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Corrosion and Materials Professional

API API-571

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sales@dumpsarena.co
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QUESTION NO: 1

Cracks that are typically straight, non-branching, and devoid of any associated plastic deformation are likely associated with which type of failure?

- A. Stress corrosion cracking
- B. Brittle fracture
- C. Thermal fatigue
- D. Temper embrittlement

ANSWER: B**QUESTION NO: 2**

The extent and depth of decarburization is a function of temperature and _____.

- A. Pressure
- B. Material properties
- C. Exposure time
- D. Velocity

ANSWER: C**QUESTION NO: 3**

What structure is 304 stainless steel?

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

ANSWER: B**QUESTION NO: 4**

_____ is a form of carbon that may promote carburization, particularly during decoke cycles where temperatures exceed the normal operating temperatures.

- A. Carbonic acid
- B. Coke
- C. Crude oil
- D. None of the above

ANSWER: B

QUESTION NO: 5

A form of fatigue cracking in which cracks develop under the combined effects of cyclic loading and corrosion is called _____. Cracking often initiates at stress concentrations such as a pit in the surface.

- A. Cyclic cracking
- B. Corrosion fatigue
- C. Stress fatigue
- D. Stress cracking

ANSWER: B

QUESTION NO: 6

Which if the following materials are not susceptible to hydrogen stress cracking?

- A. Carbon steel
- B. Low alloy steel
- C. Stainless steel
- D. None of the above

ANSWER: C

QUESTION NO: 7

A condition where steel loses strength due to the removal of carbon and carbides leaving only an iron matrix is called decarburization. This occurs during high temperatures, during PWHT and from exposure to fires. Which of the following materials is not affected by this?

- A. Low alloy steel

- B. Duplex SS
- C. Carbon steel
- D. None of the above

ANSWER: B

QUESTION NO: 8

_____ eliminates the susceptibility of most common steels to SCC.

- A. Preheat
- B. High temperature
- C. PWHT
- D. All of the above

ANSWER: C

QUESTION NO: 9

Cracking can occur at low caustic levels if a concentrating mechanism is present. In such cases, caustic concentrations of _____ ppm are sufficient to cause cracking.

- A. 50-100
- B. 100-150
- C. 150-200
- D. 200-250

ANSWER: A

QUESTION NO: 10

Susceptibility to hydrogen stress cracking _____ with _____ hardness.

- A. Increases, increasing
- B. Decreases, increasing
- C. Decreases, Decreasing
- D. Both A and C

ANSWER: D

QUESTION NO: 11

NAC may be found in hot hydrocarbon streams downstream of the crude and vacuum units, _____ any hydrogen mix point.

- A. Upstream of
- B. Downstream of
- C. Adjacent to
- D. Around

ANSWER: A

QUESTION NO: 12

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: 13

What is the chemical symbol for ethane or ethylene?

- A. C²
- B. C₃
- C. C₄
- D. CH₄

ANSWER: A

QUESTION NO: 14

With high temperature sulfide corrosion (Sulfidization), noticeable increases may be found downstream of _____ injection points.

- A. Hydrogen
- B. Caustic
- C. Ammonia
- D. Water

ANSWER: A

QUESTION NO: 15

Naphthenic acid is _____ by catalytic reactions in downstream hydro processing and FCC units.

- A. Enhanced
- B. Destroyed
- C. Concentrated
- D. Diluted

ANSWER: B

QUESTION NO: 16

Geometry, stress level, number of cycles and _____ are the predominate factors in determining the fatigue resistance of a component.

- A. Temperature
- B. Material properties
- C. Pressure
- D. Velocity

ANSWER: B

QUESTION NO: 17

Hardness levels above _____ are highly susceptible to hydrogen stress cracking (HF). Time-to-failure decreases as the hardness increases.

- A. 225 BHN

- B. 237 BHN
- C. 241 BHN
- D. 247 BHN

ANSWER: B

QUESTION NO: 18

Corrosion from oxygen tends to be _____ type damage and can show up anywhere even if only very small amounts break through the scavenging system.

- A. General
- B. Localized
- C. Pitting
- D. Cracking

ANSWER: C

QUESTION NO: 19

The loss in strength from spheroidization (Softening) is usually accompanied by a(n) _____ in ductility, which allows for deformation at stress concentrations.

- A. Increase
- B. Decrease
- C. Reduction
- D. Yield

ANSWER: A

QUESTION NO: 20

Ammonium chloride salts are hygroscopic and readily absorb water. A _____ amount of water can lead to very aggressive ammonium chloride corrosion.

- A. Large
- B. Small
- C. Proper

D. Improper

ANSWER: B