

X

NPTEL

reviewer4@nptel.iitm.ac.in ▼

Courses » Surface Engineering for Corrosion and Wear Resistance Application

Announcements **Course** Ask a Question Progress FAQ

Unit 7 - Week 5 :

Register for
Certification exam

Course outline

How to access
the portal

Week 0 :

Week 1 :

Week 2 :

Week 3 :

Week 4 :

Week 5 :

- Lecture 22 :
Shot Peening
- Lecture 23 :
Shot Peening
and Rolling
- Lecture 24 :
Flame
Hardening and
Induction
Hardening
- Lecture 25 :
Case
Carburizing
- Lecture 26 :
Liquid
Carburizing and
Gas
Carburizing

Assignment 5

The due date for submitting this assignment has passed.

As per our records you have not submitted this **Due on 2019-03-06, 23:59 IST.**
assignment.

1) Shot peening, ultrasonic peening or laser shock peening – all these processes employ the **1 point**
common strengthening mechanism of:

- a. Martensitic transformation
- b. Pearlitic transformation
- c. Work hardening
- d. Age hardening

No, the answer is incorrect.

Score: 0

Accepted Answers:

c. Work hardening

2) Residual state of stress after shot peening, ultrasonic peening or laser shock peening **1 point**
usually is:

- a. Tensile
- b. Compressive
- c. Neutral
- d. Torsional

No, the answer is incorrect.

Score: 0

Accepted Answers:

b. Compressive

3) The following property is likely to improve after laser shock peening: **1 point**

- a. Ductility
- b. Toughness

© 2014 NPTEL - Privacy & Terms - Honor Code - FAQs -





A project of



In association with



Funded by

| | | | |
|-------------------------------------|---|---|---|
| Week 6 : | ce De | 4) Ultrasonic peening may improve surface hardness of: | 1 point |
| Week 7 : | | <input type="radio"/> a. All metallic alloys | |
| Week 8 : | | <input type="radio"/> b. Only steel and ferrous alloys | |
| Week 9 : | | <input type="radio"/> c. Only non-ferrous alloys | |
| Week 10 : | | <input type="radio"/> d. Only superalloys | |
| Week 11 : | | No, the answer is incorrect. |  |
| Week 12 : | | Score: 0 | |
| Supplementary Lecture Slides | | Accepted Answers: |  |
| DOWNLOAD VIDEOS | | <i>a. All metallic alloys</i> | |
| Solution | | 5) Buffing, cleaning, polishing and grinding differ from each other in terms of: | 1 point |
| Interaction Session | | <input type="radio"/> a. Depth of surface hardening |  |
| | | <input type="radio"/> b. Level of surface reflectivity/luster | |
| | <input type="radio"/> c. Amount of abrasives used |  | |
| | <input type="radio"/> d. Degree of material removal | | |
| | No, the answer is incorrect. | | |
| | Score: 0 | | |
| | Accepted Answers: | | |
| | <i>d. Degree of material removal</i> | | |
| | 6) Degree of hardness and residual stress created is most effective or the maximum after identical duration of: | 1 point | |
| | <input type="radio"/> a. Laser shock peening | | |
| | <input type="radio"/> b. Ultrasonic peening | | |
| | <input type="radio"/> c. Shot peening | | |
| | <input type="radio"/> d. Skin pass rolling | | |
| | No, the answer is incorrect. | | |
| | Score: 0 | | |
| | Accepted Answers: | | |
| | <i>a. Laser shock peening</i> | | |
| | 7) The principal reason for improving hardness and residual stress in any peening process is the increase in the density of the following type of defect: | 1 point | |
| | <input type="radio"/> a. Point defects | | |
| | <input type="radio"/> b. Line defects | | |
| | <input type="radio"/> c. Surface defects | | |
| | <input type="radio"/> d. Volume defects | | |
| | No, the answer is incorrect. | | |
| | Score: 0 | | |
| | Accepted Answers: | | |
| | <i>b. Line defects</i> | | |
| | 8) Diameter of steel shots used for shot peening is typically: | 1 point | |
| | <input type="radio"/> a. 0.005 mm | | |
| | <input type="radio"/> b. 0.05 mm | | |
| | <input type="radio"/> c. 0.5 mm | | |
| | <input type="radio"/> d. 5.0 mm | | |

No, the answer is incorrect.

Score: 0

Accepted Answers:

c. 0.5 mm

9) Identify the group employing the same mechanism of surface hardening:

1 point

- a. Skin pass rolling, ultrasonic peening, flame hardening
- b. Induction hardening, hammer peening, needle peening
- c. Ultrasonic peening, flame hardening, induction hardening
- d. Shot peening, needle peening, hammer peening



No, the answer is incorrect.

Score: 0

Accepted Answers:

d. Shot peening, needle peening, hammer peening



10) Suggest a possible technique from the following which is useful for improving endurance limit of a small and sophisticated gear for wrist watch:

1 point

- a. Laser shock peening
- b. Hammer peening
- c. Needle peening
- d. Skin pass deformation

No, the answer is incorrect.

Score: 0

Accepted Answers:

a. Laser shock peening

11) Induction hardening is considered more precise than flame hardening because:

1 point

- a. Hardness is more
- b. Residual stress produced is more
- c. Temperature of heating is more
- d. Depth of heating is inversely related to frequency

No, the answer is incorrect.

Score: 0

Accepted Answers:

d. Depth of heating is inversely related to frequency

12) Induction hardening is not applicable to maraging steel because:

1 point

- a. It does not undergo precipitation hardening
- b. It does not contain alloying elements
- c. It does not respond to electromagnetic induction
- d. It does not contain carbon

No, the answer is incorrect.

Score: 0

Accepted Answers:

d. It does not contain carbon

13) Aluminum alloys are not amenable to flame hardening like steel because they:

1 point

- a. Do not undergo shear transformation on cooling

- b. Do undergo shear transformation on cooling
- c. Possess lower melting/liquidus temperature than steel
- d. Possess lower density than steel

No, the answer is incorrect.

Score: 0

Accepted Answers:

a. Do not undergo shear transformation on cooling



14) Mention which of the following may harden the surface of steel without changing composition?

1 point



- a. Carburizing
- b. Carbonitriding
- c. Induction hardening
- d. Calorizing



No, the answer is incorrect.

Score: 0

Accepted Answers:

c. Induction hardening

15) Surface melting (confined to the near surface region) may increase strength and wear resistance by:

1 point

- a. Increasing dislocation density
- b. Grain refinement
- c. Diffusive transformation
- d. Non-diffusive transformation

No, the answer is incorrect.

Score: 0

Accepted Answers:

b. Grain refinement

16) Carburizing is done above AC_3 temperature because:

1 point

- a. Diffusion is faster
- b. Reaction is safer
- c. Solubility is higher
- d. Transformation kinetics are faster

No, the answer is incorrect.

Score: 0

Accepted Answers:

c. Solubility is higher

17) Carburizing is ideal for plain carbon steels with:

1 point

- a. 0.1 – 0.2 wt. % carbon
- b. 0.3 – 0.6 wt. % carbon
- c. 0.4 – 0.8 wt. % carbon
- d. > 0.8 wt. %

No, the answer is incorrect.

Score: 0

Accepted Answers:

a. 0.1 – 0.2 wt. % carbon

18) Carbon content of a steel axle subjected to induction hardening will typically be:

1 point

- a. 0.1 – 0.2 wt. % carbon
- b. 0.2 – 0.3 wt. % carbon
- c. 0.3 – 0.4 wt. % carbon
- d. > 0.4 wt. %



No, the answer is incorrect.

Score: 0

Accepted Answers:

d. > 0.4 wt. %

19) Hardening associated with pack carburizing:

1 point

- a. Requires a separate heat treatment
- b. Requires no separate heat treatment
- c. Requires air cooling after carburizing
- d. Requires water slow cooling after carburizing



No, the answer is incorrect.

Score: 0

Accepted Answers:

a. Requires a separate heat treatment

20) Hardening of carburized layer is due to:

1 point

- a. Pearlite
- b. Bainite
- c. Martensite
- d. Cementite

No, the answer is incorrect.

Score: 0

Accepted Answers:

c. Martensite

21) Tempering of carburized and hardened steel is required for:

1 point

- a. Additional hardening
- b. Precipitation hardening
- c. Restore dimensional accuracy
- d. Restore machinability

No, the answer is incorrect.

Score: 0

Accepted Answers:

d. Restore machinability

22) Identify the factor which does not affect induction hardening:

1 point

- a. Composition of steel
- b. Diameter of the component
- c. Frequency of induction
- d. Carbon content of steel

No, the answer is incorrect.

Score: 0

Accepted Answers:

b. Diameter of the component

23) State of residual stress after carburizing and hardening is:

1 point

- a. Compressive at the surface but tensile in the core
- b. Tensile at the surface but compressive at the core
- c. Compressive throughout the component
- d. Tensile throughout the component



No, the answer is incorrect.

Score: 0

Accepted Answers:

a. Compressive at the surface but tensile in the core

24) Identify the component not suitable for shot peening

1 point

- a. Crank shaft
- b. Gear wheel
- c. Turbine blade
- d. Cold roll

No, the answer is incorrect.

Score: 0

Accepted Answers:

c. Turbine blade

25) Surface temperature rises in electrolytic surface hardening due to:

1 point

- a. Induction heating
- b. Hydrogen film formation pulses
- c. Resistance heating
- d. Joule heating

No, the answer is incorrect.

Score: 0

Accepted Answers:

b. Hydrogen film formation pulses

Previous Page

End

