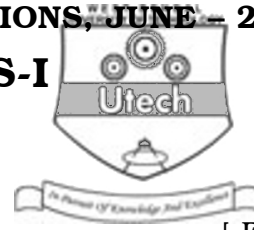
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## ENGINEERING &amp; MANAGEMENT EXAMINATIONS, JUNE – 2009

## PROCESS CERAMICS-I

## 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) Which statement is not true ?

- a) Quartz powder shows dilatent behaviour
- b) Flow curve of thixotropic suspension shows hysteresis loop
- c) For filter pressing deflocculated suspension is preferred
- d) Plastic flow shows a yield stress.

ii) Critical speed of a ball mill is

- a)  $n C = \frac{1}{2\pi} \sqrt{\frac{g}{R-r}}$
- b)  $n C = \frac{1}{4\pi} \sqrt{\frac{g}{R-r}}$
- c)  $n C = \frac{1}{\pi} \sqrt{\frac{g}{R-r}}$

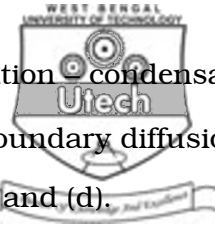
iii) Atterberg number for plasticity measurement is calculated by deducting the % water corresponding to

- a) Rolling out limit from flow limit
- b) Cohesion limit from flow limit
- c) Adhesion limit from flow limit.



iv) Which mechanism lead densification ?

- |                      |                               |
|----------------------|-------------------------------|
| a) Surface diffusion | b) Evaporation - condensation |
| c) Lattice diffusion | d) Grain boundary diffusion   |
| e) both (a) and (b)  | f) Both (c) and (d).          |



v) Factor that controls sintering in ceramic system is

- |                   |                  |
|-------------------|------------------|
| a) Particle size  | b) Temperature   |
| c) Time of firing | d) all of these. |

vi) Grinding mechanism in Attritor mill is

- |                      |                 |
|----------------------|-----------------|
| a) impact            | b) rubbing      |
| c) spinning          | d) all of these |
| e) only (a) and (b). |                 |

vii) A necessary condition for sintering in ceramic system to occur is that the dihedral angle in equilibrium

- |  |
|--|
| a) $120^\circ - 180^\circ$                 |
| b) $> 180^\circ$                           |
| c) $> 180^\circ \text{ \& } < 360^\circ$ . |

viii) The rate of drying in constant rate period of drying depends on

- |                                |                                    |
|--------------------------------|------------------------------------|
| a) humidity of surrounding air | b) movement of the surrounding air |
| c) temperature of the air      | d) none of these                   |
| e) all of these.               |                                    |

ix) True density and bulk density will be identical when

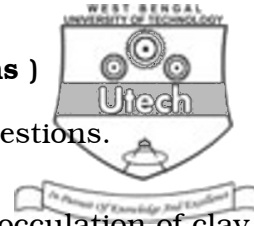
- |                                      |
|--------------------------------------|
| a) Open porosity is zero             |
| b) Close porosity is zero            |
| c) Open and closed porosity are zero |
| d) None of these.                    |

x) For drying of sanitary ware what type of drier is preferred ?

- |                    |                      |
|--------------------|----------------------|
| a) Hot floor drier | b) Funnel drier      |
| c) IR drying       | d) Microwave drying. |



5

**GROUP – B****( Short Answer Type Questions )**Answer any *three* of the following questions.

3 × 5 = 15

2. Briefly describe the mechanism of flocculation and deflocculation of clay water slip. 5
3. State the basic characteristics of a good quality slip. Prove that for a slip  $L \propto \int t$  where  $L$  is the skin layer thickness and  $t$  is the casting time. 2 + 3
4. Name the different shaping methods used in ceramic system and also mention their characteristics. How does semidry pressing differ from dry pressing ? 2 + 3
5. Give the modern definition of glass. Draw the specific volume versus temperature plot and locate glass transformation region. 2 + 3
6. How does plastic flow differ from Newtonian flow ? What is yield stress ? State the characteristic of dilatant flow with example.  $1\frac{1}{2} + 1 + 2\frac{1}{2}$

**GROUP – C****( Long Answer Type Questions )**Answer any *three* of the following questions.

3 × 15 = 45

7. Mention the importance of firing stages in ceramic product manufacturing. Briefly describe the different stages of firing. Describe the nitrification process of whiteware body. Discuss the liquid phase sintering in presence of reactive liquid with sketch. 2 + 6 + 3 + 4
8. Write in short about the different theories of glass formation. Describe the mechanism of different refining agents used in conventional glass processing. Write the approximate oxide composition of glass used in laboratory ware and optical glass. 9 + 4 + 2



9. a) Briefly discuss the different ways of packing of **unized** spherical particles. Discuss the McGearry model of packing of different sized spherical particles. 4 + 4
- b) Name the different types of free water present in clay paste. Briefly discuss the drying mechanism of clay containing body. Name the important defects that arise due to incorrect drying operation. 2 + 3 + 2
10. a) Explain the double layer theory of clay-water system. State the importance of zeta potential in conferring stability to deflocculated clay. Briefly describe the role of protective colloid in slip. 4 + 2 + 2
- b) Draw and explain the viscosity as a function of temperature curve of soda-lime-silica glass and define Tg, Ts & Tu. 1 + 6
11. Write short notes on any *three* of the following : 3 × 5
- a) Spray dryer and its importance in ceramic processing
- b) Deairing pug mill
- c) Isostatic pressing *vs.* uniaxial pressing
- d) Humidity drier
- e) Thixotropic suspension.

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END