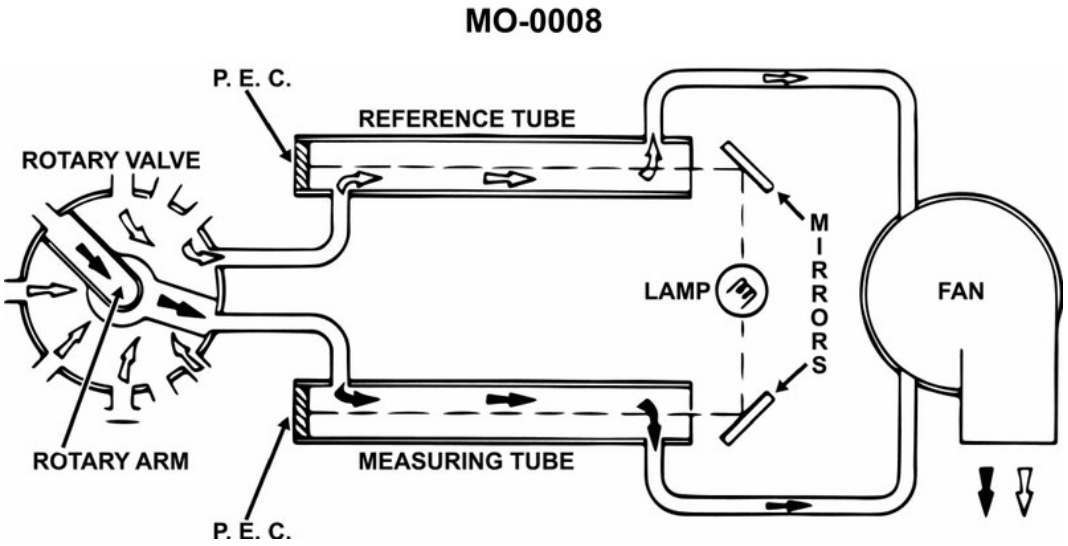

Q610 - Motor Plants

1. The device shown in the illustration is a _____



- photoelectric, explosive gas indicator, for use in high-speed, two-stroke, trunk type piston engines
- **comparator type mist detector for large low-speed, crosshead type engines**
- rotary type mist detector, designed for use in four-stroke, high-speed diesel engines
- level type explosimeter, for small medium-speed, trunk type piston engines

Note:
The illustration depicts a comparator type mist detector, characterized by its use of reference and measuring tubes to compare air streams, a design specific to large, low-speed, crosshead engines.

---

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. 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.

---

4. 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.

---

5. The theoretical minimum compression ratio necessary to ensure compression ignition in a direct injection diesel engine is _____.

- 10 to 1
- **12 to 1**
- 16 to 1
- 20 to 1

Note:
A compression ratio of 12 to 1 is the theoretical minimum required for compression ignition in a direct injection diesel engine, as it provides sufficient air temperature to ignite the fuel without external assistance.

---

6. Opposed-piston diesel engines are classified as _____.

- **two-stroke cycle single acting**
- two-stroke cycle double acting
- four-stroke cycle single acting
- four-stroke cycle double acting

Note:
Opposed-piston diesel engines are classified as two-stroke, single-acting due to their design: two pistons per cylinder with combustion pressure acting on one face of each piston, and a cycle completed in two strokes using port-controlled scavenging rather than valves.

---

7. Diesel engines are classified as reciprocating internal combustion engines because they _____.

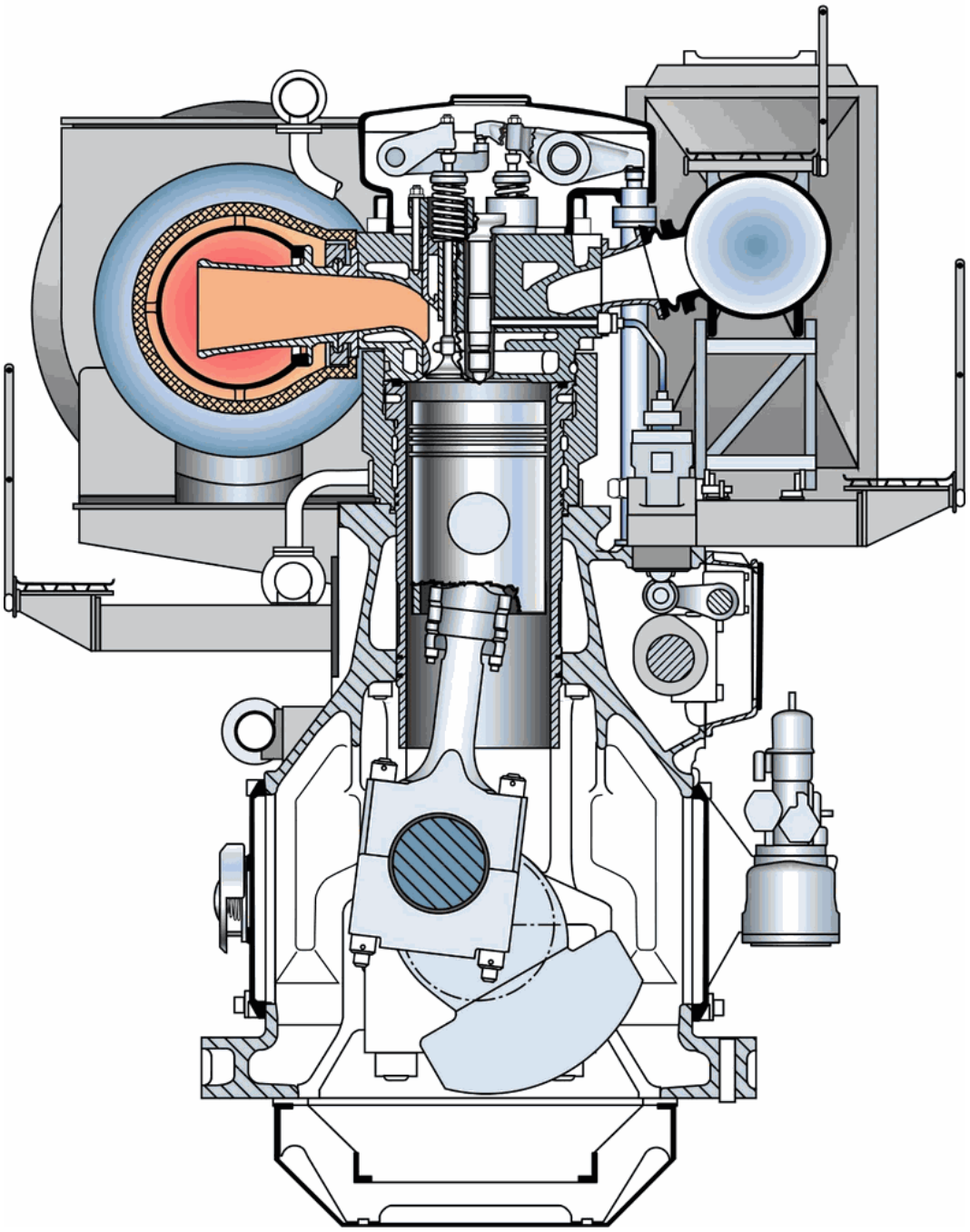
- use a continuous combustion process to impart rotary motion to the pistons
- use energy from fuel burned outside their cylinders
- **burn fuel in a closed chamber which imparts linear motion to pistons**
- burn fuel in a combustion chamber that moves back and forth

Note:
Diesel engines are classified as reciprocating internal combustion engines because fuel combustion within a closed chamber generates linear piston motion.

---

8. The diesel engine shown in the illustration is a _____

MO-0007



- **<u>four-stroke cycle engine at the end of the compression stroke</u>**
- two-stroke cycle engine at the end of the compression stroke
- four-stroke cycle engine at the end of the exhaust stroke
- two-stroke cycle engine at the beginning of the power stroke

Note:
The illustration depicts a four-stroke diesel engine at the end of the compression stroke, characterized by the piston at top dead center with both intake and exhaust valves closed, indicating the point immediately before fuel injection and power.

---

9. The minimum fuel oil delivery pressure required for efficient injection depends primarily on the _____.

- degree of cylinder air turbulence
- **maximum pressure in the engine cylinders during injection**
- quantity of the fuel to be injected
- duration of the injection delay period

Note:
Fuel injection pressure must exceed cylinder pressure to enable fuel entry and atomization; therefore, the minimum fuel oil delivery pressure primarily depends on the maximum pressure in the engine cylinders during injection.

---

10. Which of the air intake systems listed will result in the lowest specific fuel consumption?

- Natural aspiration
- **Turbocharged**
- Roots blower
- Piston blower

Note:
Turbocharging minimizes specific fuel consumption by utilizing exhaust gas energy to increase air intake without directly drawing power from the crankshaft.
