

# 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. H<sub>2</sub>O
- 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, H<sup>2</sup>S

**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. H<sub>2</sub>S 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. H<sup>2</sup>S, Oxygen
- D. Water, H<sup>2</sup>S

**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.