
Q612 - Gas Turbine Plants

1. The leakage of air into the pump casing by way of the packing gland of a condensate pump, is prevented by _____.

- **a water seal line to the packing gland**
- an air seal line from the compressed air line
- special packing in the stuffing box
- the vacuum in the pump suction

Note:
Air leakage through a condensate pump's packing gland is prevented by a water seal line to the packing gland, which floods the packing and blocks air ingress due to the vacuum on the pump suction.

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2. Clean low-pressure steam drains are collected in the _____.

- contaminated drain inspection tank
- **atmospheric drain tank**
- deaerating feedwater heater
- main condenser hotwell

Note:
Clean, low-pressure steam drains are directed to the atmospheric drain tank for collection and cooling before returning to the feedwater system. This tank operates at or near atmospheric pressure and is specifically designed for non-contaminated drains, differentiating it from tanks for contaminated drains, deaerating feedwater heaters, or the main condenser hotwell, which handle different condensate streams.

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3. The atmospheric drain tank (ADT) normally drains to the _____.

- main and/or auxiliary air ejector condenser
- distillate tank
- **main and/or auxiliary condenser**
- reserve feed tanks

Note:
The atmospheric drain tank (ADT) returns drains by gravity to the main and/or auxiliary condenser to maintain the condensate cycle. This is consistent with the ADT's function as a low-pressure collection tank for drains from the steam cycle, which are then returned to the condensate system.

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4. Which of the following is the advantage of operating a typical closed feedwater system for a marine boiler when compared to an open feedwater system?

- Reduced steam requirement for feedwater heating.
- Reduced requirement for condensate purity.
- Allows for lower feed pump operating pressures.
- **Increased capability of removing and controlling dissolved oxygen.**

Note:
A closed feedwater system minimizes air contact and facilitates efficient deaeration, primarily improving dissolved oxygen removal and control, which is its key advantage over an open system.

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5. In the boiler steam and water system, pressure is highest in the _____.

- mud drum
- **feed line**
- dry pipe
- steam stop

Note:
The feed line experiences the highest pressure because the feed pump must generate pressure exceeding boiler steam pressure to deliver water into the boiler.

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6. Recirculation of the feedwater ensures a flow of water through the _____.

- third stage heater
- standby feed pump suction line
- economizer
- **main feed pump**

Note:
Feedwater recirculation protects the main feed pump by ensuring continuous flow, preventing overheating and damage during low-demand conditions. The recirculation line connects to the main feed pump discharge and returns to a lower-pressure point, making the main feed pump the primary component safeguarded by this system.

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7. Compared to other types of engines, what is the biggest advantage of a gas turbine engine?

- Simplicity of installation
- Simplicity of the control circuits
- Low power-to-weight ratio
- **Highest power-to-weight ratio**

Note:
Gas turbine engines offer the highest power-to-weight ratio compared to other engine types, delivering significant power with minimal weight.

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8. Which of the following terms refers to axial compressor stator blades?

- Roots
- Nozzles
- Shrouds
- **Vanes**

Note:
Axial compressor stator blades are correctly termed vanes, which direct airflow between rotating blade rows. Rotor blades are the moving components, while shrouds support blade tips and nozzles direct gas flow in turbines or exhaust systems. The blade root is the attachment point to the disk, not the stator blade itself.

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9. How do the high-velocity high-temperature gases cause the gas turbine rotor to rotate?

- By increasing the velocity of the gases.
- By creating a low-pressure area before the rotor.
- **By transferring velocity energy and thermal energy to the turbine blades.**
- By converting the high-velocity gas to low-velocity gas.

Note:
The gas turbine rotor rotates due to the transfer of velocity and thermal energy from the high-velocity, high-temperature gases to the turbine blades, generating a force that drives the rotation.

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10. In a gas turbine, the air charge is permitted to be compressed adiabatically by what factor, process, or condition?

- Low-compression ratio
- **Speed of the process**
- Rapid heat transfer
- Interstage cooling

Note:
Adiabatic compression occurs rapidly, minimizing heat transfer. Therefore, the speed of the process is the condition that permits adiabatic compression in a gas turbine.
