Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech(CT)/SEM-6/CT-605/2011

2011

PROCESS 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

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$

   i) Properties of a Ceramic product depends on

      a) Properties of Raw materials only

      b) Process parameters only

      c) Both on properties of raw materials and process parameters

      d) None of these.

   ii) Theoretically mono-dispense ceramic powders are

      a) fully agglomerated

      b) partly agglomerated

      c) not agglomerated

      d) none of these.

iii) Size range of mono size ceramic powders is

a) 1-20 microns b) 20-100 microns

c) 100-1000 microns d) none of these.

iv) During co-precipitation, no. of cations precipitated is

a) one b) more than one

c) no cation d) none of these.

v) In stoichiometric magnesium aluminate spinel ratio of $Mg(OH)_2$: $AL(OH)_3$ is

a) 1 : 1 b) 1 : 2

c) 2 : 1 d) none of these.

vi) Achievable packing density of mono size spherical ball is

a) 50% theoretical b) 40% theoretical

c) 62% theoretical d) none of these.

vii) Fine microstructue of ceramic body is obtained by

a) normal sintering

b) hot pressing

c) hot isostatic pressing

d) none of these.

viii) Densification during solid state sintering takes place by

a) surface diffusion

b) evaporation and condensation

c) volume diffusion

d) none of these.

ix) Theory of liquid state sintering was developed by

a) R.L. Cable b) Kuczynski

c) Furnace d) none of them.

x) Condition of secondary grain growth in ceramic bodies is

a) pore mobility = grain boundary mobility

b) pore mobility > grain boundary mobility

c) pore mobility < grain boundary mobility

d) none of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Discuss briefly about agglomerates and agglomeration.
3. State the differences between Slip casting and Tape casting.
4. Discuss briefly about mono size, mono disperse submicron ceramic powders.
5. State the differences between ordinary pressing and cold isostatic pressing.
6. Discuss briefly about morphological changes that taking place during solid state sintering.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. Define co-precipitation. With process flow diagram discuss briefly how magnesium aluminate precursor powder is prepared by co-precipitation technique. State the effect of pH during co-precipitation of Magnesium aluminate spinel hydrate. 3 + 8 + 4

8. Define solid state sintering. How does it differ from liquid state sintering. Discuss briefly about driving force of solid state sintering. 4 + 4 + 7

9. Name different stages of solid state sintering. Discuss briefly how sintering takes place during each stage of solid state sintering. Discuss the role of additives during solid state sintering. 4 + 7 + 4

10. Discuss briefly how technical alumina available in the market can be processed to make near theoretical dense alumina bodies. Mention different process parameters and state process flow diagram.

11. Write short notes on any *three* of the following : 3 × 5

    a) Physical vapour deposition technique

    b) Sol – Gel technique

    c) Hot pressing

    d) Sintering atmosphere

    e) Kuczynski's sintering model

    f) Sintered microstructure of ceramic bodies.