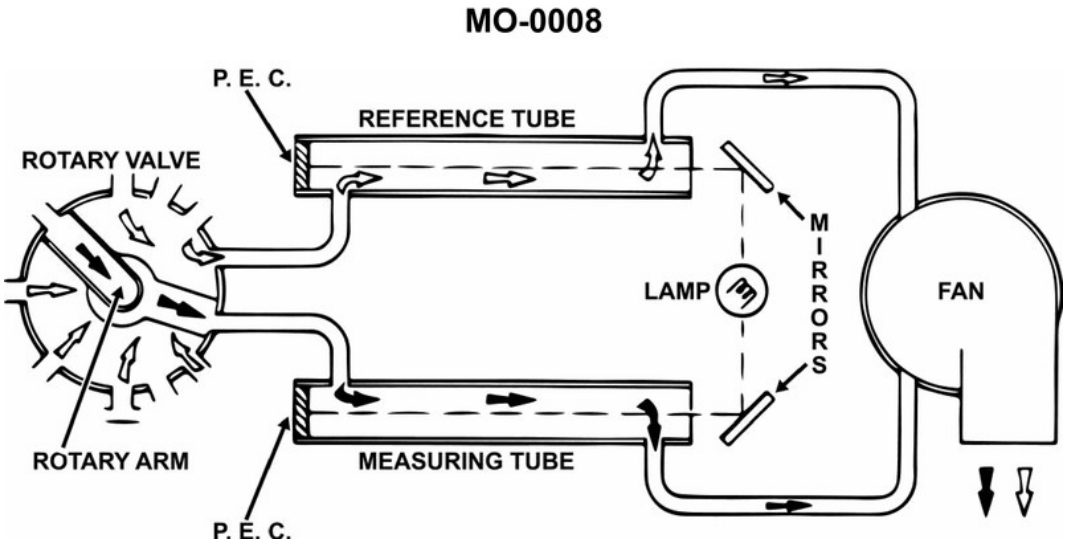

Q694 - Motor Plants

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.

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2. 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.

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3. The rate of pressure rise during the period following fuel ignition in a diesel engine is influenced by the length of the ignition delay period. What else will influence the pressure rise?

- **Turbulence of the air charge**
- Volumetric efficiency
- Fuel efficiency
- Valve overlap

Note:
The rate of pressure rise following fuel ignition in a diesel engine is influenced by ignition delay and turbulence of the air charge, which affects fuel-air mixing and combustion speed.

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4. After stopping a diesel engine with a high main bearing temperature, what is the time one needs to wait before a diesel engine crankcase can be opened?

- Not less than 15 minutes.
- **Not less than 30 minutes.**
- Not less than 60 minutes.
- Not less than 120 minutes.

Note:
Wait at least 30 minutes after stopping a diesel engine with a high main bearing temperature before opening the crankcase to allow for temperature reduction and oil mist dissipation, preventing potential ignition hazards.

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5. Why are some diesel engine cylinder liners plated on the wearing surface with porous chromium?

- The chromium will not wear out the piston rings.
- The chromium strengthens the liners in the way of the scavenging air ports.
- Chromium eliminates the need for oil scraper rings.
- **Pores in the plating aid in maintaining the lube oil film.**

Note:
Porous chromium plating contains microscopic pores that act as reservoirs for lubricating oil, maintaining a continuous oil film between the piston rings and cylinder liner to reduce wear and prevent scuffing; this function distinguishes the correct answer.

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6. Low compression pressure in a diesel engine can be caused by _____.

- **improperly seating intake valves**
- leaking cylinder liner seal rings
- late fuel injection timing
- carbon deposits on the piston

Note:
Improperly seating intake valves allow compressed air to escape during the compression stroke, directly reducing compression pressure.

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7. Piston cooling fins are located _____.

- on top of the piston crown
- **underneath the piston crown**
- at the base of the piston skirt
- inside the cylinder liner cooling water jacket

Note:
Piston cooling fins are located on the underside of the piston crown to maximize heat transfer to the cooling oil, as the top surface requires a smooth contour for proper combustion.

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8. High-speed, multi-cylinder, diesel engines commonly use counterweights placed opposite to the crankpins to _____.

- prevent bearing loads
- **provide dynamic balance by equalizing centrifugal force**
- counteract inertia forces
- provide a balance of rocking couples around the crankshaft

Note:
Counterweights on high-speed diesel engines balance centrifugal forces, reducing vibration and bearing loads. This dynamic balance is achieved by equalizing the mass distribution around the crankshaft, making option B the correct answer. Other options address related but secondary effects, such as bearing loads, reciprocating inertia, or rocking couples.

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9. The valve cam slope angle determines the _____.

- engine torque characteristics
- diameter of intake and exhaust valves
- engine fuel efficiency
- **acceleration rate of valve opening and closing**

Note:
The valve cam slope angle directly determines the acceleration rate of valve opening and closing; this is because the slope angle dictates the rate of lift change with respect to cam rotation.

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10. When two cams of the same diameter, one with tangential flanks and the other with convex flanks are compared, the cam with tangential flanks will cause_____.

- **less valve gear wear**
- more abrupt valve action
- greater valve lift
- less valve seat wear

Note:
Tangential cam flanks reduce valve gear wear by providing a smoother, lower-impact valve opening and closing compared to convex flanks of the same diameter, minimizing contact forces and wear.
