



B.E/B.Tech (Full Time) DEGREE END SEMESTER EXAMINATION APRIL/MAY 2014

MATERIALS SCIENCE AND ENGINEERING BRANCH

FOURTH SEMESTER

**ML9254 – POWDER METALLURGY**

REGULATIONS 2008

Time: 3 hr

Max. Marks: 100

**PART – A (2 X 10 =20)**

1. How surface contaminants affect the powder properties?
2. State an advantage and disadvantage of porosity of particles.
3. Which process of synthesis of powder is economic and why?
4. What are the differences between blending and mixing?
5. Name two applications of explosive compaction of powders.
6. What is the critical ratio of diameter to height ratio in uniaxial compaction? why?
7. Give an example for activated sintering technique.
8. Which technique among the two: liquid infiltration and liquid phase sintering, yields least porosity? why?
9. What do you mean by "two phase materials concept" in powder metallurgy products?
10. Why dispersed strengthened materials are suitable for high temperature application?

**PART – B (5 X 16 =80)**

11. (i) How are self lubricating bearing are produced by powder metallurgy technique? (8)  
(ii) Brief on the Powder Metallurgy route of production of Carbide tipped tools? (8)
  - 12.(a) Describe a method of measuring particle size based on  
(i) sedimentation (8)  
(ii) adsorption (8)
- (OR)**
- (b) (i) Brief on the following powder characteristics and their effects on properties of sintered products: Flow rate, Particle size distribution, Apparent density and Composition & structure. (4+4+4+4)
- 13.(a)(i) Compare the mechanism of powder production by ball milling and atomization. (10)  
(ii) Brief on the hydrometallurgical method of preparation of powder with an example. (6)

**(OR)**

(b) Write short notes on the following powder production methods:

- (i) Carbonyl reduction (10)
- (ii) Electrolysis (6)

14. (a) (i) How are the problems of friction during pressurized forming are overcome? (8)
- (ii) Brief on the methods of pressureless compaction techniques and their application? (8)

(OR)

- (b) (i) Discuss on the various aspects of design of die and press in pressurized compaction techniques with illustration. (12)
- (ii) List the difference between powder rolling and bulk metal rolling. (4)

15. (a) Describe on the driving forces of sintering and the mechanisms of sintering. (16)

(OR)

(b) Write short notes on the following:

- (i) Post sintering processes (4)
- (ii) Liquid phase sintering (6)
- (iii) Hot Isostatic Pressing (6)