Assignment 4

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

Due on 2019-02-27, 23:59 IST

1) Surface engineering means:
   - a. Only tailoring surface hardness and microstructure (1 point)
   - 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:
   - a. Induction hardening (1 point)
   - 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:
   - a. Shot peening (1 point)
   - b. Electron beam cladding

No, the answer is incorrect.
Score: 0

Accepted Answers:
- b. Electron beam cladding
4) An example of surface engineering of silicate glass without change in surface dimension but only change in condition could be:

- a. Plasma electrolytic oxidation
- b. Plasma spray deposition
- c. Glass tempering
- d. Glass ceramic crystallization

**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:

- 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:

- 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:

- 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:

- a. Plasma spray coating
- b. Laser surface alloying
9) An example of surface engineering of semiconductor device without change in surface dimension but only change in composition could be:

- (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:

- (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:

- (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:

- (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
18) Tempering of silicate glass requires:

- 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

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

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

No, the answer is incorrect.
Score: 0

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

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

No, the answer is incorrect.
Score: 0

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

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

No, the answer is incorrect.
Score: 0

22) Calorizing of ferrous boiler tubes induces protection against:

- 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:

- 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:

- 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:

- 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