

API

Exam API-571

Corrosion and Materials Professional

Version: 5.0

[Total Questions: 454]

Question No : 1

With cooling water corrosion, _____ oxygen content tends to _____ carbon steel corrosion rates.

- A. Increasing, increasing
- B. Decreasing, decreasing
- C. Decreasing, increasing
- D. Increasing, decreasing

Answer: A

Question No : 2

Corrosion in boiler feedwater and condensate return systems is usually the result of dissolved gases, oxygen and _____.

- A. Carbon monoxide
- B. H₂O
- C. Temperature
- D. Carbon Dioxide

Answer: D

Question No : 3

_____ is a selective corrosion mechanism in which one or more constituents of an alloy are preferentially attacked leaving a lower density often porous structure.

- A. Phenol corrosion
- B. Dealloying
- C. Carburization
- D. Preferentially weld attack

Answer: B

Question No : 4

Decarburization results in a _____, which can be confirmed by hardness testing.

- A. Hardness
- B. Softness
- C. Brittleness
- D. Oxidizing

Answer: B

Question No : 5

Corrosion of the anode may be significantly higher _____ to the connection to the cathode, depending on solution conductivity.

- A. Parallel
- B. Adjacent
- C. Diagonally
- D. Perpendicular

Answer: B

Question No : 6

_____ is a loss in toughness due to a metallurgical change that can occur in alloys containing a ferrite phase, as a result of exposure in the temperature range 600° F to 1000° F.

- A. Caustic embrittlement
- B. Notch toughness
- C. 885° F embrittlement
- D. Ductile embrittlement

Answer: C

Question No : 7

Components that have been carburized may have a change in the level of _____.

- A. Carbon
- B. Chromium
- C. Ferromagnetism
- D. Stress

Answer: C

Question No : 8

Temperature, _____ and stress are critical factors of stress rupture. This is usually found in furnaces with coking tendencies and fired heater tubes.

- A. Pressure
- B. Ductility
- C. Time
- D. Tensile strength

Answer: C

Question No : 9

Hydrogen permeation or diffusion rates have been found to be minimal at pH _____ and increase at both higher and lower pH's.

- A. 4
- B. 5
- C. 6
- D. 7

Answer: D

Question No : 10

The grain size has an important influence on the high temperature ductility and on the reheat cracking susceptibility. A _____ grain size results in _____ ductile heat affected zones, making the material more susceptible to reheat cracking.

- A. Large, more
- B. Small. Less
- C. Large, Less
- D. Small, More

Answer: C

Question No : 11

Proper application of _____ will control but not eliminate microbes that cause MIC so that continued treatment is necessary.

- A. Ozone
- B. Caustic
- C. Biocides
- D. None of the above

Answer: C

Question No : 12

High temperature hydrogen attack results from exposure to hydrogen at elevated temperatures and pressures. The hydrogen reacts with _____ in steel to produce _____, which cannot diffuse through the steel. The loss of carbides causes an overall loss in strength.

- A. Carbides, oxygen
- B. Alloys, hydrogen dioxide
- C. Carbides, methane
- D. Hydrogen dioxide, H²S

Answer: C

Question No : 13

Caustic embrittlement is a form of stress corrosion cracking characterized by surface-initiated cracks that occur in piping and equipment exposed to caustic, primarily adjacent to non-PWHT welds. Which of the following materials is the most resistant to embrittlement?

- A. Carbon steel
- B. Nickel based alloys
- C. Low alloy steels
- D. 400 Series SS

Answer: B

Question No : 14

Corrosion of carbon steel and other alloys from their reaction with sulfur compounds in high temperature environments is called _____. The presence of hydrogen accelerates corrosion.

- A. Sulfide corrosion
- B. High temperature corrosion
- C. H₂S corrosion
- D. Sulfidation

Answer: D

Question No : 15

What structure is 410 stainless steel?

- A. Martensitic
- B. Austenitic
- C. Duplex
- D. Ferritic

Answer: A

Question No : 16

Sulfidation usually creates:

- A. Uniform corrosion.
- B. Isolated pitting.

- C. Intergranular cracking.
- D. Transgranular cracking.
- E. Hard and brittle zones.
- F. Inspection nightmares.

Answer: A

Question No : 17

Sulfide stress cracking (SSC) is defined as cracking of metal under the combined action of tensile stress and corrosion in the presence of _____ and _____.

- A. Sulfur, Oxide
- B. Hydrogen, water
- C. H²S, Oxygen
- D. Water, H²S

Answer: D

Question No : 18

Sulfidation is also known as _____.

- A. Sulfur corrosion
- B. Sulfate corrosion
- C. Sulfidic corrosion
- D. None of the above

Answer: C

Question No : 19

300 Series SS, 5Cr, 9Cr and 12Cr alloys are not susceptible to _____ at conditions normally seen in refineries.

- A. CI SCC
- B. SOHIC

- C. HTHA
- D. HTLA

Answer: C

Question No : 20

Since all fuels contain some amount of sulfur, sulfuric and sulfurous acid _____ can occur if the metal temperature is below this temperature.

- A. Corrosion
- B. Pitting
- C. Dew point corrosion
- D. All of the above

Answer: C

Question No : 21

Which of the following materials are susceptible to polythionic acid SCC?

- A. 300 Series SS
- B. Alloy 600
- C. Alloy 800
- D. All of the above

Answer: D

Question No : 22

Phosphoric acid corrosion is usually found in _____ areas.

- A. High velocity
- B. Low velocity
- C. High temperature
- D. Low temperature

Answer: B

Question No : 23

Units where graphitization may be suspected are the FCCU and the _____ unit.

- A. Hydrotreater
- B. Coker
- C. Alky
- D. None of the above

Answer: B

Question No : 24

_____ are the most common type of equipment susceptible to carburization in the refining industry.

- A. Reactors
- B. Heat exchangers
- C. Heater tubes
- D. Fin Fans

Answer: C

Question No : 25

_____ cooling water outlet temperatures and/or process side outlet temperatures tend to _____ corrosion rates as well as fouling tendency.

- A. Increasing, decrease
- B. Decreasing, decrease
- C. Decreasing, increase
- D. Increasing, increase

Answer: D

Question No : 26

Corrosion from oxygen in boiler feed water usually creates:

- A. Uniform corrosion.
- B. Isolated pitting.
- C. Intergranular cracking.
- D. Transgranular cracking.
- E. Hard and brittle zones.

Answer: B

Question No : 27

In order to minimize and prevent amine SCC, PWHT all carbon steel welds in accordance with API RP _____.

- A. 751
- B. 912
- C. 510
- D. 945

Answer: D

Question No : 28 CORRECT TEXT

Ways to prevent thermal fatigue include reducing stress concentrators by making _____ transitions at places where the wall thickness changes.

Answer: Smooth

Question No : 29

Time to failure by thermal fatigue is primarily affected by:

- A. Magnitude of stress and operating temperature.