Power train III

Ques: How does volumetric efficiency after engine performance and how it can be improved?

Sol: When VE ↑, combustion pressure increases and so the torque produced by engine increases, which is good for engine performance.

* It can be improved by:
→ forced induction
→ increased valve lifts
→ tuned intake/exhaust manifolds.
→ larger intake valves
→ more than one intake and exhaust valves, etc.

Ques: Which are bigger, inlet valves or exhaust valves and why?

Ans: Inlet valves are always bigger than exhaust valves because during intake stroke, only suction force is acting for intake of air/fuel mixture, but during exhaust stroke, the driving force of pistons facilitates escape of exhaust gases.

Ques: Why are bearing necessary in an engine? what properties must a bearing have?

Ans: Bearings are necessary to reduce friction and to facilitate the respective motion smoothly.

Properties: Bearings surface must be soft enough to embed small particles but hard enough not wear too rapidly.

Ques: What is piston clearance and what happens when the value deviates from the ideal range?

Ans: Piston clearance is the distance b/w the wall of the cylinder and the wall of the piston (skirt). Generally, piston clearance ≈ [0.025 - 0.12 mm].

(i) If clearance is too small: there is loss of power from high friction and severe wear. Also, piston can fall or seize in cylinder and lockup the engine.

(ii) If clearance is too large: It may cause piston slap. The noise is caused by piston shifting from one side of the cylinder to the other, at the beginning of the power stroke.

Ques: Assuming the slit in the piston ring wasn't there, what will be the effect on the engine?

Ans: The following effects will be encountered if the slit was not there in piston rings:

→ Firstly, it will be difficult to change new rings of oil and compression in case of wear and tear.
→ If exhaust gas traps in it, it becomes difficult for the gases to blowby and hence rings will wear out fast.
→ piston life get reduces.
→ movement of rings in case of compression/expansion and cooling of piston will be difficult and may harm the piston.
→ If piston expands due to heat, piston clearance reduces and hence, the engine may get damaged.

Ques: Name our valve train system and what are the disadvanges of that kind of setup?

Ans: Our valve train system is Double overhead valve system.
Disadvantages include:
→ It covers larger area and it increases size of camshaft
→ It increases weight of engine
→ It is more expensive.
→ It is only suitable for high performance systems

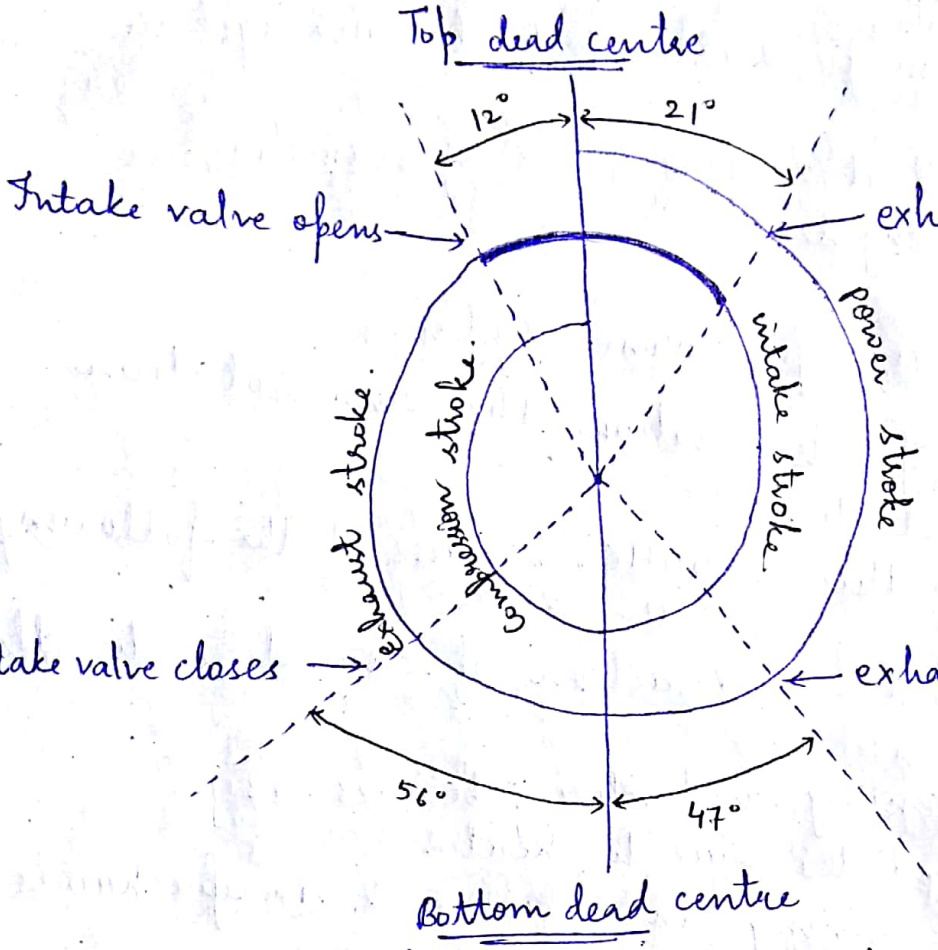
Ques: Which setup is best for translation the cam rotation valve opening? Why is that so?

Ans: The best method for this is DOHC, because of the following reasons:
→ better and faster response and action of cam lobe directly on valve.
→ facilitation of valve opening and closing becomes easy.
→ less chance of wear and tear due to heat.
→ Compared to OHV, where opening and closing is via pushrods and rocker arms.
→ faster response and better control.
→ less chance of damage.

Ques: The dimension of the seat of the valve is exactly that of the valve. Will it be beneficial to the engine? Explain.

Ans: It will not be recommended generally because by having an interference angle, we may have greater seating force at the outer edge of the valve seat, which will help the valve further through any kind of deposition formed.
Though, valves with valve rotators may be beneficial through this arrangement.

Ques 9: Draw the valve timing diagram and explain it.



The fundamental purpose of the valve timing is to maximize the volumetric efficiency in whichever way possible to improve the engine performance.

explaination:

→ open the intake valve a little before TDC, so that the VE↑ and there is time gap to open valve.

→ Intake valve opens up a little over BDC so that max. value of air-fuel mixture can enter, now intake valve closes.

→ Compression stroke starts and continue till TDC where ignition takes place.

→ A little before BDC, exhaust valve opens and stays open up till a little later after TDC to let all gases escape.

→ Here, at time when both intake & exhaust valves are open, cool air (comparatively) from intake forces exhaust gases to escape more rapidly and this effect is known as scavenging effect.