

Unit 7 - Manufacturing of Biomaterials (metals, ceramics and polymers)

Course outline

How to access the portal

Week 1 Introduction to Biomaterials and Biocompatibility

Defining tissue engineering scaffolds and implants

Structure and Properties of Proteins and Cells

Stem cells and Cell fate processes

Cell-material Interaction (in vitro and in vivo) and Clinical trials

Manufacturing of Biomaterials (metals, ceramics and polymers)

- Metal manufacturing
- Ceramics manufacturing
- Polymers manufacturing
- Additive Manufacturing

Quiz : WEEK 6 ASSIGNMENT

HA-based Composites

Glass ceramics for orthopedic and dental applications, acetabular socket and femoral head, prototype development

Text Transcripts

WEEK 6 ASSIGNMENT

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-09-11, 23:59 IST.

1) Micro-CT or Micro computed-tomography is used for assessing the structural features of a material

1 point

- Qualitatively
- Quantitatively
- Superficially
- none of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Quantitatively

2) The manufacturing of rolled plates is done at temperature or above _____, where T_m is the melting temperature of the metal.

1 point

- $T_m/4$
- $2T_m$
- $T_m/2$
- $3/4T_m$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $T_m/2$

3) Advanced sintering processes include the following

1 point

- Hot isostatic pressing
- Hot pressing
- Spark plasma sintering
- all of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
all of the above

4) Degree of polymerization indicates

1 point

- number of monomers in a polymer
- type of polymers
- arrangement of polymers
- none of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
number of monomers in a polymer

5) The most appropriate sintering temperature for a composite A+B, if the melting point of metal A is 230 K and that of B is 540 K.

1 point

- 540 K
- 600 K
- 345 K
- 810 K

No, the answer is incorrect.
Score: 0

Accepted Answers:
345 K

6) Hydroxyapatite is sintered at a temperature

1 point

- above 1000°C
- below 500°C
- above 2000°C
- above 1500°C

No, the answer is incorrect.
Score: 0

Accepted Answers:
above 1000°C

7) During sintering of ceramics

1 point

- only pore size changes
- only pore shape changes
- both pore size and pore shape changes
- maximum neck growth occurs by vapor phase transfer

No, the answer is incorrect.
Score: 0

Accepted Answers:
both pore size and pore shape changes

8) Hardness is a measure of resistance against

1 point

- fracture
- crack growth
- permanent deformation
- pore growth

No, the answer is incorrect.
Score: 0

Accepted Answers:
permanent deformation

9) If the crack growth resistance increases, then

1 point

- fracture toughness will decrease
- fracture toughness will increase
- hardness will increase
- hardness will decrease

No, the answer is incorrect.
Score: 0

Accepted Answers:
fracture toughness will increase

10) NiTi stent for cardiovascular applications can be manufactured via

1 point

- rolling
- forging
- extrusion
- wire drawing

No, the answer is incorrect.
Score: 0

Accepted Answers:
wire drawing

11) The polymer processing involves

1 point

- forging
- hot rolling
- injection molding
- all of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
injection molding

12) Crystal morphology in ceramics depends upon

1 point

- its composition
- the sintering temperature
- both (i) and (ii)
- none of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
both (i) and (ii)

13) For the processing of ceramic materials for biomedical applications which route will you choose?

1 point

- Melting and casting
- Sintering
- Evaporation
- Extrusion

No, the answer is incorrect.
Score: 0

Accepted Answers:
Sintering

14) The grain size increases, when (in reference to sintering conditions to reach fully dense ceramics)

1 point

- sintering time is shorter
- sintering time is longer
- sintering temperature is lower
- none of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
sintering time is longer

15) Weber number (We) is

1 point

- ratio of inertial forces to viscous forces
- ratio of kinetic energy to surface energy
- ratio of surface energy to kinetic energy
- ratio of viscous forces to inertial forces

No, the answer is incorrect.
Score: 0

Accepted Answers:
ratio of kinetic energy to surface energy