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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 9 - Week 7 :

Register for Certification exam

Course outline

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Week 0 :

Week 1 :

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Week 7 :

- Lecture 31 : Diffusion Coating Principle
- Lecture 32 : Diffusion Coating Processes
- lecture 33 : Thick Coating by Cladding
- Lecture Materials
- Quiz :

Assignment 7

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment. **Due on 2019-03-20, 23:59 IST.**

1) Engineering components likely to experience prolonged exposure to elevated temperature are: ***1 point***

- a. Turbine blades
- b. Furnace lining
- c. Steam tubes
- d. All of above

No, the answer is incorrect.
Score: 0

Accepted Answers:
d. All of above

2) Engineering component NOT likely to be subjected to diffusion coating is: ***1 point***

- a. Gas turbine blades
- b. Heat exchanger plates
- c. Orthopedic implants
- d. Boiler tubes

No, the answer is incorrect.
Score: 0

Accepted Answers:
c. Orthopedic implants

3) Pure metal is prone to oxidation but which of the following form of metal is suitable for high temperature application in air? ***1 point***

- a. Metal matrix composites
- b. Metal oxides

4) Alloying element likely to enhance oxidation resistance of metallic alloys is: ***1 point***

- a. Carbon
- b. Oxygen
- c. Manganese
- d. Aluminum

No, the answer is incorrect.
Score: 0

Accepted Answers:
d. Aluminum

5) Diffusion occurs (without exception): ***1 point***

- a. Down the chemical potential gradient
- b. Up the chemical potential gradient
- c. Down the thermal gradient
- d. Down the concentration gradient

No, the answer is incorrect.
Score: 0

Accepted Answers:
a. Down the chemical potential gradient

6) Diffusion coating is a: ***1 point***

- a. Chemically activated ambient temperature process
- b. Thermally activated time dependent process
- c. Mechanically activated elevated temperature process
- d. Thermally activated time independent process

No, the answer is incorrect.
Score: 0

Accepted Answers:
b. Thermally activated time dependent process

7) Which of the following elements is suitable for improving oxidation resistance of metallic alloys? ***1 point***

- a. All the below
- b. Aluminum
- c. Silicon
- d. Chromium

No, the answer is incorrect.
Score: 0

Accepted Answers:
a. All the below

8) Which of the following substrate is NOT suitable for diffusion coating? ***1 point***

- a. Ferritic steel
- b. Stainless steel
- c. Alumina
- d. Superalloy

No, the answer is incorrect.

Score: 0

Accepted Answers:
c. Alumina

9) Diffusion coefficient is proportional to: ***1 point***

- a. Heating rate
- b. Heating time
- c. Thermal gradient
- d. Isothermal temperature

No, the answer is incorrect.
Score: 0

Accepted Answers:
d. Isothermal temperature

10) Activation barrier is smaller for: ***1 point***

- a. Substitutional than interstitial diffusion
- b. Interstitial than substitutional diffusion
- c. Volume than surface diffusion
- d. Grain boundary than surface diffusion

No, the answer is incorrect.
Score: 0

Accepted Answers:
b. Interstitial than substitutional diffusion

11) Diffusion coating is primarily useful for improving: ***1 point***

- a. Wear resistance
- b. Corrosion resistance
- c. Oxidation resistance
- d. Surface hardness

No, the answer is incorrect.
Score: 0

Accepted Answers:
c. Oxidation resistance

12) Which of the following is not a diffusion coating method? ***1 point***

- a. Calorizing
- b. Aluminizing
- c. Chromizing
- d. Chrome plating

No, the answer is incorrect.
Score: 0

Accepted Answers:
d. Chrome plating

13) Diffusion coating involves: ***1 point***

- a. All the below
- b. Volume diffusion
- c. Chemical diffusion

d. Surface and boundary diffusion

No, the answer is incorrect.
Score: 0

Accepted Answers:
a. All the below

14) Typical thickness of diffusion coating layer is: ***1 point***

a. 0.01 mm to 0.001 mm
b. 0.1 mm to 0.01 mm
c. 1 mm to 0.1 mm
d. 10 mm to 1.0 mm

No, the answer is incorrect.
Score: 0

Accepted Answers:
d. 10 mm to 1.0 mm

15) Diffusion coating is usually carried out at a temperature: ***1 point***

a. Above liquidus temperature of the substrate alloy
b. Below solidus temperature of the substrate alloy
c. Around recrystallization temperature of the substrate alloy
d. Above solvus point of the substrate

No, the answer is incorrect.
Score: 0

Accepted Answers:
b. Below solidus temperature of the substrate alloy

16) For diffusion coating, vapor pressure of the diffusant element should ideally be: ***1 point***

a. Higher than that of the substrate
b. Lower than that of the substrate
c. Same as that of the substrate
d. Independent of that of the substrate

No, the answer is incorrect.
Score: 0

Accepted Answers:
a. Higher than that of the substrate

17) Typical temperature range for aluminizing of steel is: ***1 point***

a. 700 – 1100°C
b. 600 – 1000°C
c. 500 – 900°C
d. 400 – 800°C

No, the answer is incorrect.
Score: 0

Accepted Answers:
a. 700 – 1100°C

18) The typical salt used as a precursor for pack cementation of Al in steel is: ***1 point***

a. Sodium cyanide
b. Sodium nitrate
c. Sodium sulfide
d. Sodium fluoride

No, the answer is incorrect.
Score: 0

Accepted Answers:
d. Sodium fluoride

19) Calorizing involves diffusion of: ***1 point***

a. Chromium
b. Aluminum
c. Silicon
d. Zinc

No, the answer is incorrect.
Score: 0

Accepted Answers:
b. Aluminum

20) Which of the flowing is usually NOT a part of siliconizing process? ***1 point***

a. $SiCl_4$
b. SiC
c. SiO_2
d. SiB_2

No, the answer is incorrect.
Score: 0

Accepted Answers:
c. SiO_2

21) The main difference between aluminizing and pack cementation lies in: ***1 point***

a. Treatment temperature and time
b. Nature of diffusant element and process kinetics
c. Physical state of the diffusant and method of coating
d. Purpose and application of coating

No, the answer is incorrect.
Score: 0

Accepted Answers:
c. Physical state of the diffusant and method of coating

22) Identify the technique different than the rest of the techniques listed below in terms of objective and application: ***1 point***

a. Weld overlay
b. Butt welding
c. Laser cladding
d. Hard facing

No, the answer is incorrect.
Score: 0

Accepted Answers:
b. Butt welding

23) What is NOT true of cladding? ***1 point***

- a. Composition of the substrate and clad may be same or different
- b. Clad-substrate interface is sharp
- c. Entirely a solid state process
- d. Clad is fused but not the substrate

No, the answer is incorrect.
Score: 0

Accepted Answers:
c. Entirely a solid state process

24) Filler metal in weld overlay can NOT be fed as: ***1 point***

- a. Molten pool
- b. Wire
- c. Powder
- d. Rod

No, the answer is incorrect.
Score: 0

Accepted Answers:
a. Molten pool

25) What is NOT true of submerged arc welding (SAW)? ***1 point***

- a. Flux is used to create a slag layer
- b. Can be used both for welding and cladding
- c. Can be applied for weld overlay on metals, ceramics and plastic
- d. Arc cavity is located below the slag layer

No, the answer is incorrect.
Score: 0

Accepted Answers:
c. Can be applied for weld overlay on metals, ceramics and plastic

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