



**DEPARTMENT OF MECHANICAL ENGINEERING
17MECC87- AUTOMOBILE ENGINEERING (UG)
STANDARD OPERATING PROCEDURE**

Name of the Lab	AUTOMOBILE ENGINEERING LAB
Purpose	To provide training for students about the automobile components and how to dismantle and assemble.
Scope	To find out the worn out parts and replace or reconditioned
Responsibility	Faculty Incharge, HOD/MECH

STANDARD OPERATING PROCEDURE FOR 6 CYLINDER PETROL ENGINE

- Before dismantle the components should be cleaned with soft cloth.
- Handle the tools as per procedure for dismantling
- Drain off all the oil from the engine.
- Remove the tappet cover with its gasket.
- Remove the rocker shaft assembly and then push rod.
- Remove the nuts of inlet and exhaust manifold and remove them.
- Remove the cylinder head nuts and remove cylinder head with its gaskets.
- Tilt the engine to one side, remove the oil sump with its gaskets.
- Remove timing cover and chain.
- Remove oil pump with strainer after removing pump foundation bolts.
- Flywheel is then removed.
- Remove connecting rod big end bolts, remove the cap, push the connecting rod so that piston comes out from the other side.
- After the pistons are removed the crank shaft is taken out from the cylinder block.
- Remove the water pump.
- Remove timing gear from the cam shaft.
- Remove the cam shaft. Place the each dismantled parts on the tray
- Clean the parts by diesel.
- Check the condition of the parts.
- Replace the worn out parts.
- Assemble the parts as instructed in manual.

PRECAUTIONS TO BE FOLLOWED

- Wear the gloves and handle the tool safely.
- Place the components properly

RECORD TO BE MAINTAINED

- Laboratory Manual containing the experiments that can be performed with the equipment
- Maintenance Record

W. R. L.

HOD /MECH



**DEPARTMENT OF MECHANICAL ENGINEERING
17MECC87- AUTOMOBILE ENGINEERING (UG)
STANDARD OPERATING PROCEDURE**

Name of the Lab	AUTOMOBILE ENGINEERING LAB
Purpose	To provide training for students about the automobile components and how to dismantle and assemble.
Scope	To find out the worn out parts and replace or reconditioned
Responsibility	Faculty Incharge, HOD/MECH

STANDARD OPERATING PROCEDURE FOR 4 CYLINDER PETROL ENGINE

- Before dismantle the components should be cleaned with soft cloth.
- Handle the tools as per procedure for dismantling
- Drain off all the oil from the engine.
- Remove the tappet cover with its gasket.
- Remove the rocker shaft assembly and then push rod.
- Remove the nuts of inlet and exhaust manifold and remove them.
- Remove the cylinder head nuts and remove cylinder head with its gaskets.
- Tilt the engine to one side, remove the oil sump with its gaskets.
- Remove timing cover and chain.
- Remove oil pump with strainer after removing pump foundation bolts.
- Flywheel is then removed.
- Remove connecting rod big end bolts, remove the cap, push the connecting rod so that piston comes out from the other side.
- After the pistons are removed the crank shaft is taken out from the cylinder block.
- Remove the water pump.
- Remove timing gear from the cam shaft.
- Remove the cam shaft. Place the each dismantled parts on the tray
- Clean the parts by diesel.
- Check the condition of the parts.
- Replace the worn out parts.
- Assemble the parts as instructed in manual.

PRECAUTIONS TO BE FOLLOWED

- Wear the gloves and handle the tool safely.
- Place the components properly

RECORD TO BE MAINTAINED

- Laboratory Manual containing the experiments that can be performed with the equipment
- Maintenance Record

Rathu

HOD /MECH



DEPARTMENT OF MECHANICAL ENGINEERING
17MECC87- AUTOMOBILE ENGINEERING (UG)
STANDARD OPERATING PROCEDURE

Name of the Lab	AUTOMOBILE ENGINEERING LAB
Purpose	To provide training for students about the automobile components and how to dismantle and assemble.
Scope	To find out the worn out parts and replace or reconditioned
Responsibility	Faculty Incharge, HOD/MECH

STANDARD OPERATING PROCEDURE FOR 3 CYLINDER DIESEL ENGINE

- Before dismantle the components should be cleaned with soft cloth.
- Handle the tools as per procedure for dismantling
- Drain off all the oil from the engine.
- Remove the tappet cover with its gasket.
- Remove the rocker shaft assembly and then push rod.
- Remove the nuts of inlet and exhaust manifold and remove them.
- Remove the cylinder head nuts and remove cylinder head with its gaskets.
- Tilt the engine to one side, remove the oil sump with its gaskets.
- Remove timing cover and chain.
- Remove oil pump with strainer after removing pump foundation bolts.
- Flywheel is then removed.
- Remove connecting rod big end bolts, remove the cap, and push the connecting rod so that piston comes out from the other side.
- After the pistons are removed the crank shaft is taken out from the cylinder block.
- Remove the water pump.
- Remove timing gear from the cam shaft.
- Remove the cam shaft.
- Place the each dismantled parts on the tray
- Clean the parts by diesel.
- Check the condition of the parts.
- Replace the worn out parts.
- Assemble the parts as instructed in manual.

PRECAUTIONS TO BE FOLLOWED

- Wear the gloves and handle the tool safely.
- Place the components properly

RECORD TO BE MAINTAINED

- Laboratory Manual containing the experiments that can be performed with the equipment
- Maintenance Record

W. R. K.



**DEPARTMENT OF MECHANICAL ENGINEERING
17MECC87- AUTOMOBILE ENGINEERING (UG)
STANDARD OPERATING PROCEDURE**

Name of the Lab	AUTOMOBILE ENGINEERING LAB
Purpose	To provide training for students about the automobile components and how to dismantle and assemble.
Scope	To find out the worn out parts and replace or reconditioned
Responsibility	Faculty Incharge, HOD/MECH

STANDARD OPERATING PROCEDURE FOR TRANSFER CASE

- Before dismantle the components should be cleaned with soft cloth.
- Handle the tools as per procedure for dismantling.
- Place the each dismantled parts on the tray
- Input shaft is disconnected from the gear box.
- Output shaft is then disconnected from the propeller shaft.
- Disconnect the input shaft from the central member.
- Disconnect the central member from the gear lever.
- Carefully disconnect the shifting mechanism.
- Clean the parts by diesel.
- Check the condition of the parts.
- Replace the worn out parts.
- Replace the intermediate gear carefully between the input shaft and centre mechanism.
- Needle bearings are also carefully placed.
- Check up the shifting for shifting gear and dog clutch.
- Assemble the intermediate gear with needle bearings.
- Assemble the clutch shifting mechanism properly.
- Assemble the input shaft and output shaft.

PRECAUTIONS TO BE FOLLOWED

- Wear the gloves and handle the tool safely.
- Place the components properly

RECORD TO BE MAINTAINED

- Laboratory Manual containing the experiments that can be performed with the equipment
- Maintenance Record

W. R. Sathya



DEPARTMENT OF MECHANICAL ENGINEERING
17MECC87- AUTOMOBILE ENGINEERING (UG)
STANDARD OPERATING PROCEDURE

Name of the Lab	AUTOMOBILE ENGINEERING LAB
Purpose	To provide training for students about the automobile components and how to dismantle and assemble.
Scope	To find out the worn out parts and replace or reconditioned
Responsibility	Faculty Incharge, HOD/MECH

STANDARD OPERATING PROCEDURE FOR CONSTANT MESH GEAR BOX

- Before dismantle the components should be cleaned with soft cloth.
- Handle the tools as per procedure for dismantling.
- Place the each dismantled parts on the tray
- Drain off gear box oil. Unscrew top cover bolts and pull out the top cover.
- With screw driver engage two gears second and fourth to lock main shaft.
- Remove cotter pin, lock nut of output flange, washer and tap flange.
- Bring the gear in neutral position, and then remove the end cover.
- Remove speedometer worm from the main shaft.
- Remove inspection cover and selector with its forks.
- Remove lock nut and snap ring and push the bearing out from clutch shaft with brass drift.
- Dismantle the main shaft assembly with bearing from the rear end.
- Remove the counter shaft.
- Dismantle top cover and take out gear selector forks.
- Clean the parts by diesel. Check the condition of the parts.
- Replace the worn out parts.
- Fix up bearing at both ends in housing.
- Assemble reverse gear first, fit circlip at one end.
- Fix up ball bearing on main shaft.
- Fix primary shaft with bearing lock ring and check nut.
- Install the primary shaft in the housing.
- Fix up end cover of counter shaft. Assemble top cover.
- Fix up washer, slide needle bearing distance piece and again second needle bearing and lock with circlip.

PRECAUTIONS TO BE FOLLOWED

- Wear the gloves and handle the tool safely.
- Place the components properly

RECORD TO BE MAINTAINED

- Laboratory Manual containing the experiments that can be performed with the equipment
- Maintenance Record

Rathna L



**DEPARTMENT OF MECHANICAL ENGINEERING
17MECC87- AUTOMOBILE ENGINEERING (UG)
STANDARD OPERATING PROCEDURE**

Name of the Lab	AUTOMOBILE ENGINEERING LAB
Purpose	To provide training for students about the automobile components and how to dismantle and assemble.
Scope	To find out the worn out parts and replace or reconditioned
Responsibility	Faculty Incharge, HOD/MECH

STANDARD OPERATING PROCEDURE FOR SLIDING MESH GEAR BOX

- Before dismantle the components should be cleaned with soft cloth.
- Handle the tools as per procedure for dismantling.
- Place the each dismantled parts on the tray
- Drain off gear box oil. Unscrew top cover bolts and pull out the top cover.
- With screw driver engage two gears second and fourth to lock main shaft.
- Remove cotter pin, lock nut of output flange, washer and tap flange.
- Bring the gear in neutral position, and then remove the end cover.
- Remove speedometer worm from the main shaft.
- Remove inspection cover and selector with its forks.
- Remove lock nut and snap ring and push the bearing out from clutch shaft with brass drift.
- Dismantle the main shaft assembly with bearing from the rear end.
- Remove the counter shaft.
- Remove lock of reverse shaft and pull out reverse gear shaft.
- Remove circlip from reverse assembly and pull out the needle bearing with washers.
- Dismantle top cover and take out gear selector forks.
- Clean the parts by diesel. Check the condition of the parts.
- Replace the worn out parts.
- Fix up bearing at both ends in housing.
- Assemble reverse gear first, fit circlip at one end.
- Fix up end cover of counter shaft. Assemble top cover.
- Fix up washer, slide needle bearing distance piece and again second needle bearing and lock with circlip.

PRECAUTIONS TO BE FOLLOWED

- Wear the gloves and handle the tool safely.
- Place the components properly

RECORD TO BE MAINTAINED

- Laboratory Manual containing the experiments that can be performed with the equipment
- Maintenance Record

Wather L

HOD/MECH



**DEPARTMENT OF MECHANICAL ENGINEERING
17MECC87- AUTOMOBILE ENGINEERING (UG)
STANDARD OPERATING PROCEDURE**

Name of the Lab	AUTOMOBILE ENGINEERING LAB
Purpose	To provide training for students about the automobile components and how to dismantle and assemble.
Scope	To find out the worn out parts and replace or reconditioned
Responsibility	Faculty Incharge, HOD/MECH

STANDARD OPERATING PROCEDURE FOR SYNCHROMESH MESH GEAR BOX

- Before dismantle the components should be cleaned with soft cloth.
- Handle the tools as per procedure for dismantling.
- Place the each dismantled parts on the tray
- Drain off gear box oil. Unscrew top cover bolts and pull out the top cover.
- With screw driver engage two gears second and fourth to lock main shaft.
- Remove cotter pin, lock nut of output flange, washer and tap flange.
- Bring the gear in neutral position, and then remove the end cover.
- Remove speedometer worm from the main shaft.
- Remove inspection cover and selector with its forks.
- Remove lock nut and snap ring and push the bearing out from clutch shaft with brass drift.
- Dismantle the main shaft assembly with bearing from the rear end.
- Remove the counter shaft.
- Remove lock of reverse shaft and pull out reverse gear shaft.
- Remove circlip from reverse assembly and pull out the needle bearing with washers.
- Dismantle top cover and take out gear selector forks.
- Clean the parts by diesel. Check the condition of the parts.
- Replace the worn out parts.
- Fix up ball bearing on main shaft.
- Fix primary shaft with bearing lock ring and check nut.
- Install the primary shaft in the housing.
- Fix up end cover of counter shaft. Assemble top cover.
- Fix up washer, slide needle bearing distance piece and again second needle bearing and lock with circlip.

PRECAUTIONS TO BE FOLLOWED

- Wear the gloves and handle the tool safely.
- Place the components properly

RECORD TO BE MAINTAINED

- Laboratory Manual containing the experiments that can be performed with the equipment
- Maintenance Record

Rathna L

HOD/MECH



**DEPARTMENT OF MECHANICAL ENGINEERING
17MECC87- AUTOMOBILE ENGINEERING (UG)
STANDARD OPERATING PROCEDURE**

Name of the Lab	AUTOMOBILE ENGINEERING LAB
Purpose	To provide training for students about the automobile components and how to dismantle and assemble.
Scope	To find out the worn out parts and replace or reconditioned
Responsibility	Faculty Incharge, HOD/MECH

STANDARD OPERATING PROCEDURE FOR STEERING GEAR BOX

- Before dismantle the components should be cleaned with soft cloth.
- Handle the tools as per procedure for dismantling.
- Place the each dismantled parts on the tray
- Remove the steering wheel, if it refuses to come use puller.
- Remove drop arm nut and remove the drop arm.
- With soft hammer push roller sector shaft.
- Remove the bottom plate then the bearing.
- Remove the top plate cover and the tube.
- Remove the outer race, push the steering worm shaft out.
- Clean the parts by diesel.
- Check the condition of the parts.
- Replace the worn out parts.
- Fix the roller shaft in with its bushes and tighten the end cover.
- Fix up worm shaft with taper roller bearing with the bottom cover and top cover.
- Tight the nuts at the top and bottom plate and fix up steering outer tube.
- Fix the steering wheel
- Fix up steering drop arm and the lock nut.

PRECAUTIONS TO BE FOLLOWED

- Wear the gloves and handle the tool safely.
- Place the components properly

RECORD TO BE MAINTAINED

- Laboratory Manual containing the experiments that can be performed with the equipment
- Maintenance Record

W. R. Sathya

HOD/MECH



**DEPARTMENT OF MECHANICAL ENGINEERING
17MECC87- AUTOMOBILE ENGINEERING (UG)
STANDARD OPERATING PROCEDURE**

Name of the Lab	AUTOMOBILE ENGINEERING LAB
Purpose	To provide training for students about the automobile components and how to dismantle and assemble.
Scope	To find out the worn out parts and replace or reconditioned
Responsibility	Faculty Incharge, HOD/MECH

STANDARD OPERATING PROCEDURE FOR BRAKE SYSTEM

- Before dismantle the components should be cleaned with soft cloth.
- Handle the tools as per procedure for dismantling.
- Place the each dismantled parts on the tray
- Hold the eccentric in position and fasten the locknut.
- Repeat this procedure to adjust the reverse shoe. But, turn the eccentric towards the back of the vehicle.
- Repeat this on all the four brakes.
- Check the fluid level in the master cylinder.
- The purpose of air bleeding is to remove the air bubbles
- The air bleeding is done by the following the procedure given below:
- Before brake bleeding, ensure sufficient oil is present in master cylinder.
- Start the process with the Wheel cylinder, which is far off from the master cylinder.
- First, fix up bleeder pipe in vent screw provided in the wheel cylinder.
- Keep the other end of pipe in glass bottle.
- Press the brake pedal 4 or 5 times and keep it pressed the last time.
- Now unscrew the vent screw of wheel cylinder.
- Brake oil and air bubbles come out in the glass bottle.
- When the pedal goes down, close the vent screw.
- Again repeat the procedure until all the bubbles are removed

PRECAUTIONS TO BE FOLLOWED

- Wear the gloves and handle the tool safely.
- Place the components properly

RECORD TO BE MAINTAINED

- Laboratory Manual containing the experiments that can be performed with the equipment
- Maintenance Record

W. R. K.

HOD/MECH



**DEPARTMENT OF MECHANICAL ENGINEERING
17MECC87- AUTOMOBILE ENGINEERING (UG)
STANDARD OPERATING PROCEDURE**

Name of the Lab	AUTOMOBILE ENGINEERING LAB
Purpose	To provide training for students about the automobile components and how to dismantle and assemble.
Scope	To find out the worn out parts and replace or reconditioned
Responsibility	Faculty Incharge, HOD/MECH

STANDARD OPERATING PROCEDURE FOR FUEL INJECTION SYSTEM AND FUEL FILTER

- Before dismantle the components should be cleaned with soft cloth.
- Handle the tools as per procedure for dismantling
- The pre filter is fitted on the fuel injection pump.
- Loosen the knurled round nut and release the clamp and remove the glass bowl from the pre filter.
- Clean with diesel oil the filter and bowl and dry with compressed air.
- Reassemble the element and the bowl and fix the clamp and tighten the knurled nut.
- Then clean the A.C. filter.
- Unscrew the larger nut in the centre of the cover and drop the filter bowl clear.
- Remove the paper filter. It is not advisable to clean the filter element and it should be replaced.
- Place the filter cover in a tray and clean in diesel oil and dry.
- Inspect the relief valve and the rubber gasket for damage.
- Immerse the new element in clean fuel oil and insert it in the bowl.
- Assemble the gasket and fix the bowl with the element and tighten the top large nut. Make sure the bowl is aligned correctly and gasket is in its place.
- Slacken the bleeder cock and bleed the system.

PRECAUTIONS TO BE FOLLOWED

- Wear the gloves and handle the tool safely.
- Place the components properly

RECORD TO BE MAINTAINED

- Laboratory Manual containing the experiments that can be performed with the equipment
- Maintenance Record

Rathna L

HOD/MECH



**DEPARTMENT OF MECHANICAL ENGINEERING
17MECC87- AUTOMOBILE ENGINEERING (UG)
STANDARD OPERATING PROCEDURE**

Name of the Lab	AUTOMOBILE ENGINEERING LAB
Purpose	To provide training for students about the automobile components and how to dismantle and assemble.
Scope	To find out the worn out parts and replace or reconditioned
Responsibility	Faculty Incharge, HOD/MECH
<p>STANDARD OPERATING PROCEDURE FOR REMOVE AND SERVICE OF OILPUMP AND OIL FILTER</p> <ul style="list-style-type: none"> • Before dismantle the components should be cleaned with soft cloth. • Handle the tools as per procedure for dismantling • The prefilter is fitted on the fuel injection pump. • Loosen the knurled round nut and release the clamp and remove the glass bowl from the prefilter. • Clean with diesel oil the filter and bowl and dry with compressed air. • Reassemble the element and the bowl and fix the clamp and tighten the knurled nut. • Then clean the A.C. filter. • Unscrew the larger nut in the centre of the cover and drop the filter bowl clear. • Remove the paper filter. It is not advisable to clean the filter element and it should be replaced. • Place the filter cover in a tray and clean in diesel oil and dry. • Inspect the relief valve and the rubber gasket for damage. • Immerse the new element in clean fuel oil and insert it in the bowl. • Assemble the gasket and fix the bowl with the element and tighten the top large nut. Make sure the bowl is aligned correctly and gasket is in its place. • Slacken the bleeder cock and bleed the system. <p>PRECAUTIONS TO BE FOLLOWED</p> <ul style="list-style-type: none"> • Wear the gloves and handle the tool safely. • Place the components properly <p>RECORD TO BE MAINTAINED</p> <ul style="list-style-type: none"> • Laboratory Manual containing the experiments that can be performed with the equipment • Maintenance Record 	

W. R. L.

HOD/MECH



**DEPARTMENT OF MECHANICAL ENGINEERING
17MECC87- AUTOMOBILE ENGINEERING (UG)
STANDARD OPERATING PROCEDURE**

Name of the Lab	AUTOMOBILE ENGINEERING LAB
Purpose	To provide training for students about the automobile components and how to dismantle and assemble.
Scope	To find out the worn out parts and replace or reconditioned
Responsibility	Faculty Incharge, HOD/MECH

STANDARD OPERATING PROCEDURE FOR OVALITY AND TAPER MEASUREMENT OF CYLINDER BORE

- Before dismantle the components should be cleaned with soft cloth.
- Handle the tools as per procedure for dismantling
- Initially measure the cylinder bore size at 3 points like top, middle and bottom using telescopic bore gauge or vernier caliper.
- Set the cylinder bore centre and the front mounted spindle centre by using spring loaded pin arrangement.
- After ensuring the boring part is rotated at the exact centre of bore , tight the clamp giving more torque.
- Sides should be bored.
- Set the depth of stopper upto b.d.c.
- Rebore , then clean the ovality, taper , scoring marks e.t.c
- The vertical boring machine is placed on the engine, after it is fixed to the stand.
- Boring machine is fixed to the engine clamp and machine clamp.
- The spindle is lifted and to centered to the cylinder which is to be measured and machines using the pin and spring.
- The centering pins are introduced into their respective holes and the spring is introduced over them.
- The spindle is lowered into the bore and the centering pins are extended by turning the expander knob.
- Tool is set the required length according to the next specified bore diameter and tool adjusting nut..

PRECAUTIONS TO BE FOLLOWED

- Wear the gloves and handle the tool safely.
- Place the components properly

RECORD TO BE MAINTAINED

- Laboratory Manual containing the experiments that can be performed with the equipment
- Maintenance Record

Wather L

HOD/MECH



**DEPARTMENT OF MECHANICAL ENGINEERING
17MECC87- AUTOMOBILE ENGINEERING (UG)
STANDARD OPERATING PROCEDURE**

Name of the Lab	AUTOMOBILE ENGINEERING LAB
Purpose	To provide training for students about the automobile components and how to dismantle and assemble.
Scope	To find out the worn out parts and replace or reconditioned
Responsibility	Faculty Incharge, HOD/MECH

STANDARD OPERATING PROCEDURE FOR CLUTCH

- Before dismantle the components should be cleaned with soft cloth.
- Handle the tools as per procedure for dismantling.
- Place the each dismantled parts on the tray
- Mark the pressure plate and clutch cover position with respect to each other
- Place the clutch assembly on the clutch drive aligning the slot on the clutch finger with the thrust and seal on the pressure plate.
- Compress the spring cups by clutch.
- Loosen the mounting seat screw of the rotating plate on the retaining plate so removed.
- Loosen the mounting seat screw of the clutch finger brackets and eccentric pins
- Clean the parts by diesel.
- Check the condition of the parts.
- Replace the worn out parts.
- Place the clutch fingers bush in the clutch fingers.
- Fit the clutch bracket with eccentric pin.
- Hand tighter the mounting set screw of clutch bracket.
- Align the marks of clutch plate and pressure plate and place the clutch over the pressure plate.
- Compress the spring with clutch finger.
- Place the pressure pad on the pressure plate and tighten the pad mounting set screws.
- Release the load from the spring and remove clutch cover assembly from the clutch jig.
- Place the withdrawn plate, retaining plate on the clutch jig finger; tighten mounting set screws of the withdrawn plate.

PRECAUTIONS TO BE FOLLOWED

- Wear the gloves and handle the tool safely.
- Place the components properly

RECORD TO BE MAINTAINED

- Laboratory Manual containing the experiments that can be performed with the equipment
- Maintenance Record

Rathna L

HOD/MECH