
Q690 - Motor Plants

1. The bore of a diesel engine cylinder describes the _____.

- swept volume of the cylinder
- **inside diameter of the cylinder**
- piston displacement in the cylinder
- length of the piston stroke

Note:
The bore of a diesel engine cylinder is defined as its inside diameter. This measurement, representing the cylinder's internal diameter, distinguishes it from stroke, swept volume, and piston displacement, which are related but distinct concepts.

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2. The main operating characteristic of diesel engines which distinguishes them from other internal combustion engines is the _____.

- method of supplying air
- cooling system
- **method of igniting fuel**
- valve operating mechanism

Note:
Diesel engines uniquely utilize compression ignition, where fuel ignites due to the heat generated from compressing air, differentiating them from engines that rely on spark ignition. This fundamental distinction defines the method of igniting fuel and is not attributable to variations in air supply, cooling systems, or valve mechanisms.

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3. 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.

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4. 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.

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5. A 4-stroke, medium-speed, eight cylinder, in-line diesel engine has a firing order of 1-5-2-6-8-4-7-3. When performing routine valve maintenance, #1 cylinder is set at TDC in firing position. Which exhaust valves can be checked for proper valve lash?

- 1, 3, 2, 7
- 1, 3, 2, 8
- 1, 5, 2, 4
- **1, 5, 2, 6**

Note:
Cylinder #1 at TDC in the firing stroke means cylinders 1, 5, 2, and 6 have exhaust valves closed and on the cam base circle, allowing for accurate valve lash checks.

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6. What is the function of a diesel engine's stationary parts?

- To add power to the engine.
- To keep the engine firmly attached to its auxiliary pumps.
- **To maintain the engine's moving parts in their proper relative positions.**
- To rotate the crankshaft.

Note:
Stationary parts provide structural support and alignment for a diesel engine's moving components, ensuring their proper relative positions during operation; they do not generate power, rotate the crankshaft, or primarily secure auxiliary pumps.

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7. 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.

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8. Which statement about diesel engine combustion is true?

- Maximum combustion pressure is reached before TDC.
- Combustion does not begin until the piston starts down on the power stroke.
- Turbulence in the cylinder causes a delay in ignition.
- **Maximum cylinder firing pressure is not developed until the piston passes TDC.**

Note:
Maximum cylinder pressure in a diesel engine occurs after TDC due to fuel injection before TDC and a brief ignition delay, allowing for continued combustion and pressure rise as the piston enters the power stroke.

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9. What type of marine engine has a fuel nozzle and combustion chamber located between two pistons in a common cylinder liner?

- Horizontal reciprocating
- **Vertical opposed-piston**
- Single acting in-line cylinder
- Double acting in-line cylinder

Note:
Vertical opposed-piston engines feature two pistons within a single cylinder liner, positioning the fuel nozzle and combustion chamber between the pistons. This configuration distinguishes them from horizontal reciprocating, single acting in-line, and double acting in-line engines, which utilize one piston per cylinder.

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10. In a diesel engine, which type of wrist pin is fixed to the small end of the connecting rod and moves in the piston?

- **Semi-floating**
- Full floating
- Solid
- Fixed

Note:
A semi-floating wrist pin is fixed to the connecting rod and rotates within the piston, aligning with the question's description.
