

POSTAL Book Package

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GATE • PSUs

PRODUCTION AND INDUSTRIAL ENGINEERING

Objective Practice Sets

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Powder Processing

MCQ and NAT Questions

- Q.1** For the same material, powder metallurgy process is superior to casting for
- (a) making large products
 - (b) better control over the density of product
 - (c) better strength of the finished product
 - (d) making parts with wide variations of thickness at different sections
- Q.2** Green strength in powder metallurgy refers to the strength of
- (a) original material in the bulk form
 - (b) the powder before compaction
 - (c) the powder after compaction
 - (d) the powder after sintering and cooling
- Q.3** Process of forming metal powder by directing molten metal through an orifice after which it is break into small particle using high pressure fluid is known as
- (a) Atomization (b) Reduction
 - (c) Crushing (d) Electrolysis
- Q.4** Formation of metal powder to use in powder metallurgy by reducing some compound with Co or other molecules is known as
- (a) Atomization (b) Reduction
 - (c) Crushing (d) Electrolysis
- Q.5** Production of pure powder of iron and copper can be effectively done using
- (a) Atomization (b) Reduction
 - (c) Crushing (d) Electrolysis
- Q.6** Powder of various ferrous and non-ferrous material which become brittle on heating can be formed using
- (a) Atomization (b) Reduction
 - (c) Crushing (d) Electrolysis
- Q.7** Sintering is done to
- (a) decrease final strength
 - (b) increase final strength
 - (c) decrease strength
 - (d) none of the above
- Q.8** In powder metallurgy, sintering of the component
- (a) increases density and reduces ductility
 - (b) increases porosity and reduces density
 - (c) increases density and reduces porosity
 - (d) increases porosity and reduce brittleness
- Q.9** Which one of the following methods is NOT used for producing metal powders.
- (a) Atomization
 - (b) Compaction
 - (c) Machining and Grinding
 - (d) Electrolysis
- Q.10** Which of the following powder production methods produces spongy and porous particles?
- (a) Atomization
 - (b) Reduction of metal oxides
 - (c) Electrolytic deposition
 - (d) Pulverization
- Q.11** The process of impregnation in powder metallurgy technique is best described by which of the following?
- (a) After sintering operation of powder metallurgy, rapid cooling is performed to avoid thermal stresses.
 - (b) Low melting point metal is filled in the pores of a sintered powder metallurgy product.
 - (c) Liquid oil or grease is filled in the pores of a sintered powder metallurgy product.
 - (d) During sintering operation of powder metallurgy, rapid heating is performed to avoid sudden produce of high internal pressure due to volatilization of lubricant.

while mixing is mixing same type of metal or alloy powders.

- (c) Blending is mixing the same metal or alloy powders of different size distribution, while mixing is mixing different type of metal or alloy powders.
- (d) Blending and mixing refers to the same process of mixing same type of metal or alloy powders of different size distribution.

Q.26 Which of the following is/are advantages to manufacture a component using powder metallurgy

- (a) Automation of process can be easily done.
 (b) Mechanical properties are inferior.
 (c) Provides controlled porosity.
 (d) Not cause any waste product.



Answers Powder Processing

1. (b) 2. (c) 3. (a) 4. (b) 5. (d) 6. (c) 7. (b) 8. (b) 9. (b)
 10. (b) 11. (c) 12. (b) 13. (a) 14. (d) 15. (c) 16. (a) 17. (d) 18. (a)
 19. (c) 20. (d) 21. (c) 22. (c) 23. (a) 24. (c) 25. (a, b, d) 26. (a, c, d)

Explanations Powder Processing

1. (b)

Unlike casting, density of product could be better controlled during compaction stage of powder metallurgy by varying compaction forces.

2. (c)

The strength of the part after compaction is called green strength.

3. (a)

Atomization is a process of forming metal powder by directing molten metal through an orifice after which it is break into small particle using high pressure fluid. In Atomization, they usually carry a layer of oxide over them, which means they are more prone to oxidation.

4. (b)

Reduction is a process of formation of metal powder to use in powder metallurgy by reducing some compound with Co or other reducing agents.

5. (d)

Electrolysis is a most effective process for the formation of iron and copper powder. It uses two electrodes and an electrolyte.

6. (c)

Ferrous and non-ferrous metals are heated first, and when they become brittle, they are crushed.

7. (b)

Sintering increases the final strength of the materials formed using powder metallurgy. Sintering is very important to produce good quality of powder.

8. (b)

During sintering process, the solvent added at mixing stage will evaporate and produce porosity which comes the reduction in density of the component.

9. (b)

Compaction is not a metal powder production method. It is one of the step in powder metallurgy process.

There are four methods of powder productions :

- (i) Atomization
- (ii) Reduction
- (iii) Electrolysis
- (iv) Machining and grinding

10. (b)

Reduction is the process of powder production in which metal oxide is reduced to metal powder through contact with a reducing gas at temperature below the melting point. This method produce spongy and porous particles.