



Note: Answer 5 questions only

Q1 :- (10 marks)

- a- Answer The Following Shortly:**
- 1- What is the historical ceramic object?
 - 2- Can impurities change crystal habit during crystallization? Draw these effect.
 - 3- State only finishing operations.
- b- How you can treated these powders problems?**
(a: Toxicity of powder, b: Bad compaction, c: Work hardening effect)?

Q2:- (10 marks)

- a- Answer :**
- 1- What did crystallization phenomena usually include?
 - 2- Define particle size distribution? What's types?
- b- State only:**
- 1- Golden Rules of Sampling.
 - 2- Types of mills used in ceramic raw materials.

Q3 :- (10 marks)

- a- Answer The Following Shortly:**
- 1- How does the relation between flowability and particle (shape or size)?
 - 2- Which one is the great bulk density or tap density?(other condition is constant).
 - 3- What does Hausner ratio decreasing means from compressibility index Concept?
- b- Draw the different between ductile and brittle powder during milling process.**

Q4 :- (10 marks)

- a- Answer :**
- 1- In atomization method used to produce powders of ceramic powder. How is the relation between water speed in jet and fabricated particle size?
 - 2- State the heat provided types in thermal decompositions reactions, reaction energy.
 - 3- How can furnace atmosphere controlled?
- b- Sketch evaporation condensation generator.**

Q5:- (10 marks)

- a- Select fabrication method for this product: (a: Long coherent and brittle green strip , b: Compacted disc from hard carbide powder with high sudden pressure , c: Body with very low pressure and higher packing density , d: Crucible , e: Long glass fiber).**
- b- Sketch a diagram for drying of a ceramic green body showing the weight loss and shrinkage with time.**

Q6 :- (10 marks)

- a- If you have mixture of powders contain different metals and ceramics powders , how could separating them?**
- b- Sketch and discuss the pore fabrication and movement during intermediate and final stage of sintering.**