	Ulledh
Name:	
Roll No.:	A State of State Line and Confirms
Inviailator's Signature	

CS/B.TECH (CT)/SEM-3/CT-301/2009-10 2009

INTRODUCTION TO 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.

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following:

$$10 \times 1 = 10$$

- i) A triclinic system has
 - a) $a \neq b \neq c$
- b) $a \neq b \neq c$

$$\alpha = \gamma = 90^{\circ} \neq \beta$$

$$\alpha = \beta = \gamma \neq 90^{\circ}$$

c)
$$a = b = c$$

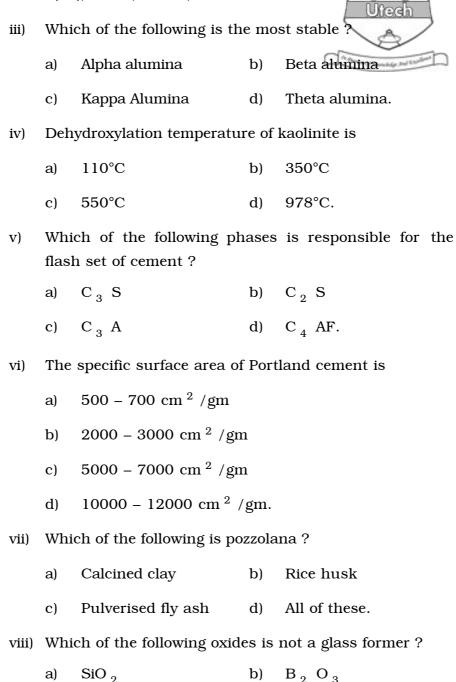
d) none of these.

$$\alpha = \beta = \gamma \neq 90^{\circ}$$

- ii) The molecular formula of 'Talc' is
 - a) $\,$ 3 MgO $_{\rm 4}$ SiO $_{\rm 2}$ $_{\rm \cdot}$ 2 H $_{\rm 2}$ O
 - b) $3 \text{ MgO} \cdot 4 \text{ SiO}_2 \cdot \text{H}_2 \text{ O}$
 - c) $\,$ MgO $_{\rm 3}$ SiO $_{\rm 2}$ $_{\rm .}$ 4 H $_{\rm 2}$ O
 - d) $\,$ 3 MgO $_{2}$ SiO $_{2}$ $_{2}$. H $_{2}$ O.

44216 [Turn over

CS/B.TECH (CT)/SEM-3/CT-301/2009-10



GeO 2

c)

d) $\operatorname{Cr}_{2} \operatorname{O}_{3}$.

- ix) The stoneware is a
 - a) crude salt glazed porcelain made from cheaper grade raw material
 - b) thoroughly vitrified translucent ware with a hard glaze
 - c) porous semivitreous ware with a soft glaze
 - d) vitrified translucent ware with a soft glaze.
- x) The filter press is mainly used in
 - a) making of refractories
 - b) ceramic insultor making
 - c) cement making
 - d) glass making.

GROUP - B

(Short Answer Type Questions)

Write short notes on any three from the following.

 $3 \times 5 = 15$

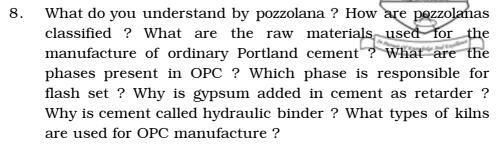
- 2. Ceramic glaze.
- 3. Different shaping methodologies of ceramic whitewares.
- 4. Zachariasen's model for glass formation.
- 5. Limitations of ceramics.
- 6. Monolithic refractories.

GROUP - C

(Long Answer Type Questions)

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

7. Classify materials. Classify ceramics. Show triaxial body in a triaxial diagram. Classify whitewares. Draw a process flow-chart of slip-house operation. 2 + 3 + 3 + 3 + 4



$$2 + 1 + 2 + 2 + 2 + 2 + 2 + 2$$

9. Define glass. Enumerate the similarities and dissimilarities between a glass and a ceramic. Discuss with a sketch how the solidification behaviour of glass differs from that of for a crystalline material when these materials are cooled from the liquid state. Draw the viscosity-temperature curve for glass and indicate on it the working, softening, annealing and strain point viscosities of glass mentioning their values.

$$4 + 2 + 4 + 5$$

10. What are the criteria for selection of quartzite as a raw material for the manufacture of Silica refractories? Discuss the 'binders' and 'additives' added during silica brick manufacture. Where do silica bricks find applications?

$$4 + 4 + 4 + 3$$

- 11. a) Define ceramics. Discuss the fundamental differences between a metal and a ceramic. Enumerate the distinctive advantages of ceramics. 2 + 2 + 4
 - b) State the applications with at least one example for the following functions and properties: 7
 - i) Thermal insulation
 - ii) Non-linear I-V characteristics
 - iii) Soft magnets
 - iv) Translucency and chemical inertness

4

- v) Nuclear fission
- vi) Biocompatibility
- vii) Hardness.

44216