

B.E. (MET) PART-IV 8TH SEMESTER EXAMINATION, 2014
POWDER METALLURGY (MT – 801)

Time:3 hours

Full Marks: 70

Answer any seven questions

1. (a) What are the important methods of powder production? 3
(b) Describe the atomization technique for producing metal powders. 4
(c) How process parameters control the shape, size and size distribution of metal powders? 3
2. (a) How critical speed of rotation of the ball mill affects the milling action? 3
(b) Describe the basic principles of Hammett Eddy mill in production of metal powders. 5
(c) What are the limitations of metal powders 2
3. (a) Mention the different methods of powder compaction techniques 3
(b) what are the advantages of double action pressing over single action pressing? Explain with an example? 4
(c) What should be the method used when the parts of non uniform thickness are compacted? 3
4. (a) What is the difference between compressibility and compactibility of metal powders? 3
(b) How apparent density and compression ratio determine the size of the die cavity? 3
(c) What are the factors that should be considered for construction of a die? 4
5. (a) Mention different techniques of isostatic pressing with suitable sketches. 5
(b) What are the advantages of isostatic pressing over conventional die compaction technique? 3
(c) State the function of lubricant in powder compaction method? 2
6. (a) What are the advantages and limitations of hot pressing over conventional compacting sintering operation? 4
(b) What treatment should be given to oxidized copper powders before compaction? 3
(c) Briefly describe the extrusion process of metal powder. 3
7. (a) What is the importance of sintering atmosphere? Mention three commonly employed atmosphere for sintering. 3
(b) Describe the mechanism of sintering? 5
(c) What is the difference between solid state sintering and liquid phase sintering? 2
8. (a) How sintering temperature and time affect the loosely heaped metal powders and compacts produced at very high pressure? 3
(b) What will happen during sintering when lubricants are retained along with the metal powders? 2
(c) Briefly mention the production of cermet by powder metallurgy technique. 5

9. Justify the following statements: 2.5 x 4 = 10
- (i) Single material cannot meet the property demand for heavy duty electrical contact materials processed by P/M route.
 - (ii) To prevent material transfer during sparking one should consider several factors.
 - (iii) Pb has a self regulating influence on temperature as a component in friction parts.
 - (iv) Graphite cannot alone increase friction in a friction part.
10. How P/M filters and bearings act differently? Mention the changes in process route to accommodate these differences. Discuss the suitability of Cu-Sn system for preparation of P/M bearing and filters. 4+3+3