



Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech (CT-OLD)/SEM-6/CT-605/2013

2013

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 × 1 = 10

- i) Ceramic powders prepared by chemical route is often agglomerated due to
 - a) Attractive force among particles
 - b) Repulsive force among particles
 - c) Combined attractive and repulsive forces among particles
 - d) None of these.
- ii) Maximum packing density (% theoretical) obtainable by monosize spheres is
 - a) ~ 62 %
 - b) 74%
 - c) 40%
 - d) none of these.



- iii) Uniform packing density in a green body is achieved by
- a) unidirection pressing
 - b) pressing from top and bottom directions
 - c) Isostatic pressing
 - d) none of these.
- iv) Product of coprecipitation process contains
- a) one metallic ion
 - b) more than one metallic ions
 - c) no metallic ion
 - d) none of these.
- v) Thin ceramic films are formed by
- a) Slip casting
 - b) Dry pressing
 - c) Tape casting
 - d) None of these.
- vi) Dopant used to prevent secondary recrystallization of alumina during sintering is
- a) Na_2O
 - b) Fe_2O_3
 - c) MgO
 - d) none of these.
- vii) Finer microstructure of a ceramic body during sintering is achieved by
- a) normal sintering
 - b) hot pressing
 - c) hot isostatic pressing
 - d) none of these.



- viii) True porosity of a ceramic body is obtained from
- open pores
 - closed pores
 - combined open and closed pores
 - none of these.
- ix) % sealed pores present in white Tabular alumina is
- 0%
 - 1 – 3%
 - 5 – 7%
 - none of these.
- x) Alumina content in a stoichiometric $\text{Mg Al}_2\text{O}_4$ is
- 66.4%
 - 75.2%
 - 71.7%
 - none of these.

GROUP – B

(Short Answer Type Questions)

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

- Define agglomerates and agglomeration. Discuss how soft and Hard agglomerates are formed.
- Discuss why powders prepared by chemical routes are often agglomerated.
- Describe briefly how morphological changes taking place during solid state sintering.
- Discuss the differences between liquid state sintering and vitrification.
- Discuss the differences between slip casting and tape casting.



GROUP – C

(Long Answer Type Questions)

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

7. Define spinel. How are they classified ? Describe briefly how refractory grade spinels (Magnesium aluminate) are prepared in the plant. State some of their uses. $2 + 2 + 8 + 3$
8. Define a Sol and an gel. How can they be classified ? Describe briefly how submicron size ceramic powders can be prepared by Sol-Gel process. $(1\frac{1}{2} + 1\frac{1}{2}) + 2 + 10$
9. Define isostatic pressing. How does it differ from ordinary pressing ? Discuss briefly how alumina grinding media can be prepared by isostatic pressing. Describe briefly ideal microstructure required for grinding media. How can it be achieved ? $2 + 3 + 6 + 4$
10. Define solid state sintering. How can it be classified ? Discuss briefly the driving force of sintering. Describe briefly Kuczynskil's Kinetic Model of sintering. $3 + 2 + 4 + 6$
11. Write short notes on any *three* of the following : 3×5
 - a) Mono size and Mono dispersed ceramic powders.
 - b) Co-precipitation technique
 - c) Role of inprocess inspection
 - d) Volume Diffusion
 - e) Development of green microstructure of a ceramic body.
