
Q602 - Motor Plants

1. 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.

---

2. A safety valve on an auxiliary boiler simmers constantly and cannot be stopped by several quick blow-offs using the hand-relieving gear. The problem may be _____.

- loose dirt on the seat
- exposed valve springs
- a clogged drain line
- **a damaged seat**

Note:
A damaged seat prevents proper sealing, resulting in continuous leakage that persists despite attempts to clear the valve with quick blow-offs; this distinguishes it from issues like dirt, drain line clogs, or spring exposure, which would typically be resolved by such actions.

---

3. If the bowl of a disk-type centrifugal purifier when operated as a separator is not primed, the _____.

- purifier will act as a clarifier at the discharge ring
- oil solids will be deposited only at the intermediate top disk
- **oil will be lost through the water discharge ports**
- oil has a tendency to emulsify in the bowl

Note:
Without priming, the centrifugal purifier lacks a water seal, causing oil to be discharged through the water discharge ports and resulting in oil loss.

---

4. Poor combustion in a diesel engine can be caused by _____.

- **low compression temperature**
- high compression pressure
- high scavenge air pressure
- low exhaust pressure

Note:
Low compression temperature prevents adequate fuel ignition due to insufficient air temperature at the end of compression, resulting in poor combustion.

---

5. On a diesel-propelled vessel operating with constant slip what is the effect on fuel consumption with an increase in shaft RPM?

- **fuel consumption varies as the cube of the shaft RPM**
- fuel consumption varies directly proportional to the shaft RPM
- fuel consumption varies as the square of the shaft RPM
- fuel consumption varies inversely with the shaft RPM

Note:
Fuel consumption increases as the cube of shaft RPM because power required to drive a displacement vessel rises proportionally to the cube of its speed, and ship speed is directly related to shaft RPM when propeller slip is constant.

---

6. Which of the following statements concerning the factors affecting ignition delay is correct?

- An increase in combustion chamber turbulence will increase ignition delay.
- **An increase in coolant temperature will decrease ignition delay.**
- An increase in intake air temperature will increase ignition delay.
- An increase in compression ratio will increase ignition delay.

Note:
Increased coolant temperature decreases ignition delay by raising cylinder wall and air temperatures, bringing the fuel-air charge closer to auto-ignition conditions. Ignition delay is the time between fuel injection and combustion; higher temperatures and pressures shorten this delay. Increased intake air temperature and compression ratio reduce, not increase, ignition delay. Combustion chamber turbulence reduces ignition delay by improving mixing and heat transfer.

---

7. For a given fuel, a change in the compression ratio will affect the ignition lag by which of the listed means?

- A decrease in compression ratio will decrease the ignition lag.
- An increase in compression ratio will increase the ignition lag.
- **An increase in compression ratio will decrease the ignition lag.**
- A decrease in ignition lag will increase the compression ratio.

Note:
Increased compression ratio elevates air temperature and pressure, accelerating fuel auto-ignition and reducing ignition lag.

---

8. The pressure in an operating diesel engine cylinder continues to rise for a short period after the piston passes top dead center as a result of the _____.

- **expansion during the combustion process**
- maximum compression pressure is just being attained
- fuel injection occurring at that point and combustion begins
- exhaust and intake valves just closing

Note:
Cylinder pressure rises briefly after top dead center due to ongoing combustion adding heat faster than the expanding gases can relieve it.

---

9. The purpose of an oil mist detector in a main propulsion diesel engine is to warn of _____.

- **a possible overheated bearing**
- excessively high crankcase vacuum
- low cylinder oil pressure
- excessive carbon buildup in the lube oil

Note:
Oil mist detectors identify increased oil vapor, typically caused by an overheated bearing, which poses a risk of crankcase explosion. These detectors monitor oil mist concentration, not crankcase vacuum, cylinder oil pressure, or lube oil carbon content; their purpose is to provide early warning of potentially dangerous conditions.

---

10. If a crankcase explosion due to a hot spot were to occur, the size of the explosion is dependent on which of the following?

- **The ratio of oil mist to air in the crankcase.**
- The amount of water in the oil in the crankcase.
- The temperature of the hot spot in the crankcase.
- The amount of debris in the oil in the crankcase.

Note:
The size of a crankcase explosion resulting from a hot spot is primarily determined by the ratio of oil mist to air in the crankcase; this mixture's flammability dictates the explosion's magnitude.
