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Q532 - Motor Plants II

1. Sacrificial zinc anodes are used on the saltwater side of diesel engine heat exchangers to _____.

- **Reduce electrolytic action on heat exchanger metals**
- Keep heat transfer surfaces shiny and clean
- Prevent rapid accumulation of marine growth
- Provide a protective coating on heat exchanger surfaces

Note:

Sacrificial zinc anodes corrode preferentially to protect heat exchanger metals from electrolytic corrosion.

2. At a given pressure, erosion of steam piping and machinery will be minimized by utilizing _____.

- wet steam
- **superheated steam**
- saturated steam
- desuperheated vapor

Note:

Superheated steam minimizes erosion because it lacks liquid droplets, preventing the sandblasting effect caused by wet or saturated steam.

3. Diesel engine jacket water is used in the fresh water distillation process as the _____.

- coolant for the distillate
- **means of heating the feedwater**
- primary means of producing a vacuum within the distiller
- coolant for the brine cooler

Note:

Diesel engine jacket water heats the feedwater in a freshwater distillation process, providing the necessary heat for evaporation.

4. Before any work is done on a burner in an automatically fired auxiliary boiler, you should always _____.

- block all control valves
- allow the boiler to cool completely
- lock all safety interlock switches closed
- **close all manually operated fuel valves**

Note:

To prevent accidental burner ignition during maintenance on an automatically fired auxiliary boiler, the primary safety measure is to close all manually operated fuel valves, ensuring no fuel supply reaches the burner.

5. Which type of energy conversion is associated with an operating steam boiler?

- Specific
- **Thermal**
- Mechanical
- Kinetic

Note:

A steam boiler converts the chemical energy of fuel into heat energy; therefore, the energy conversion is thermal.

6. Assume that steam has formed in a boiler in which all of the steam stop valves are closed, and the water level is held constant. When there is an increase in the temperature of the steam and water in the boiler, which of the following effects will occur on the pressure and the specific volume of the steam?

- The pressure will increase and the volume will remain constant.
- The steam pressure and volume will remain constant.
- The pressure will remain constant and the volume will increase.
- **The pressure will increase and the specific volume will decrease.**

Note:

Increased temperature in a closed boiler with a constant water level increases saturation pressure and the mass of steam, resulting in a decrease in specific volume while pressure increases.

7. The greatest resistance to heat transfer from the fireside to the waterside of a water-tube boiler takes place in the _____.

- soot buildup directly on the tube exterior
- **gas film layer surrounding the tube**
- moving water and steam inside the tube
- steel tube wall itself

Note:

The greatest resistance to heat transfer in a water-tube boiler occurs within the gas film layer surrounding the tube, due to its significantly lower heat-transfer coefficient compared to the tube wall, water, and steam.

8. A variable capacity, pressure atomizing, fuel oil burner functions to _____.

- maintain a constant fuel temperature
- **provide a wide range of combustion**
- provide a constant fuel return pressure
- maintain smokeless fuel oil atomization

Note:

A variable capacity, pressure-atomizing burner enables efficient fuel combustion across a range of firing rates by maintaining proper atomization and flame stability.

9. Which of the following statements describes how the fuel oil enters the whirling chambers of the sprayer plates used in an auxiliary boiler return flow fuel oil system?

- Through the outer barrel tube
- Through the sprayer plate drilled passages
- **Through tangential slots in the sprayer plate**
- Through baffles in the orifice plate

Note:

Fuel oil enters the whirling chambers through tangential slots in the sprayer plate to induce a swirling motion for atomization.

10. A naturally aspirated diesel engine at full throttle will have an intake manifold pressure _____.

- **slightly less than atmospheric pressure**
- approximately equal to exhaust manifold pressure at all times
- that is widely fluctuating
- constantly decreasing as engine load increases

Note:

A naturally aspirated diesel engine at full throttle experiences intake manifold pressure slightly below atmospheric pressure due to flow restrictions in the intake system.
