

B.E. (MET) PART-IV 8TH SEMESTER EXAMINATION, 2013

POWDER METALLURGY (MT – 801)

Time: 3 hours

Full Marks: 70

Answer any seven questions

1. (a) Define powder metallurgy technique. 3
(b) Mention the major advantages of powder metallurgy technique. 4
(c) Mention the limitations of metal powders? 3
2. (a) Mention the different methods of powder compaction techniques. 3
(b) What should be the method used when the parts of non uniform thickness are compacted ? 3
(c) State the function of lubricant in Powder metallurgy technique. 4
3. (a) Discuss the principle of production of metal powders by atomization process. 5
(b) Discuss about various parameters that can be varied in an atomizer unit? 5
4. (a) How you will determine the shape, size and size distribution of metal powders ? 4
(b) How apparent density and compression ratio determine the size of the die cavity? 3
(c) Mention different methods for coating of metal powders? 3
5. (a) Discuss the principle of rolling of metal powders. 6
(b) How the characteristics of the rolled strip vary on different parameters ? 2
(c) What are the differences between dry bag system and wet bag system in isostatic pressing? 2
6. (a) What is specific surface of metal powders. How does specific surface affect the property of green compact? 3
(b) Define flow rate of metal powders. How will you measure this property? 4
(c) Define green strength of green compact. 3
7. (a) What are the advantages of hot pressing over conventional compacting and sintering operation? 5
(b) Illustrate the powder extrusion technique with schematic diagram? 5
8. (a) Discuss the mechanism of Sintering? 5
(b) How do sintering temperature and time affect loosely heat metal powders? 2
(c) Briefly explain the effect of sintering temperature on density, tensile strength and elongation of stainless steel compacts? 3
9. Differentiate PM filters and bearing in regards to size and morphology of the pores. How can you justify elimination of compaction during preparation of filters? What is the need for pre-sintering stage? State the microstructure requirement for high performance of bearing and how this structure can be achieved? 2+3+2+3
10. Suggest suitable design of the materials to overcome friction problems in aircrafts breaks. What is the role of gritty material in friction? 2+8