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NPTEL

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Courses » Surface Engineering for Corrosion and Wear Resistance Application

Announcements **Course** Ask a Question Progress FAQ

Unit 6 - Week 4 :

Register for
Certification exam

Course outline

How to access
the portal

Week 0 :

Week 1 :

Week 2 :

Week 3 :

Week 4 :

- Lecture 17 :
Classification of
Surface
engineering
- Lecture 18 :
Strengthening
of metals
- Lecture 19 :
Strengthening
of Non-Metals
- Lecture 20 :
Diffusive
transformation
in Steel
- Lecture 21 :
Non-Diffusive
transformation
in Steel
- Lecture
Materials

Assignment 4

The due date for submitting this assignment has passed.

As per our records you have not submitted this **Due on 2019-02-27, 23:59 IST.**
assignment.

1) Surface engineering means:

1 point

- a. Only tailoring surface hardness and microstructure
- b. Only tailoring surface chemical properties and composition
- c. Only tailoring surface strength and composition
- d. Only tailoring surface microstructure or composition or both

No, the answer is incorrect.

Score: 0

Accepted Answers:

d. Only tailoring surface microstructure or composition or both

2) An example of surface engineering of steel without change in surface dimension but only change in microstructure could be:

1 point

- a. Induction hardening
- b. Sub-zero quenching
- c. Forging
- d. Weld overlaying

No, the answer is incorrect.

Score: 0

Accepted Answers:

a. Induction hardening

3) An example of surface engineering of silicate glass without change in surface dimension but only change in condition could be:

1 point

- a. Shot peening
- b. Electron beam cladding

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Week 6 :	4) An example of surface engineering of silicate glass without change in surface dimension 1 point
Week 7 :	but only change in condition could be:
Week 8 :	<input type="radio"/> a. Plasma electrolytic oxidation
Week 9 :	<input type="radio"/> b. Plasma spray deposition
Week 10 :	<input type="radio"/> c. Glass tempering
Week 11 :	<input type="radio"/> d. Glass ceramic crystallization
Week 12 :	
Supplementary Lecture Slides	
DOWNLOAD VIDEOS	
Solution	
Interaction Session	

No, the answer is incorrect.
Score: 0
Accepted Answers:
c. Glass tempering

5) An example of surface engineering of a superalloy component steel with change in surface dimension, microstructure and composition could be: **1 point**

a. Carburizing

b. Plasma nitriding

c. Martensite hardening

d. Pack cementation

No, the answer is incorrect.
Score: 0
Accepted Answers:
d. Pack cementation

6) An example of surface engineering of decorative brass flower vase with both change in surface dimension as well as composition could be: **1 point**

a. Partial crystallization

b. Laser shock peening

c. Electroplating

d. Electro-polishing

No, the answer is incorrect.
Score: 0
Accepted Answers:
c. Electroplating

7) An example of surface engineering of austenitic stainless steel based bio-medical implant without change in surface dimension but both change in microstructure and composition: **1 point**

a. Plasma immersion ion implantation

b. Laser surface annealing

c. Laser surface cladding

d. Hot dip galvanizing

No, the answer is incorrect.
Score: 0
Accepted Answers:
a. Plasma immersion ion implantation

8) An example of surface engineering for reclamation of a damaged or worn steel roll with change in surface dimension, microstructure and composition could be: **1 point**

a. Plasma spray coating

b. Laser surface alloying

- c. Laser surface hardening
- d. Laser surface cladding

No, the answer is incorrect.

Score: 0

Accepted Answers:

d. Laser surface cladding

9) An example of surface engineering of semiconductor device without change in surface dimension but only change in composition could be: **1 point**

- a. High velocity oxy fuel coating
- b. Cold spray coating
- c. Ion implantation
- d. Ion plating

No, the answer is incorrect.

Score: 0

Accepted Answers:

c. Ion implantation

10) An example of a common surface coating practice for a nickel based component with change in surface dimension, microstructure and composition could be: **1 point**

- a. Sputtering
- b. Anodizing
- c. Cathodizing
- d. Rapid thermal annealing

No, the answer is incorrect.

Score: 0

Accepted Answers:

b. Anodizing

11) Identify the possible strengthening mechanism in flame hardening: **1 point**

- a. Solid solution hardening
- b. Grain refinement
- c. Dispersion hardening
- d. Martensite transformation

No, the answer is incorrect.

Score: 0

Accepted Answers:

d. Martensite transformation

12) Identify the possible strengthening mechanism in nitriding of austenitic stainless steel: **1 point**

- a. Dislocation strengthening
- b. Amorphization
- c. Dispersion strengthening
- d. Martensite hardening

No, the answer is incorrect.

Score: 0

Accepted Answers:

c. Dispersion strengthening

13) Identify the possible strengthening mechanism in ion implantation of Ti-alloy: **1 point**

- a. Increase in dislocation density
- b. Solute supersaturation
- c. Texture strengthening
- d. Two-phase hardening

No, the answer is incorrect.

Score: 0

Accepted Answers:

b. Solute supersaturation

14) Identify the possible strengthening mechanism in shot peening **1 point**

- a. Controlled plastic deformation
- b. Controlled elastic deformation
- c. Diffusive phase transformation
- d. Coherency strengthening

No, the answer is incorrect.

Score: 0

Accepted Answers:

a. Controlled plastic deformation

15) Identify the possible strengthening mechanism in carburized steel: **1 point**

- a. Long range ordering
- b. Short range ordering
- c. Martensitic strengthening
- d. Precipitation hardening

No, the answer is incorrect.

Score: 0

Accepted Answers:

c. Martensitic strengthening

16) Martensite-austenite growth front in steel moves extremely fast and is a: **1 point**

- a. Coherent-glissile interface
- b. Incoherent-glissile interface
- c. Incoherent-sessile interface
- d. Coherent-sessile interface

No, the answer is incorrect.

Score: 0

Accepted Answers:

a. Coherent-glissile interface

17) Strength of martensite in steel does not depend on: **1 point**

- a. Grain size
- b. Supersaturation
- c. Crystal lattice/structure
- d. Critical resolved shear stress

No, the answer is incorrect.

Score: 0

Accepted Answers:

d. Critical resolved shear stress

18) Tempering of silicate glass requires:

1 point

- a. Slow cooling at surface and fast cooling in the interior
- b. Fast cooling at surface and slow cooling in the interior
- c. Uniform cooling at the surface and in the interior
- d. Fast cooling/quenching of the entire glass sample

No, the answer is incorrect.

Score: 0

Accepted Answers:

b. Fast cooling at surface and slow cooling in the interior

19) Which of the following is not applicable for strengthening of polymeric solids?

1 point

- a. Partial crystallization
- b. Cross linking
- c. Grain refinement
- d. Dispersion strengthening

No, the answer is incorrect.

Score: 0

Accepted Answers:

c. Grain refinement

20) Which of the following is not a possible strengthening strategy in composites?

1 point

- a. Precipitation strengthening
- b. Particulate strengthening
- c. Multi-phase strengthening
- d. Fiber strengthening

No, the answer is incorrect.

Score: 0

Accepted Answers:

a. Precipitation strengthening

21) Chromate conversion coating of Al-alloy induces protection against:

1 point

- a. Fatigue damage
- b. Corrosion and tarnishing
- c. Surface melting
- d. Surface softening

No, the answer is incorrect.

Score: 0

Accepted Answers:

b. Corrosion and tarnishing

22) Calorizing of ferrous boiler tubes induces protection against:

1 point

- a. Gouging wear
- b. Brinelling
- c. Oxidation
- d. Creep

No, the answer is incorrect.

Score: 0

Accepted Answers:

c. Oxidation

23 Sputtering of semiconductor substrate is ideal for inducing:

1 point

- a. Corrosion resistance
- b. Oxidation resistance
- c. Reducing emissivity
- d. Tailoring conductivity



No, the answer is incorrect.

Score: 0

Accepted Answers:

d. Tailoring conductivity

24 Cold spray is ideal for depositing metallic or ceramic coating with:

1 point

- a. High density and adherence
- b. High oxidation resistance
- c. High corrosion resistance
- d. High surface asperity

No, the answer is incorrect.

Score: 0

Accepted Answers:

a. High density and adherence

25 Galvanizing of steel is zinc based coating applied principally to offer:

1 point

- a. High surface hardness
- b. High weathering resistance
- c. Low friction coefficient
- d. Strong diffusion barrier

No, the answer is incorrect.

Score: 0

Accepted Answers:

b. High weathering resistance

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