LUBRICATING SYSYEM

(Q.1) Why do filter elements have to be replaced?

- The engine oil gradually becomes contaminated with worn metal particles, dirt from the atmosphere, carbon and other foreign materials.
- Out of these, the heavier matter will settle and collect in the oil pan, but the lighter matter will mix with the oil and be sent to various parts of the engine where they will cause wear and overheating.
- Therefore an oil filter is installed in the oil line to remove impurities present in the oil by passing through the oil filter.
- Now due prolonged use of oil filter even the oil filter becomes dirty or contaminated due collecting dirt and dust particles.
- Thus filter elements needs to be replaced at regular interval of time. The oil filter is installed on the outside of the engine to permit easy replacement of the filter elements.

(Q.2) State the causes and remedies for engine lubrication failure.

OR

State four reasons for heavy lubricating oil consumption in a diesel engine.

OR

Explain principle causes for excessive engine oil consumption with their remedies.

OR

State causes and remedies.

- **Low oil pressure.**
- **High oil pressure.**

OR

State causes and remedies of excessive oil consumption.

➢ Oil leakage OR Loss of lubrication:-

CAUSES	REMEDIES
1. Cylinder head, cylinder block & sump or oil pump housing damaged or cracks.	Replace
2. Worn out or damaged bearings & loose Connections.	1. Replace bearings. 2. Fit properly the connections.
3. Oil seal faulty.	Replace oil seal.
4. Gasket faulty.	Replace gasket.

➢ Low oil pressure:-

CAUSES	REMEDIES
1. Less oil in the oil pan.	Add adequate amount of oil as prescribed.
2. Loose connection in the oil lines.	Tighten the connection.
3. Faulty pressure gauge giving incorrect reading.	Replace pressure gauge.
4. Oil leakage.	Repair as necessary.
5. Oil pump faulty.	Repair or replace.
6. Oil filter clogged.	Replace.
7. Relief valve faulty.	Repair or replace.
8. Defective lubrication system.	Check the lubrication system and repair as necessary.

➢ High oil pressure:-

CAUSES	REMEDIES
1. Relief valve faulty.	Repair or replace.
2. Defective lubrication system.	Check the lubrication system and repair as necessary.
3. Oil pump faulty.	Repair or replace.
4. Faulty pressure gauge giving incorrect reading.	Replace pressure gauge.

- **Excessive oil consumption:-**
  - Loose bearing.
  - Tapered or out of round cylinders.
  - Excessive clearance in the intake valve guides.
  - Worn piston rings.
  - Loose connections in oil seal.
  - Worn rear camshaft oil seal.
  - Excessive oil pressure.
  - Clogged oil breather.
  - Clogged oil return from the distributor.
  - Cylinder distortion due to improper tightening of the cylinder head nuts.

(Q.3)What critical clearances are checked in a gear type lubricating pump for wear?

- Replace the oil pump gears if the clearance between the gear teeth is 0.018 inch or more.
- Replace the driven gear stub axle if it is worn 0.002 inch or more.
- Replace the oil pump body if it is cracked or broken, or if the clearance between the end of the gear teeth and housing is more than 0.0035 inch.
- Replace the bushing, the pump shaft if it is shown wear and the clearance is 0.005 inch or more.
- Replace the bushing in the pump body if they are worn more 0.002 inch.

(Q.4) Explain how will you decide to change the lubricating oil of an engine, with the process of changing the engine oil.

OR

Describe the procedure of changing engine oil.

OR

Explain three main step procedure of changing engine oil.

- Check the oil level with the help of dipstick.
- Now check the quantity as well as quality of oil. Then check colour and viscosity and if found less or dirty, it means the engine oil is require to change.
- **Condition: -** During changing the engine oil, engine should be in cold situation.
- Remove drain plug of the oil sump and allow the impure oil to draw out.
- During this procedure also check oil filter and if found dirty then replace the filter elements.
- Now close the drain plug.
- Add the adequate amount of engine oil as recommended by manufacture's company.
- Finally, check oil filter and drain plug for leakage and if any leakage is found then tight the oil filter and drain plug.

(Q.5) Explain the cause of engine oil deterioration.

- **Oxidation**
- **Dilution**
- **Carbon**
- **Water**
- **Lead compounds**
- **Metals**

- **Dust and dirt**

➢ **Oxidation:-**

Oxidation occurs when a molecules of oxygen from the air attaches itself directly to an original oil molecule to make a more complex compound. A lubricant that is exposed to high temperature and oxygen will eventually oxidize.

➢ **Lead compounds:-**

During the combustion of lead gasoline lead compounds are formed. These compounds are carried into the crankcase by mixing with the oil that is scraped off the cylinder wall by the piston rings.

➢ **Metals:-**

As a result of normal wear, lubricating oil is contaminated by powdered metals in varying amounts.

Iron is the most common metal found mixed with the lubricating oil.

➢ **Water:-**

During the combustion of the air-fuel mixture in an I.C. engine, oxygen in the air combines with the hydrocarbon structure of the fuel to form water, which is present in the combustion chamber as vapour.

➢ **Dust and dirt:-**

Dust and dirt enters in the engine through the carburetor air intake and through the crankcase ventilation system.