- Functions of Clutch
- (a) To permit the engagement or disengagement of a gear when the vehicle is stationary and the engine is running.
- (b) To transmit the engine power to rear wheels smoothly without shocks to the transmission system when the vehicle is in motion.
- (c) To permit the engaging of the gears when the vehicle is in motion without damaging Rear wheels.

- . Characteristics or Requirements of a Clutch
- A clutch must have the following requirements.
- (a) Transmission of torque:
- It should be capable of transmitting maximum torque of the engine.
- (b) Gradual engagement:
- The clutch should be able to engage gradually and positively without the occurrence of sudden jerks.
- (c) Dissipation of heat:
- The design of the clutch is such that it should ensure the dissipation of heat sufficiently which is generated during operation.
- (d) Dynamic balancing:
- The clutch should be dynamically balanced to the vibration in transmission system. It is very important requirement in modern cars which is operated at high speed.
- (e) Size of the clutch:
- The size of the clutch should be as smaller as possible so that it will occupy minimum space.
- (f) Free pedal clutch play:
- In order to reduce effective clamping load on the car thrust bearing as well as wear on it, a provision should be made for clutch free pedal play.
- (g) Vibration damping:
- A suitable mechanism should be incorporated within the clutch for damping of vibration and elimination of noise produced during the transmission.
- (h) Non-exertive operation of disengagement:
- The clutch must have non-tiresome operation of disengagement for the driver for higher power transmission.

- TYPES OF CLUTCHES
- The clutches are classified as follows.
- 1. Friction clutch
- (i) Single plate clutch
- (ii) Multi-plate clutch
- (iii)Wet clutch
- (iv)Dry clutch

- (i) Single plate clutch
- Single plate clutch consist of clutch plate, friction or pressure plate,
- clutch cover, clutch shaft, the various part of the clutch explained below.
- (i) Fly wheel:
- The flywheel is the mounting surf:ace for the clutch.
- The flywheel rotates as the engine crankshaft rotates.
- The friction or pressure plate bolts to the flywheel face.
- The clutch disc is claped and held against the flywheel by the
- spring action of the pressure plate.
- The face of the flywheel is precision machined to a smooth surface.
- The face of the flywheel that touches the clutch disc is made of iron.
- Even if the flywheel were aluminum, the face is iron because it wears well and dissipates heat better.
- A pilot bearing or busn bearing supports the spigot end of the clutch shaft which is also housed in the flywheel.
- It is also the second driving member.

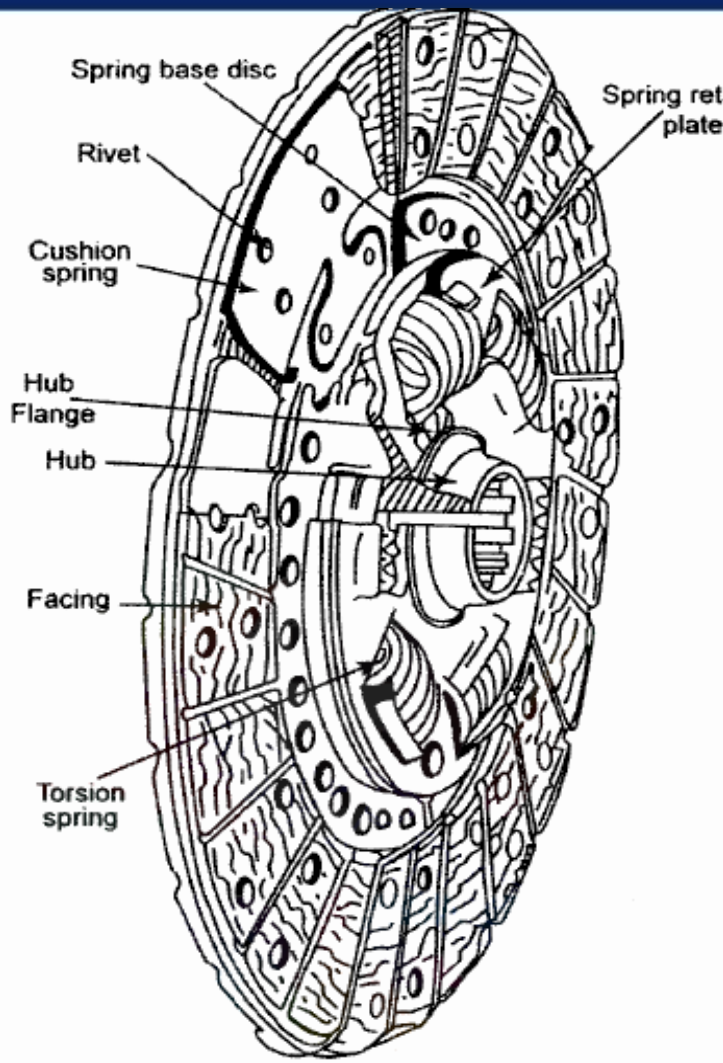

Figure 3.4 Clutch plate

- (ii) Pilot Bearing:
- The pilot bearing or bushing is pressed into the end of the crankshaft to suppurt the end of the transmission input shaft.
- The pilot bearing is a solid bronze bushing, but it also may be a roller or ball bearing.
- The end of the transmission input shaft has a small journal machined on its end.
- This journal slides inside the pilot bearing.
- The pilot bearing prevents the transmission shaft and clutch disc from wobbling up and down when the clutch is released.
- It also assists the input shaft center the disc on the flywheel.
- (iii) Clutch plate or disc plate
- It is one of the important driving members of a single plate clutch.
- Figure 3.4 shows the constructional details of the clutch plate.
- A clutch disc is the plate between flywheel and friction or pressure plate.
- It has a series of facings inverted on both sides to enlarge the friction.
- These clutch facings are made of asbestos material. They are highly wear and heat resistive.

- The clutch plate consists of a central hub machined with internal splines to limit the axial travel along the splined gearbox during shaft. A cushion drive clutch plate is pr~vide.dwith modern motor vehicles.
- It helps to proviide a dampm. g actiIon agam. st the torsional vibrations or variations ofthe driving torque between engine and transmission.
- (iv) Pressure plate:
- The pressure plate is made of special cast iron. It is the heaviest part of the clutch assembly.
- The main function of the pressure plate is to establish even contact with the driven plate facing through which the pressure springs can exert a sufficient force to transmit the full torque of the engine.
- The pressure plate presses the clutch plate on to the flywheel from its machined surface. Between pressure plate and clutch cover assembly, pressure springs are fitted.
- The pressure will be withdrawn from the flywheel whenever release levers are depressed by the toggle or release levers are pivoted accordingly.

- (v) Clutch cover assembly:
- Clutch cover assembly is bolted to the flywheel. It consists of pressure plate, release lever mechanism clutch cover and pressure springs.
- Figure 3.5 shows the view of the clutch cover assembly In general, the clutch plate revolves with the flywheel. But when the clutch is disengaged, the flywheel as well as the pressure plates will be forced to rotate independently from driven plate and driving shaft.
- The release mechanism is used to release the clutch.
- The pressure plate is backed by a number of coil springs and housed with them in a pressed-steel cover bolted to the flywheel. The springs push the pressure plate against the cover.

- (vi) Release mechanism:
- The clutch levers are pivoted on pins in the clutch cover.
- Their outer ends are located and positioned on pressure plate legs and inner ends are projecting towards the clutch shaft.
- A careful and accurate adjustment of the release mechanism is one of the most important factors of governing the performance of a clutch assembly.
- (vii) Withdrawalforce and rearing:The withdrawal force carrying the bearings is pivoted on a ball-mounted fulcrum in the clutch outer casing.
- The bearing is generally facing the inner end ofthe toggle lever.
- The other end of the force is connected to the clutch pedal by means of rods and levers.
- (viii) Primary or clutch shaft

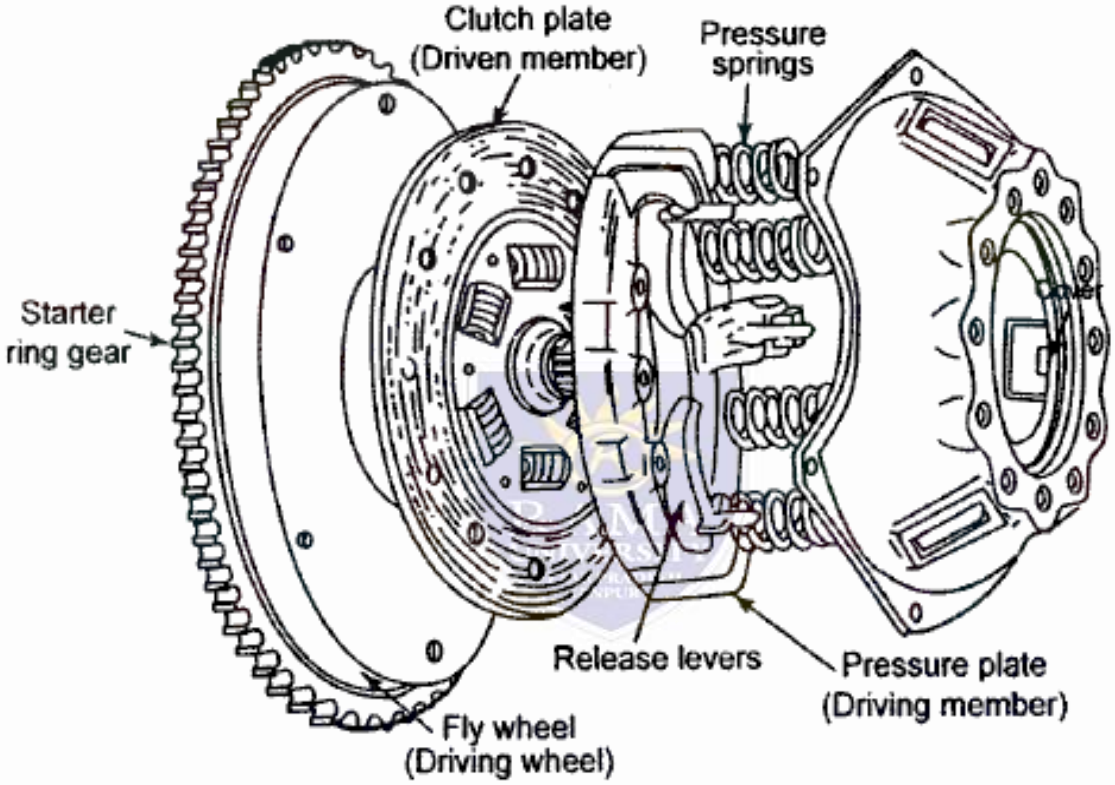

Figure 3.5 Clutch plate assembly