Curriculum

For

Light vehicle driver

[Short term, modular curriculum]

Council for Technical Education and Vocational Education
Curriculum Development Division
2008.

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Introduction:

This curriculum has been developed with a purpose of preparing technical workforce in the field of light vehicle driving able to get employment in the country. The technical skills incorporated in this curriculum come from the experts who have already worked in field of light vehicle driving. Its contents are organized in the form of modules. So it is a tailor made curriculum to be implemented in a modular form.

It is a competency based curriculum too. It is also designed to produce lower level technical workforce in the field of light vehicle driving equipped with skills, knowledge and attitudes related to light vehicle driving in order to meet the demand of such workforce in the country so as to contribute in the national streamline of poverty reduction in Nepal.

Aims

The main aim of this curricular program is to produce skilled workforce in the field of light vehicle driving by providing training to the potential citizen of the country and link them to employment opportunities in the country. The aims of this curriculum are:

- To produce lower level technical workforce in the field of light vehicle driving
- To produce such technical workforce who will be able to provide serve through the application of the skills and knowledge of light vehicle driving being as an entrepreneur.

Objectives:

After the completion or this training program, the trainees will be able:

To renew related documents

To handle tools and equipment

To monitor, inspect & service light vehicles

To drive light vehicle

Description:

This curriculum provides skills and knowledge necessary for light vehicle driver. There will be both demonstration by trainers/instructors and opportunity by trainees to carry out the skills/tasks necessary for this level of technical workforce. Trainees will practice and learn skills by using typical tools, materials and equipment necessary for this curricular program.

On successful completion of this training, the trainees will be able to renew related documents; handle tools and equipment; monitor, inspect & service light vehicles; and drive light vehicle.

Course structure

			Time (hrs.)			Marks		
SN	Module / sub-module	Nature	Th.	Pr.	Tot.	Th.	Pr.	Tot.
1.	**Related document, tools & equipment**		**8**	**32**	**40**	**15**	**60**	**75**
	1. Reviewing related documents	P	2	8	10			
	2. Handling tools & equipment		6	24	30			
2.	**Monitoring, inspecting and servicing light vehicles**	**P**	**32**	**128**	**160**	**20**	**80**	**100**
3.	**Light vehicle driving**	**P**	**38**	**152**	**190**	**25**	**100**	**125**
	Total:		**78**	**312**	**390**	**60**	**240**	**300**

Duration:
The total duration of this curricular program will be three months (390 hours).

Target group:
The target group for this training will be all the interested literate individuals of the country

Group size:
The group size of this training program will be not more than 30

Target location:
The target location of this training program will be all over Nepal.

Medium of Instruction:
The medium of instruction for this training program will be Nepali or English or both.

Pattern of attendance:
The trainees should have 80% attendance in theory classes and 90% in Practical (Performance) to be eligible for internal assessment and final examinations.

Focus of the program:
This is a competency based curriculum. This curriculum emphasizes on competent performance of the task specified in it. Not less than 80% time is allotted to the competencies and not more than 20% to the related technical knowledge. So, the main focus will be on the performance of the specified competencies/tasks /skills included in this curriculum.

Entry criteria:
Individuals who meet the following criteria will be allowed to enter in this curricular program:

- Literate
- Physically and mentally fit
- Age- Minimum of 16 years
- Preference will be given to female, Dalit, Janjati, and Conflict affected people

Follow up suggestion:

This is not a training program only for training sake. The ultimate success of this program will rest on the proficiency of the graduates of this training program in providing services in the community either by wage employment or by self-employment.
In other to assess the success of this program and collect feedbacks/inputs for the revision of the program, a schedule of follow up is suggested as follows:-

- First follow up: - Six months after the completion of the training program.
- Second follow up: - Six months after the completion of the first follow up.
- Follow up cycle: - In a cycle of one year after the completion of second follow up for five years.

Certificate requirement:

The related training institute will provide the certificate of "Light vehicle driver" to those individuals who successfully complete all the tasks with their related technical knowledge specified in this curriculum.

Student Evaluation Details:

- Continuous evaluation of the trainees' performance is to be done by the related instructor/trainer to ensure the proficiency over each competency.
- Related technical knowledge learnt by the trainees will be evaluated through written or oral tests as per the nature of the content
- Trainees must secure minimum marks of 60% in an average of both theory and practical evaluations.

Trainers' Qualification:

- Bachelor's degree in the related field
- Good communicative & instructional skills.
- Experience in the related field.

Trainer – Trainees Ratio:

- 1:10 for practical classes
- Depends on the nature of subject matter and class room situation for theory classes.

Suggestion for instruction

Demonstrate task performance

- Demonstrate task performance in normal speed
- Demonstrate slowly with verbal description of each and every steps in the sequence of activity flow of the task performance using question and answer techniques
- Repeat the above step for the clarification on trainees demand if necessary.
- Perform fast demonstration of the task performance.

Provide trainees the opportunity to practice the task performance demonstrated.

- Provide trainees to have guided practice:- create environment for practicing the demonstrated task performance and guide the trainees in each and every step of task performance
- Provide trainees the opportunity to repeat & re-repeat as per the need to be proficient on the given task performance
- Switch to another task demonstration if and only if the trainees developed proficiency in the given task performance

Evaluation performance of the trainees/ student

- Perform task analysis
- Develop a detail task performance check list
- Perform continuous performance evaluation of the trainees / students by applying the performance check list.

Modules

Module: 1: Related Documents, Tools & Equipment
Module: 2: Monitoring, inspecting & servicing light vehicles
Module: 3: Light Vehicle Driving

Module: 1: Related Documents, Tools & Equipment

Description:

These module deals with the knowledge and skills related to reviewing related documents and handling of tools and equipment.

Objectives:

After its completion the trainees will be able:

- To review related documents
- To handle related tools and equipment

Sub-modules:

1: Renewing Related Documents
2: Handling tools and equipment

Sub module: 1: Renewing Related Documents

Description:

These sub-module deals with the knowledge and skills related to reviewing related documents. It consists of tasks related to the review of documents. Each task structure consists of performance steps, terminal performance objective, and minimum technical knowledge necessary to know related to the task.

Objectives:

After its completion the trainees will be able:

- To renew license
- To renew blue book
- To renew road permit
- To renew route permit
- To renew green sticker (emission test certificate)

Tasks:

After its completion trainees are expected to get proficiency on the following tasks:

1. Renew license
2. Renew blue book
3. Renew road permit
4. Renew route permit
5. Renew green sticker (emission test certificate)

Task structures

Task: 1: Renew license.

Steps	Terminal performance objective	Related technical knowledge
1. Check the validity of the license 2. Find out the place of issue as it has to be renewed from that place 3. Get a firm of license renewal from Department of Transport Management. 4. Ask the renewable charge as it differs for different group 5. Pay the amount to the cashier and take a receipt. 6. Fill up the firm and submit it to License dept. along with the money receipt. 7. Ask them for the collection date. 8. Collect the renewed license	**Condition (Given):** License which needs to be renewed **Task (What):** Renew license **Standard (How well):**	➢ Importance of license ➢ Functioning of Department of Transport Management

Required tools/equipment:

Safety:

- Care should be taken as you may be cheated with the fake brokers
- Carry change money if possible
- Be in a queue

Task No: 2: Renew Blue book.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Check the validity of the blue book 2. Find out the place of issue as it has to be renewed from that place 3. Get a firm of license renewal from Department of Transport Management. 4. Check the vehicle tax payment and if it is due clear it. 5. Ask the renewable charge as it differs for different group 6. Pay the amount to the cashier and take a receipt. 7. Fill up the firm and submit it Blue book dept. along with the money receipt. 8. Ask them for the collection date. 9. Collect the renewed blue book	**Condition (Given):** Blue book which needs to be renewed **Task (What):** Renew blue book. **Standard (How well):**	➢ Importance of blue book ➢ Functioning of Department of Transport Management

Required tools/equipment:

Safety:

- Care should be taken as you may be cheated with the fake brokers
- Carry change money if possible
- Be in a queue

Task No: 3: Renew Road Permit.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Check the validity of the road permit 2. Find out the place of issue as it has to be renewed from that place 3. Get a firm of road permit renewal from Department of Transport Management. 4. Check the vehicle tax payment and blue book validity. 5. Ask the renewable charge 6. Pay the amount to the cashier and take a receipt. 7. Fill up the firm and submit it Road permit dept. along with the money receipt. 8. Ask them for the collection date. 9. Collect the renewed blue book	**Condition (Given):** Road permit which needs to be renewed **Task (What):** Renew road permit. **Standard (How well):**	➢ Importance of road permit ➢ Functioning of Department of Transport Management

Required tools/equipment:

Safety:

- Care should be taken as you may be cheated with the fake brokers
- Carry change money if possible
- Be in a queue

Task No: 4: Renew Route permit.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Check the validity of the route permit 2. Find out the place of issue as it has to be renewed from that place 3. Get a firm of license renewal from Department of Transport Management. 4. Check the vehicle tax payment and validity of blue book. 5. Ask the renewable charge as it differs for different group 6. Pay the amount to the cashier and take a receipt. 7. Fill up the firm and submit it route permit dept. along with the money receipt. 8. Ask them for the collection date. 9. Collect the renewed route permit	**Condition (Given):** Route permit which needs to be renewed **Task (What):** Renew route permit. **Standard (How well):**	➢ Importance of route permit ➢ Functioning of Department of Transport Management

Required tools/equipment:

Safety:

- Care should be taken as you may be cheated with the fake brokers
- Carry change money if possible
- Be in a queue

Task No: 5: Renew Green Sticker (Emission test certificate).

Steps	Terminal Performance Objective	Related Technical Knowledge
9. Check the validity of the green sticker 10. Service your vehicle before taking it for emission test 11. Confirm the blue book validity 12. Find out the place where emission will be checked and go with the vehicle 13. Pay the fee for the emission check to the cashier and take a receipt. 14. Conduct emission check 15. Take a green sticker and put it on the front windshield of the vehicle. 16. If vehicle failed in emission check, take it to the workshop for necessary repair and follow the same steps	**Condition (Given):** Vehicle **Task (What):** Renew green sticker **Standard (How well):** Emission should be within the norms set by MOPE	➢ Emission norms for Nepal ➢ Affect of pollution in environment and human health

Required tools/equipment:

Safety:

- Care should be taken as you may be cheated with the fake brokers
- Carry change money if possible
- Be in a queue

Sub module: 2: Handling tools and equipment

Description:

This module deals with the knowledge and skills/tasks related to the handling of tools, materials, and equipment. Each task structure consists of performance steps, terminal performance objective, and minimum technical knowledge necessary to know related to the task.

Objectives:

After its completion the trainees will be able:

- To handle wheel spanner
- To handle open spanner
- To handle ring spanner
- To handle slide wrench
- To handle socket wrench
- To handle screw driver
- To handle jack and handle

Tasks:

After its completion trainees are expected to get proficiency on the following tasks:

1. Handle wheel spanner
2. Handle open spanner
3. Handle ring spanner
4. Handle slide wrench
5. Handle socket wrench
6. Handle screw driver
7. Handle jack and handle

Task No: 1: Handle Wheel Spanner.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Put the vehicle in leveled positioned 2. Switched off the ignition 3. Put on parking brake 4. Put the wheel spanner over the head of wheel bolt 5. Rotate the spanner anti clock wise for opening and clockwise for tightening.	**Condition (Given):** A serviceable vehicle and a wheel spanner. **Task (What):** Handle wheel spanner **Standard (How well):** Head of the bolt should not be damaged	➢ Function of wheel spanner and its usage

Required tools/equipment: Wheel spanner, chock of vehicle.

Safety:

- Observe all safety rules while lifting or working under vehicle.
- Always ensure that wheels remaining on ground are firmly chocked.
- Check the nut holding grove of the wheel spanner
- Maintain clean and orderly work area.

Task No: 2: Handle Open Spanner.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Select open spanner according to the head of the bolt. 2. Put the open spanner over the head of bolt 3. Rotate the spanner anti clock wise for opening and clockwise for tightening.	**Condition (Given):** Nut bolt clamped in a vice **Task (What):** Handle open spanner **Standard (How well):** Head of the bolt should not be damaged	➢ Function of open spanner and its usage

Required tools/equipment: open spanner, vice, nut and bolt.

Safety:

- Observe all safety rules while lifting or working under vehicle.
- Always ensure that wheels remaining on ground are firmly chocked.
- Check the nut holding grove of the wheel spanner
- Maintain clean and orderly work area.

Task No: 3: Handle Ring Spanner.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Select ring spanner according to the head of the bolt. 2. Put the ring spanner over the head of bolt 3. Rotate the spanner anti clock wise for opening and clockwise for tightening.	**Condition (Given):** Nut bolt clamped in a vice **Task (What):** Handle ring spanner **Standard (How well):** Head of the bolt should not be damaged	➢ Function of ring spanner and its usage

Required tools/equipment: Ring spanner, vice, bolt and nut.

Safety:

- Observe all safety rules while lifting or working under vehicle.
- Always ensure that wheels remaining on ground are firmly chocked.
- Check the nut holding grove of the wheel spanner
- Maintain clean and orderly work area.

Task No: 4: Handle Slide Wrench.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Adjust the slide wrench to fit head of the bolt head. 2. Put the slide wrench over the head of bolt 3. Rotate the spanner anti clock wise for opening and clockwise for tightening.	**Condition (Given):** Nut bolt clamped in a vice **Task (What):** Handle Slide wrench **Standard (How well):** Head of the bolt should not be damaged	➢ Function of slide wrench and its usage

Required tools/equipment: Slide wrench, vice, nut and bolt.

Safety:

- Observe all safety rules while lifting or working under vehicle.
- Always ensure that wheels remaining on ground are firmly chocked.
- Check the nut holding grove of the wheel spanner
- Maintain clean and orderly work area.

Task No: 5: Handle socket wrench.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Select socket wrench according to the head of the bolt. 2. Put the ring spanner over the head of bolt 3. Rotate the spanner anti clock wise for opening and clockwise for tightening.	**Condition (Given):** Nut bolt clamped in a vice **Task (What):** Handle socket wrench **Standard (How well):** Head of the bolt should not be damaged	➢ Function of socket wrench and its usage

Required tools/equipment: socket wrench, vice, bolt and nut.

Safety:

- Observe all safety rules while lifting or working under vehicle.
- Always ensure that wheels remaining on ground are firmly chocked.
- Check the nut holding grove of the wheel spanner
- Maintain clean and orderly work area.

Task No: 6: Handle screw driver.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Select screw driver spanner according to the groove in the head of the bolt or screw. 2. Put the screw driver in the groove 3. Rotate the screw driver anti clock wise for opening and clockwise for tightening.	**Condition (Given):** Nut bolt with grove in a head clamped in a vice **Task (What):** Handle screw driver **Standard (How well):** Groove on the head of the bolt should not be damaged	➢ Function of screw driver and its usage ➢ Types of screw driver

Required tools/equipment: screw driver, vice, bolt and nut.

Safety:

- Observe all safety rules while lifting or working under vehicle.
- Always ensure that wheels remaining on ground are firmly chocked.
- Maintain clean and orderly work area.

Task No: 7: Handle Jack and Handle.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Put the vehicle in leveled positioned 2. Switched off the ignition 3. Put on parking brake 4. Find out the jacking position of vehicle from the owners service manual 5. Raise the jack and adjust it to lift from the jacking position of the vehicle. 6. Lift the vehicle 7. Lower the jack 8. Put it back in to a tool room.	**Condition (Given):** A serviceable vehicle and a jack and handle. **Task (What):** Handle Jack and Handle **Standard (How well):** Vehicle to be lifted from its jacking point	➢ Function of jack and handle ➢ Types of Jack

Required tools/equipment: Wheel spanner, chock of vehicle.

Safety:

- Observe all safety rules while lifting or working under vehicle.
- Always ensure that wheels remaining on ground are firmly chocked.
- Check the nut holding grove of the wheel spanner
- Maintain clean and orderly work area.

Module: 2: Monitoring, inspecting & servicing light vehicles

Description:

This module deals with the knowledge and skills related to the inspecting, monitoring, and servicing. It consists of tasks related to inspecting, monitoring, and servicing light vehicles. Each task structure consists of performance steps, terminal performance objective, and minimum technical knowledge necessary to know related to the task.

Objectives:

After its completion the trainees will be able:

- To Adjust brake
- To Bleed hydraulic brake
- To Remove and install parking brake lever
- To Inspect and adjust parking brake
- To Remove and install parking brake cable
- To Service pneumatic brake
- To Change steering oil
- To Rotate tyre
- To Change tubeless tyres
- To Repair tube puncture (flat tyre)
- To Repair tubeless tyre puncture
- To Change rim disc plate
- To Service/ repair spark plug
- To Inspect / change glow plug
- To Adjust idle speed and maximum speed
- To Bleed fuel system
- To Change transmission gear oil
- To Wash vehicle
- To Grease with grease gun
- To Lubricate with oilcan
- To Change fuel filter
- To Change oil filter
- To Change engine oil
- To Change coolant
- To Clean/change air filter
- To Drain off condense water from compressed air
- To Change thermostats
- To Adjust brake
- To Adjust clutch
- To Service battery
- To Adjust fan belts
- To Tighten underbody nuts and bolts
- To Test electrical accessories
- To Adjust RPM
- To Change differential oil
- To Set/ adjust air pressure
- To Replace battery
- To Replace/change lights/bulbs
- To Change relay/switch in electrical system
- To Set head light beam

Tasks:

After its completion trainees are expected to get proficiency on the following tasks:

1. Adjust brake
2. Bleed hydraulic brake
3. Remove and install parking brake lever
4. Inspect and adjust parking brake
5. Remove and install parking brake cable
6. Service pneumatic brake
7. Change steering oil
8. Rotate tyre
9. Change tubeless tyres
10. Repair tube puncture (flat tyre)
11. Repair tubeless tyre puncture
12. Change rim disc plate
13. Service/ repair spark plug
14. Inspect / change glow plug
15. Adjust idle speed and maximum speed
16. Bleed fuel system
17. Change transmission gear oil
18. Wash vehicle
19. Grease with grease gun
20. Lubricate with oilcan
21. Change fuel filter
22. Change oil filter
23. Change engine oil
24. Change coolant
25. Clean/change air filter
26. Drain off condense water from compressed air
27. Change thermostats
28. Adjust brake
29. Adjust clutch
30. Service battery
31. Adjust fan belts
32. Tighten underbody nuts and bolts
33. Test electrical accessories
34. Adjust RPM
35. Change differential oil
36. Set/ adjust air pressure
37. Replace battery
38. Replace/change lights/bulbs
39. Change relay/switch in electrical system
40. Set head light beam

Task No: 1: Adjust Brake.

Steps	Terminal Performance Objective	Related Technical Knowledge
Brake shoe adjustment: 1. Jack up vehicle until wheel to be adjusted is just clear of ground. 2. Clear dirt from adjusters and surrounding. 3. Turn each adjuster in clockwise direction until the brake shoes lock the brake drum. 4. Slacken off adjuster until wheel spins freely. 5. Repeat on remaining wheels. NOTE: Ensure that the hand brake has been released before adjusting the rear wheel brakes. **Hand brake adjustment:** 1. Jack up vehicle until rear wheels are clear of the ground. 2. Support on the axle stands. 3. Release hand brake. 4. Check manufacturer's instructions before adjusting hand brake. NOTE: On some vehicle the hand brake cable can be adjusted at the rear of the hand brake lever. Always consult manufacturer's manual before commencing any adjustment. 5. Adjust hand brake cable adjuster until the shoes contact with the drum. 6. Slacken adjuster sufficiently to allow the wheel to rotate freely. 7. Check hand brake linkage for wear. **8.** Adjust and lubricate as necessary.	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Adjust brake shoe or hand brake. **Standard (How well):** The brake shoe and hand brake adjusted within 15 +- 5 mm pedal free play. The vehicle stopped in minimum braking distance.	➢ Identify the parts and uses of braking system and their components. ➢ Types of brake. ➢ Explain the working principles and functions of hand brake. ➢ Identify and demonstrate the methods of adjusting brake. ➢ Trouble shooting of brake system. ➢ Safety precaution

Required tools/equipment: Mechanics' hand tools set, brake adjusting tool or screwdriver, Brake bleeding pipe, Jar etc.

Safety:

- Observe all safety rules while lifting or working under vehicle.
- Always ensure that wheels remaining on ground are firmly chocked.
- Never work on a vehicle supported only on jacks.
- Use care when removing and replacing return spring to avoid bodily injury.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.

Task No: 2: Bleed hydraulic brake.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Examine the master cylinder reservoir cap and ensure that the vent hole is clear. 2. Maintain the fluid level in the reservoir; it should be the specified level below the top of the reservoir face. 3. Check all unions and connections for tightness and freedom from leaks and check all the conditions of the flexible hoses. 4. Clean the area around the bleeding nipples. 5. Start bleeding at the nipple furthest from master cylinder and work to the nipple nearest this cylinder. 6. Select any one of the wheel cylinder, which is the longest distance from master cylinder. 7. Insert one end of the clean rubber tube (about 300 mm) over bleeding nipple on the brake back plate 8. Position the free end of the tube in a glass jar partially filled with clean brake fluid; ensure the tube end is submerged in the fluid. 9. Press the brake pedal and unscrew bleed nipple half a turn. 10. Check whether air bubbles are escaped through the tube, assistant should then press brake pedal firmly to floor. 11. Close the nipple and release pedal quickly. 12. Repeat steps 9 to 11 until all air is expelled from the system. 13. Close the bleed nipple when only brake fluid is pumped out with the pedal fully operated depressed. 14. Check fluid reservoir level frequently during this operation. 15. Remove the tube and repeat the operation on the other three wheels. 16. Check the fluid level on master cylinder during the bleeding operations on the other three wheels. 17. Fill the level; use only the brake fluid recommended for the vehicle being worked on. 18. Adjust brake to correct setting and check position when all wheels have bleed.	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Bleed air from brake. **Standard (How well):** The air bubble free from brake and the brake fluid should be in specified level.	➢ Interpretation of service manual. ➢ Importance of brake bleeding. ➢ Properties of brake fluid. ➢ Brake bleeding and adjustment process. ➢ Grade, viscosity and full form of DOT, SAE and API number. ➢ Trouble shooting.

Safety:

- Observe all safety rules while lifting or working under vehicle.
- Always ensure that wheels remaining on ground are firmly chocked.
- Never work on a vehicle supported only on jacks.

Task No: 3: Remove and install parking brake lever.

Steps	Terminal Performance Objective	Related Technical Knowledge
Removal 1. Hoist vehicle and release parking brake lever 2. Disconnect negative cable at battery 3. Disconnect lead wire of parking brake switch and coupler 4. Loosen parking brake cable stopper nut and remove adjusting nut 5. loosen parking brake cable bracket nut and remove parking brake cable from bracket 6. Remove parking brake lever bolts and then remove parking brake lever assembly. **Installation:** 1. Install reverse order of removal procedure. 2. After all parts are installed, parking brake lever needs to be adjusted. 3. Check brake drum for dragging and brake system for proper performance	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Remove and install parking brake lever. **Standard (How well):** The bolts need to be tighten as per the specification (tightening torque)	➢ Importance and working principle of parking brake. ➢ Parts related to parking brake ➢ Trouble shooting of parking brake system. ➢ Safety precautions.

Required tools/equipment: Mechanic's hand tools set, Manufacturer's service manual, jack, safety stands, torque wrench etc.

Safety:

- Observe all safety rules while lifting or working under vehicle.
- Always ensure that wheels remaining on ground are firmly chocked.
- Never work on a vehicle supported only on jacks.
- Use care when removing and replacing brake components to avoid bodily injury.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.

Task No:4: Inspect and adjust parking brake

Steps	Terminal Performance Objective	Related Technical Knowledge
Inspection 1. Hold center of parking brake lever grip and pull it to specified force 2. With parking brake lever pulled up as above, count ratchet notch 3. It should be 5 to 8 notches 4. Check both left and right wheels are locked firmly 5. If number of notches is out of specification, adjust cable. **Adjustment:** 1) Ensure the following condition of cable • No air is trapped in brake system • Brake pedal travel is proper • brake pedal has been depressed a few times without specified force • Parking brake lever has been pulled up a few times with specified force • Rear shoes are not worn beyond limit and self adjustment mechanism operates properly 2) confirming all above, adjust parking brake lever stroke by loosening or tightening adjusting nut	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Inspect and adjust parking brake **Standard (How well):** Click noise that ratchet makes while pulling parking brake lever without pressing its button to be listened to count no. of notch easily For cable adjustment, stopper nut to be loosened and turned adjusting nut while holding nut with spanner so as to prevent inner cable from getting twisted Brake drum to be checked for dragging after adjustment	➢ Importance and working principle of parking brake. ➢ Trouble shooting of parking brake system. ➢ Safety precautions.

Required tools/equipment: Mechanic's hand tools set, Manufacturer's service manual, jack, safety stands, torque wrench etc.

Safety:

- Observe all safety rules while lifting or working under vehicle.

- Always ensure that wheels remaining on ground are firmly chocked.
- Never work on a vehicle supported only on jacks.
- Use care when removing and replacing brake components to avoid bodily injury.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.

Task No:5: Remove and install parking brake cable.

Steps	Terminal Performance Objective	Related Technical Knowledge
Removal 1. Raise suitably support vehicle and remove wheel if necessary 2. Remove parking brake cable **Installation:** 4. Install it by reversing removal procedure, noting the following points 5. Install clamps properly 6. Tighten bolts and nuts to specified torque 7. Upon completion of installation, adjust cable	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Remove and install parking brake cable. **Standard (How well):** The bolts need to be tighten as per the specification (tightening torque)	➢ Importance and working principle of parking brake. ➢ Operation of parking brake cable ➢ Trouble shooting of parking brake system. ➢ Safety precautions.

Required tools/equipment: Mechanic's hand tools set, Manufacturer's service manual, jack, safety stands, torque wrench etc.

Safety:

- Observe all safety rules while lifting or working under vehicle.
- Always ensure that wheels remaining on ground are firmly chocked.
- Never work on a vehicle supported only on jacks.
- Use care when removing and replacing brake components to avoid bodily injury.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.

Task No:6: Service pneumatic brake.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Drain off condense water 2. Grease with grease gun brake pedal bushing, brake double lever, slack adjuster 3. Lubricate with oil can brake chamber fork and pin, linkages of foot brake ball joints of exhaust brake linkages 4. Check free movement of plunger in dual brake valve 5. Check brake system for leaks and rectify if necessary 6. Check travel of brake chamber's push rod/ brake lining wear and clearance with drum 7. Check proper functioning of engine exhaust brake, free movement of plunger of exhaust brake valve, mounting bolts and slackness in linkages 8. Check for hose damages and replace if necessary 9. Check brake torque plate mounting bolts and tighten if necessary 10. Check condition of gaiter in different brake valves, exhaust flap in dual brake valve, nylon breather tube and clips of spring brake actuator 11. Check mounting bolts of brake chambers, different valve mountings, air tank mountings, air line clamps and tighten if necessary 12. Remove brake drums, inspect brake linings, brake drums 13. Remove filter element in serviceable type air filter, clean and refit	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Service pneumatic brake **Standard (How well):** The bolts need to be tighten as per the specification (tightening torque)	➢ Principle of pneumatic brakes ➢ Aggregate related to pneumatic brakes ➢ Interpretation of service manual ➢ Properties of grease

Required tools/equipment: Mechanic's hand tools set, Manufacturer's service manual, jack, safety stands, torque wrench etc.

Safety:

- Observe all safety rules while lifting or working under vehicle.
- Always ensure that wheels remaining on ground are firmly chocked.
- Never work on a vehicle supported only on jacks.
- Use care when removing and replacing brake components to avoid bodily injury.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.

Task No: 7: change steering oil.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Open the steering oil filler plug/cap. 2. Check the gear oil level. 3. Inspect the quality/properties of gear oil. 4. Add the specified grade of steering oil. 5. Maintain the oil level. 6. Remove the drain plug to drain the steering oil if the oil has low viscous. 7. Drain the steering oil. 8. Tighten the drain plug 9. Refill the specified grade of steering oil. 10. Check the level of oil. 11. Add oil if level is low.	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** **C**hange steering oil. **Standard (How well):** The steering oil changed.	➢ Importance of steering system. ➢ Types of steering gear box. ➢ Properties of steering gear oil. ➢ Trouble shooting. ➢ Safety precaution.

Required tools/equipment: Mechanics' hand tools set, funnel

Safety:

- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.

Task No: 8: Rotate tyre.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Follow the service manual for the tyre rotation. 2. Lift the vehicle. 3. Apply hand brakes or support the vehicle. 4. Check the tyre pressure. 5. Be sure that the all tyres are same size and ply. 6. Remove tyres. 7. Rotate the tyre as per instructions of vehicle's service manual. 8. Rotate the front left tyre to rear left and vice versa. 9. Rotate the front right tyre to the rear right or vice versa. 10. Inflate the tyres as specifications. 11. Fit the tyres to the vehicle. 12. Remove the safety stands or jacks.	**Condition (Given):** A serviceable tyre. **Task (What):** Rotate tyre. **Standard (How well):** The tyres rotated according to the manufacturer's procedure.	➢ Importance, purpose and advantages of tyre rotation. ➢ Tyre rotation process. ➢ Trouble shooting. ➢ Safety precautions.

Required tools/equipment: Mechanic's hand tool set, Wheel wrench, hydraulic jacks, safety stands, chocks etc.

Safety:

- Ensure that the vehicle is on a level surface.
- Always ensure that wheels remaining on ground are firmly chocked. Chocks must be placed under one of the wheels not being raised.
- Don't miss-match the radial and cross ply tyre to a vehicle.
- Use care when removing and replacing wheels and tyres to avoid bodily injury.
- Always inflate the specified air pressure as per manual.
- Use care when working with mechanic's hand tools.
- Maintain clean and orderly work area.

Task No: 9: Change tubeless tyres.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Lift the wheel that you want to change tyre. 2. Remove the wheel from vehicle. 3. Deflate the tyre. 4. Remove the disc from tyre bead. 5. Check the new tyre is free from any dust and particles. 6. Place the tyre on the disc to change. 7. Insert the air valve first to the disc. 8. Insert the tyre bead to the disc. 9. Inflate the tyre as per specification. 10. Fit the tyre to the wheel.	**Condition (Given):** A repairable tyre. **Task (What):** Change tubeless tyre **Standard (How well):** The tubeless tyre changed.	➢ Types of tyre. ➢ Advantages and disadvantages of tube and tubeless tyre. ➢ Specifications and pressure of different tyre. ➢ Causes of tyre wear and their remedy.

Required tools/equipment: Mechanic's hand tool set, tyre leavers, rubber pins etc.
Safety:

- Ensure that the vehicle is on a level surface.
- A vehicle supported by a jack or bricks are a potential danger.
- Always ensure that wheels remaining on ground are firmly chocked. Chocks must be placed under one of the wheels not being raised.
- Never work on a vehicle supported only on jacks.
- Use care when working with mechanic's hand tools.
- Use care when removing and replacing wheels and tyres to avoid bodily injury.
- Always inflate the specified air pressure as per manual.
- Maintain clean and orderly work area.

Task No: 10: Repair tube puncture (flat tyre).

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Determine the option whether to apply cold patch or hot patch. 2. Locate the puncture to the tyre. 3. Inflate and keep the tube into a water basket to locate the puncture. 4. Mark the tube where air bubbles occur. 5. Roughen area around puncture to same size as patch. 6. Apply glue to the above area. 7. Remove backing from patch. 8. Apply patch to tube making sure there are no air pockets. 9. Clamp patch and tube in heating unit if you want to apply hot patch. 10. Apply heat. 11. Allow cooling and removing from heating unit. 12. Test tube for leaks. 13. Fit the tube to the tyre.	**Condition (Given):** A repairable tyre. **Task (What):** Repair tube/flat tyre. **Standard (How well):** The tube or flat tyre repaired according to performance guide.	➢ Types of tubes. ➢ Types of patching process. ➢ Tube repairing process. ➢ Trouble shooting. ➢ Safety precautions.

Required tools/equipment: Mechanic's hand tool set, tyre leavers, hot patching machine, glue, stitching roller, etc.

Safety:

- Ensure that the vehicle is on a level surface.
- Always ensure that wheels remaining on ground are firmly chocked. Chocks must be placed under one of the wheels not being raised.
- Never use sharp knife edge tools to fit the tube.
- Ensure that the puncture area is correctly identified.
- Use care when working with mechanic's hand tools.
- Use care when removing and replacing wheels and tyres to avoid bodily injury.
- Always inflate the specified air pressure as per manual.
- Maintain clean and orderly work area.

Task No: 11: Repair tubeless tyre puncture.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Remove tyre from rim. 2. Locate puncture. 3. Scrape damaged area and buff. 4. Lubricate puncture externally and internally with vulcanizing fluid by using insertion tool. 5. Install the plug -in insertion tool and lubricate thoroughly with vulcanizing fluid. 6. Insert the plug into puncture, release and remove insertion tool. 7. Cut protruding end of plug 1/16" above surface of tyre. 8. Apply patch. 9. Mount tyre on rim. 10. Inflate tyre and check for leaks.	**Condition (Given):** A tubeless tyre with a puncture. **Task (What):** Repair tubeless tyre puncture. **Standard (How well):** Tubeless tyre puncture repaired.	➢ Types of tubes. ➢ Types of patching process. ➢ Tube repairing process. ➢ Trouble shooting. ➢ Safety precautions.

Required tools/equipment: Mechanic's hand tool set, tyre leavers, hot patching machine, glue, stitching roller, etc.

Safety:

- Ensure that the vehicle is on a level surface.
- Chocks must be placed under one of the wheels not being raised.
- Never use sharp knife edge tools to fit the tube.
- Ensure that the puncture area is correctly identified.
- Use care when working with mechanic's hand tools.
- Use care when removing and replacing wheels and tyres to avoid bodily injury.
- Always inflate the specified air pressure as per manual.
- Maintain clean and orderly work area.

Task No: 12: Change rim disc plate

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Support vehicle and remove tyre and wheel assembly. 2. Remove liquid and air from the tyre via the valve core. 3. Break bead with hammer and bead-breaking tool. 4. Turn tyre rim over after bead has been released completely around tyre and repeat for second bead. 5. Lubricate rim flange, tyre bead and base of tube. 6. Pry bead over rim flange with two long tyre levers until top bead is completely over rim flange. 7. Brace weight of tyre against solid support and pull out of tyre. 8. Insert tyre levers under opposite side of bead with one side of bottom bead in rim well. 9. Work bottom bead over rim flange by taking small bites with two tyre levers for smaller tyres. 10. Stand tyre on tread for larger tyres with weight supported, and one man holding rim, work second bead over rim flange until rim drops out.	**Condition (Given):** A repairable tyre. **Task (What):** Change rim/disc plate. **Standard (How well):** The tyre demounted without damage to rim, tyre or tube.	➢ Importance, uses, function and types of rim. ➢ Trouble shooting. ➢ Safety precautions.

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Required tools/equipment: Mechanic's hand tool set, tyre leavers, hot patching machine

Safety:

- Ensure that the vehicle is on a level surface.
- Always ensure that wheels remaining on ground are firmly chocked. Chocks must be placed under one of the wheels not being raised.
- Never use sharp knife edge tools to fit the tube.
- Ensure that the puncture area is correctly identified.
- Use care when working with mechanic's hand tools.
- Use care when removing and replacing wheels and tyres to avoid bodily injury.
- Always inflate the specified air pressure as per manual.
- Maintain clean and orderly work area.

Task No: 13: Service/ repair spark plug.

Steps	Terminal Performance Objective	Related Technical Knowledge
Removal 1. Disconnect negative terminal of battery 2. Remove high tension cord 3. remove spark plug 4. check electrode wear 5. check and clean carbon deposits 6. check insulator damage 7. if found faulty change spark plug **Installation** 1. Reverse the process of removal	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Service/ repair spark plug **Standard (How well):** Specified spark plug gap need to be maintained	➢ Working principle of spark plug. ➢ Selection of spark plug ➢ Safety precautions. ➢ Interpretation of service manual

Required tools/equipment: Mechanic's hand tools set, Manufacturer's service manual, sand blaster etc.

Safety:

- Use care when removing and replacing spark plug to avoid bodily injury.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.

Task No: 14: Inspect / change glow plug.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Remove bolts and glow plug connector 2. Check the continuity of glow plug 3. Inspect glow plug relay continuity 4. Inspect relay operation 5. Inspect glow plug resistor 6. Install glow plug 7. Heat and crank the engine	**Condition (Given):** A serviceable engine. **Task (What):** Inspect / change glow plug. **Standard (How well):** Voltage should not be applied more that 11 volts to glow plug glow plug should not be cleaned with oil or gasoline	➢ Principle of working of glow plug ➢ Principle of relay and its function ➢ Principle of resistor and its function

Required tools/equipment: Mechanics' hand tools set, multimeter, manufactures manual etc.

Safety:

- Use safety precautions when working with mechanic's hand tools.
- Use clean and orderly work area.
- Use safety precaution while cranking engine

Task No: 15: Adjust idle speed and maximum speed.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Tune up engine 2. Let engine run till normal operational temperature 3. Connect tachometer **Adjust idle speed** 1. Check that the adjusting lever touches the idle speed adjusting screw when the accelerator pedal is released 2. if not adjust the accelerator linkage 3. Start engine 4. Check the idle speed 5. Adjust idle speed **Adjust maximum speed** 1. Check that the adjusting lever touches the idle speed adjusting screw when the accelerator pedal is released 2. if not adjust the accelerator linkage 3. start the engine 4. Depressed the accelerator pedal all the way 5. Check the maximum speed 6. adjust the maximum speed	**Condition (Given):** A serviceable engine. **Task (What):** Set engine speed. **Standard (How well):** Engine speed has to be within specification when all accessories are switched off	➢ Principle of tachometer ➢ What is idle speed and maximum engine speed

Required tools/equipment: Mechanics' hand tools set, Pulley wrench, feeler gauge, battery charger, belt tensioner, multimeter, injector testing bench, manufactures manual, nozzle cleaning kit, plunger stroke measuring tool, dial gauge etc.

Safety:

- Use safety precautions when working with mechanic's hand tools.
- Use clean and orderly work area.
- Use safety precaution while cranking engine
- Use mask while cleaning air filter
- Use special tool for tightening alternator drive belt

Task No: 16: Bleed fuel system.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Determine whether the fuel injection system is mechanical, electrical, petrol or diesel according to manufacturer's specifications. 2. Loosen fuel pump outlet line and crank engine until fuel flows from connection as per manufacturer's procedure. 3. Tighten connection and outlet. 4. Loosen connection at fuel filter outlet, and crank engine until fuel flows from connections. 5. Tighten connection at fuel filter outlet. 6. Loosen fuel line connections at fuel injectors and crank engine until fuel appears. 7. Retighten the connection. 8. Repeat this step for all the fuel injectors. 9. Start the engine and operate for period of time necessary to purge remaining air from lines as per manufacturer's procedure.	**Condition (Given):** A serviceable fuel injection pump of a diesel engine. **Task (What):** Bleed the fuel system in diesel engine. **Standard (How well):** The fuel system bleed and performed in accordance with manufacturer's specifications.	➢ Interpretation of service manuals. ➢ Identification the types of fuel system. ➢ Importance and purpose and functions of bleeding fuel systems. ➢ Technical terms associated with bleeding the fuel system. ➢ Trouble shooting.

Required tools/equipment: Mechanic's hand tools set, Manufacturer's service manual, special equipment as required by manufacturer etc.

Safety:

- Ventilate exhaust gases to protect respiratory system.
- Follow correct safety practices around flammable liquids.
- Follow correct safety practices when working with pressurized fuel systems.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.

Task No: 17 Change transmission gear oil.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Ensure that the gearbox is warm up to pour the oil. 2. Lift the vehicle and raise if required. 3. Clean the surrounding area of gearbox filler and drain plug. 4. Place clean tray/jar under the drain plug. 5. Unscrew and remove the drain plug. 6. Remove the filler plug. 7. Wait 15 to 30 minutes to drain the gear oil. 8. Plug up the drain plug. 9. Tighten the drain plug. 10. Refill the specified grade of oil. 11. Wait 5 to 15 minutes to check the oil level. 12. Check the oil level. 13. Top up the gear oil if level is low. 14. Tighten the filler plug.	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Change gear oil of given vehicle. **Standard (How well):** The oil changed with in specified level.	➢ Importance and identification of lubricating oil/ lubricants. ➢ Types of lubricant. ➢ Properties of gear oil. ➢ Grade and viscosity. ➢ SAE and API specification.

Required tools/equipment: Mechanics' hand tools set, drain plug wrench, tray/jar, filler pipe, funnel

Safety:

- Never use loose or unsealed gear oil.
- Always use correct grade and viscosity of gear oil to change.
- Use care when removing and replacing speedometer drive gears to avoid bodily injury.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.

Task No: 18: Wash Vehicle

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Park the vehicle in service bay. 2. Apply hand brake or place choke to the wheel. 3. Disconnect battery negative terminal. 4. Remove floor mats from the vehicle. 5. Clean the interior of the vehicle. 6. Clean the interior floor with vacuum cleaner. 7. Lift the hydraulic ramp as required height. 8. Adjust the pressure of water spray nozzle in water pump or hosepipe. 9. Wash the vehicle by using spray nozzle. 10. Clean/ wash the floor mats and mattress. 11. Wipe up the body of the vehicle with soft cloth and liquid soap or detergent. 12. Wash/Remove dry soil or mud under the chassis. 13. Wash the vehicle thoroughly. 14. Wipe the wet water with soft cloth. 15. Wax the dashboard interior.	**Condition (Given):** A vehicle in washing bay. **Task (What):** Wash the vehicle. **Standard (How well):** The vehicle is washed and waxed according to performance guide.	➢ Handling of vacuum cleaner. ➢ Purpose, importance and types of wax ➢ Liquid soap and detergent ➢ Handling of hydraulic ramp or washing bay.

Required tools/equipment: Water pump, washing bay, Vacuum cleaner.

Safety:

- Observe all safety rules while lifting and working under vehicle.
- Observe great care when using chemical solvent to cleaning components.
- Use care when using steam and chemical fumes to avoid eye and skin injury.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.

Task No: 19: Grease with grease gun.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Park the vehicle in the workshop. 2. Pack the grease to the grease gun. 3. Locate the greasing points to the vehicle. 4. Keep the grease gun to the greasing nipple. 5. Pump the grease gun to the nipple 2 to 4 times for greasing. 6. Change the greasing nipple if the greasing not complete. 7. Repeat the steps for following greasing points. 8. Grease remote gear shifting linkage. 9. Grease king pins. 10. Grease tie rod ends/ball joints. 11. Grease drag links ends. 12. Grease steering knuckle joints. 13. Grease front spring pins. 14. Grease rear spring pins. 15. Grease propeller shaft U-joints. 16. Grease propeller shaft sliding yoke. 17. Grease parking brake intermediate shaft bushes. 18. Grease brake double levers. 19. Grease brake shaft bushes. 20. Grease clutch pedal bushing.	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Grease with grease gun. **Standard (How well):** All the greasing points of the vehicle greased properly.	➢ Importance, and identification greasing points. ➢ Function of grease and greasing nipples. ➢ Properties and types of grease. ➢ Identification, uses and types of grease gun.

Required tools/equipment: Mechanics' hand tools set, grease gun, greasing nipple etc.

Safety:

- Use care when working with mechanic's hand tools.
- Use clean and orderly work area.

Task No: 20: Lubricate with oilcan.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Park the vehicle in the workshop. 2. Fill lube oil to the oil clean. 3. Locate the oiling points to the vehicle. 4. Clean the area of oiling and surroundings. 5. Oil to the points by using oilcan. 6. Repeat the steps for following points. 7. Oil control to injection points. 8. Oil ball joints of engine exhaust brake linkage if fitted. 9. Oil central flap hinges and stay rods. 10. Oil to the linkage of clutch actuation and parking brake. 11. Oil to the door hinges.	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Lubricate with oilcan. **Standard (How well):** All the oiling points of the vehicle lubricated properly.	➢ Importance, and identification oiling points. ➢ Function of lubrication/ oil. ➢ Properties and types of oil. ➢ Identification, uses and types of oil can.

Required tools/equipment: Mechanics' hand tools set, oil can, etc.

Safety:

- Use care when working with mechanic's hand tools.
- Use clean and orderly work area.

Task No: 21: Change fuel filter.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Determine the location and type of fuel filter according to manufacturer's specifications for model, part, or serial number. **To remove/replace an in-line hose connected fuel filter follow these steps**. 1. Locate the fuel filter unit. 2. Remove the air cleaner assembly as required. 3. Loosen fuel filter attachment hardware as required. 4. Disconnect fuel lines and discard clamps. 5. Remove fuel filter unit and dispose of properly. 6. Install replacement fuel filter unit in proper direction of flow. 7. Reinstall and secure fuel lines with new hose clamps. 8. Reinstall and secure attachment hardware as required. 9. Replace air cleaner assembly as required. 10. Run engine, check for leaks and make any adjustments necessary. **To remove and replace an inverted nut (steel line) connected fuel filter follow these steps.** 1. Locate the fuel filter unit. 1. Remove the air cleaner assembly as required. 2. Loosen fuel filter attachment hardware as required. 3. Position the correct size open end wrench on the filter hex nut to hold the filter in position, and remove the steel line from the filter using suitable wrench. 4. Unscrew the fuel filter unit from the carburetor and dispose of property. 5. Install replacement fuel filter unit in proper direction of flow. 6. Reinstall and secure fuel line. 7. Reinstall and secure attachment hardware as required. 8. Replace air cleaner assembly as required.	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Change the fuel filter. Remove/replace an in-line hose connected fuel filter. Remove/ replace an inverted nut (steel line) connected fuel filter. Remove/ replace an in carburetor fuel filter **Standard (How well):** An in-line hose connected fuel filter removed and replaced. An inverted nut (steel line) connected fuel filter removed and replaced An in carburetor fuel filter removed and replaced**.**	➢ Interpretation of manufacturer's service manuals. ➢ Importance, purpose and function of fuel filters. ➢ Types and parts of fuel filter. ➢ Technical terms associated with fuel filters. ➢ Location of filters. ➢ Fuel filters replacing procedure. ➢ Trouble shooting.

9. Run engine, check for leaks and make any adjustments necessary. **To remove and replace an in carburetor fuel filter follow these steps.** 1. Locate the fuel filter unit. 2. Remove the air cleaner assembly as required. 3. Loosen fuel filter attachment hardware as required. 4. Position the correct size open-end wrench on the fuel filter nut to hold the filter nut using a suitable wrench. 5. Remove fuel filter nut from the carburetor. 6. Remove the filter element and spring and dispose of properly. 7. Install replacement spring and filter element in the proper direction of flow. 8. Install the fuel filter nut using a new gasket. 9. Install the fuel line. 10. Reinstall and secure attachment hardware as required. 11. Replace the air cleaner assembly as required. 12. Run engine, check for leaks and make any adjustments necessary. **To remove and replace a fuel filter on a fuel injected injection engine follow these steps.** 1. Bleed the fuel system per manufacturer's procedures. 2. Locate the fuel filter unit. 3. Loosen fuel filter attachment hardware as required. 4. Disconnect fuel lines and discard clamps. 5. Remove fuel filter unit and dispose of properly. 6. Install replacement fuel filter unit in proper direction of flow. 7. Reinstall and secure fuel lines with new hose clamps. 8. Reinstall and secure attachment hardware as required. 9. Pressurize the fuel system per manufacturer's procedures. 10. Run engine, check for leaks and make any adjustments necessary.		

Required tools/equipment: Mechanics' hand tools set, manufacturer's service manuals, Fuel pressure gauge, filter wrench, oilcan, tray etc.

Safety:

- Follow correct safety practices around flammable liquids.
- Ventilate exhaust gases to protect respiratory system.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.

Task No: 22: Change oil filter.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Collect required tools and materials. 1. Warm up the engine for 5 minutes. 2. Place a clean tray under the drain plug. 3. Unscrew the drain plug. 4. Remove the drain plug. 5. Drain the engine oil in a jar or tray. 6. Remove oil filter. 7. Replace oil filter. 8. Plug the drain plug when oil stops dropping. 9. Tighten the drain plug as per specified torque according to the service manual. (Don't over tight) 10. Refill the specified grade of engine oil to the required level. 11. Wait 5 to 10 minutes for checking oil level. 12. Lift the dipstick and wipe it. 13. Check the oil level. 14. Refill the oil if the level is low. 15. Cap the filler cap. 16. Keep the jar or tray in proper place.	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Change the oil filter. **Standard (How well):** The oil filter changed and the oil level should be between the lower and upper level mark on the dipstick.	➢ Identification and importance of oil filter. ➢ Types of oil filter ➢ Oil grade and viscosity. ➢ SAE and API rating. ➢ Oil capacity of different make and model of engine.

Required tools/equipment: Mechanics' hand tools set, filter wrench, oilcan, tray/jar

Safety:

- Ensure that the drain plug is properly tight and oil grade is correct as specified.
- Ventilate solvent fumes to protect respiratory system.
- Use safety practice when working with engine oil to avoid injury.
- Use safety precautions when working with mechanic's hand tools.
- Use clean and orderly work area.

Task No: 23: Change engine oil

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Collect required tools and materials. 2. Warm up the engine for 5 minutes. 3. Place a clean tray under the drain plug. 4. Change the oil filter if required. 5. Unscrew the drain plug. 6. Remove the drain plug. 7. Drain the engine oil in a jar or tray. 8. Uncap the oil filler cap 9. Flush the engine oil with flushing oil if required. 10. Plug the drain plug when oil stops dropping. 11. Tighten the drain plug as per specified torque according to the service manual. (Don't over tight) 12. Refill the specified grade of engine oil to the required level. 13. Wait 5 to 10 minutes for checking oil level. 14. Lift the dipstick and wipe it. 15. Check the oil level. 16. Refill the oil if the level is low. 17. Cap the filler cap. 18. Keep the jar or tray in proper place.	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Change the engine oil. **Standard (How well):** The engine oil is changed and the oil level should be between the lower and upper level mark on the dipstick.	➢ Identification and importance of engine oil. ➢ Function and properties of engine oil ➢ Oil grade and viscosity. ➢ SAE and API rating. ➢ Oil capacity of different make and model of engine.

Required tools/equipment: Mechanics' hand tools set, filter wrench, oil can, tray/jar

Safety:

- Follow correct safety practices around flammable liquids.
- Ventilate exhaust gases to protect respiratory system.
- Use care while flushing engine oil to danger.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.

Task No: 24: Change Coolant.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Collect required tools and materials. 2. Check the coolant level in the radiator/reservoir. 3. Inspect the coolant properties. 4. Drain the radiator if required. 5. Prepare the specified quantity of coolant/water according to service manual provided. 6. Add coolant if the level is low. 7. Check the leakage from radiator. 8. Check the radiator cap.	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Change coolant. **Standard (How well):** The coolant/ water changed with in specified level and ratio.	➢ Identification and importance of engine coolant. ➢ Types of coolant and their properties. ➢ Coolant capacity and proportion of coolant/water for different make and model of engine.

Required tools/equipment: Mechanics' hand tools set, Coolant Tester, tray/jar

Safety:

- Use safety precaution while testing coolant
- Ventilate exhaust gases to protect respiratory system.
- Use care while flushing engine oil to danger.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.

Task No: 25: Clean/change air filter.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Determine type of air cleaner element using manufacturer's specifications. **To clean a dry type air cleaner elements follow these steps.** 1. Remove air cleaner element as per manufacturer's procedure. 2. Strike dry element bottom side down on floor or hard surface several times. 3. Blow out dirt with approved blowgun, blowing from inside out. 4. Inspect filter by holding shop light inside filter and verifying that light is visible through the filter element. 5. Reinstall air cleaner element into the air cleaner assembly. **To clean a oil bath type air cleaner element follow these steps:** 1. Remove air cleaner element as per manufacturer's procedures. 2. Remove sponge wrapper or wire mesh filter from dry inner element. 3. Wash sponge wrapper or wire mesh filter in solvent or mineral spirits. 4. Add oil to wrapper or wire mesh filter container/bowl as specified level. 1. Clean the dry inner filter as dry type filter element. 2. Reinstall sponge wrapper over dry inner element. 3. Reinstall air cleaner element into the air cleaner assembly.	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Clean/change air filter. **Standard (How well):** The air cleaner unit cleaned according to manufacturer's specifications; unit cannot damage; airflow must not be restricted.	➢ Importance, purpose and applications of air filters. ➢ Technical terms associated with air filters. ➢ Types and parts identification of air filters. ➢ Air filter element cleaning technique. ➢ Operating principles and functions of the air filter. ➢ Cause and effect of bad and dirty air filters.

Required tools/equipment: Mechanics' hand tools set, Manufacturer's service manuals, source of compressed air and blow gun, shop light, parts washing equipment as required, etc.

Safety:

- Follow correct safety practices when using compressed air to avoid eye injury.

- Use care when using solvents to avoid skin irritation and eye injury.
- Ventilate solvent fumes to protect respiratory system.
- Use safety precautions when working with mechanic's hand tools.
- Use clean and orderly work area.

Task No: 26: Drain off condense water from compressed air.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Park the vehicle in a level surface. 2. Locate the water drain cock/plug. 3. Clean the drain cock and surroundings. 4. Loosen the drain cock/plug. 5. Drain the water from air tank and filter. 6. Plug the drain cock/plug after water drains completely.	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Drains off condense water from compressed air. **Standard (How well):** The condensed water drain off and the air system free from water.	➢ Importance and identification of air/pneumatic system. ➢ Terminology used in condensed water. ➢ Cause and effect of condense water in air system.

Required tools/equipment: Mechanics' hand tools set,

Safety:

- Use care when working with mechanic's hand tools.
- Use clean and orderly work area.

Task No: 27: Change thermostats.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Drain cooling system. 2. Remove thermostat housing and thermostat. 3. Clean gasket surfaces. 4. Check thermostat for operation. 5. Install thermostat and housing using new gasket. 6. Refill cooling system to proper level with coolant. 7. Test pressure system for leaks. 8. Operate engine until it reaches normal operating temperature. 9. Recheck coolant level.	**Condition (Given):** A vehicle in a workshop. **Task (What):** Change Thermostat. **Standard (How well):** The thermostat valve changed and the coolant temperature must record at manufacturer's recommended temperature + or - 10° F.	➢ Interpretation of service manuals. ➢ Importance, identification, types and parts of cooling system ➢ Technical terms associated with cooling system. ➢ Function, importance and types of thermostat ➢ Thermostat testing process. ➢ Troubleshooting.

Required tools/equipment: Mechanic's hand tools set, Manufacturer's service manual, Temperature tester (thermometer), Heater, container, jar etc.

Safety:

- Use care when removing/testing or working with thermostat to avoid injury.
- Use care when working with mechanic's hand tools.
- Maintain clean and orderly work area.

Task No: 28: Adjust brake.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Collect all the required tools and materials. 2. Check the fluid in master cylinder reservoir. 3. Top up if the level is low. 4. Bleed the air if required. 5. Jack up the wheel to make free from ground. 6. Turn the brake shoe adjuster to make wheel tight. 7. Slacken the adjuster 2 to 4 turn that the wheel rotates freely. 8. Repeat the step no. 5 to 7 for all wheels. 9. Check the brake pedal free play. 10. Adjust the master cylinder push rod if the pedal free play is not specified. 11. Drive the vehicle. 12. Test the brake. 13. Adjust the brake if braking is not efficient. 14. Check the brake shoe lining and other components if the adjustment not works.	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Adjust brake of given vehicle. **Standard (How well):** The brake adjusted and the vehicle is stopped in minimum braking distance. The pedal free play should be 15 +- 5 mm.	➢ Importance and identification of braking system and their components. ➢ Function and types of brake. ➢ Importance and properties of brake fluid. ➢ Trouble shooting of brake system. ➢ Safety precaution.

Required tools/equipment: Mechanics' hand tools set, brake adjusting tool or screwdriver, Brake bleeding pipe, Jar etc.

Safety:

- Observe all safety practice while lifting and working under vehicle.
- Use care when working with mechanic's tools to avoid injury.
- Use safety precautions while bleeding air and cleaning brake shoe lining.
- Maintain clean and orderly work area.

Task No: 29: Adjust Clutch.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Collect all the required tools and materials. 2. Check the fluid in clutch cylinder reservoir. 3. Top up if the level is low. 4. Bleed the air if required. 5. Check the clutch pedal free play. 6. Adjust the clutch cylinder push rod if the pedal free play is not specified. 7. Adjust the slave cylinder push rod if applicable. 8. Check the clutch plate, clutch cylinder and other components if the adjustment not works.	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Adjust clutch of given vehicle. **Standard (How well):** The clutch is adjusted and the pedal free play should be 15 +- 5 mm.	➢ Safety precaution. ➢ Importance and identification of clutch and their components. ➢ Function and types of clutch. ➢ Importance and properties of brake/clutch fluid. ➢ Trouble shooting of clutch.

Required tools/equipment: Mechanics' hand tools set, screwdriver, bleeding pipe, Jar etc.

Safety:

- Observe all safety practice while lifting and working under vehicle.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.
- Use safety precautions while bleeding air and cleaning dust.

Task No: 30: Service battery.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Clean the battery top surface and terminal post. 2. Remove the vent plugs from battery. 3. Check the electrolyte level of each cell. 4. Add distilled water if the level is low. 5. Check the battery voltage and specific gravity of electrolyte. 6. Charge the battery if required. 7. Cap the vent plugs. 8. Lubricate the terminal posts with petroleum jelly or Vaseline or white grease.	**Condition (Given):** A serviceable battery. **Task (What):** Service the battery. **Standard (How well):** The battery inspected, charged and the electrolyte should be in specified level.	➢ Importance, function and identification of battery. ➢ Working principle and chemical reaction of battery. ➢ Battery parameters and terminology. ➢ Battery charging process. ➢ Trouble shooting of battery. ➢ Safety precaution.

Required tools/equipment: Mechanics' hand tools set, battery charger, hydrometer, funnel, multimeter, cables and terminal clamps,

Safety:

- Apply safety practices when working on electrical supply.
- Always connect the positive and negative terminal correctly to avoid injury.
- Use care when working with electrolyte to avoid eye and skin injury.
- Use care when working with mechanic's hand tools.
- Use clean and orderly work area.

Task No: 31: Adjust fan belts.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Remove all shield or cover to gain access to fan belts. 2. Loosen the alternator/ power steering pump or compressor mounting/adjusting nuts. 3. Remove old fan belts. 4. Inspect fan belt for crack, wear and tear. 5. Get new or replaced fan belt(s) with correct number/size. 6. Replace new fan belts. 7. Tighten the fan belt adjusting bracket on alternator or compressor. 8. Check for slack and tightness of the fan belts as per service manual's specifications. 9. Adjust the fan belt to obtain approximately 20 mm +- 2 mm deflection of the belt when pressed midway of the longest point between pulleys. 10. Replace the shield or cover that was removed to gain access to fan belts.	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Adjust fan belts. **Standard (How well):** The fan belt adjusted. The crank pulley, water pump, cooling fan and alternator aligned properly.	➢ Importance and working principle belt. ➢ Types of fan belts. ➢ Belt tension and slackness. ➢ Cause and effect of too loose or too tight belt.

Required tools/equipment: Mechanics' hand tools set, iron rod or lever, belt tensioner checking tool, etc.

Safety:

- Observe all safety practice while adjusting fan belt and working with radiator.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.

Task No: 32: Tighten underbody nuts and bolts.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Check and tighten push rod cover. 2. Check and tighten cylinder head cover. 3. Check and tighten timing gear cover. 4. Tighten Fuel filter and bracket mountings. 5. Check and tighten Radiator mountings. 6. Tighten starter motor mountings. 7. Check and tighten alternator mountings. 8. Check and tighten power steering pump mountings and hose connections. 9. Check and tighten air cleaner mountings and air duct hose connections. 10. Check and tighten engine-mounting bolts. 11. Check and tighten clutch-housing mounting. 12. Check and tighten mountings of clutch master/slave cylinder and hose connections. 13. Check and tighten gearbox mountings. 14. Check and tighten mounting bolts of power steering gear assembly and brackets. 15. Tighten pitman arm/drag link and tie rod. 16. Tighten propeller shaft coupling/flange bolts 17. Check and tighten U- bolts of front and rear spring's lock plate bolts. 18. Tighten fuel and air tank-mounting bolts. 19. Tighten fuel and air line hose clamps. 20. Tighten mounting of different valves in brake circuit and pipeline connections. 21. Tighten mounting bolts of anchor plate. 22. Tighten rear axle shaft cover screws. 23. Check and tighten shock absorbers. 24. Tighten mounting of vehicle body. 25. Check and tighten wheel mounting nuts and spare wheel carrier. 26. Check and tighten mounting of drivers seat. 27. Check and tighten wiper motor. 28. Check and tighten battery terminals and mounting.	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Tighten underbody nuts and bolts. **Standard (How well):** The underbody nuts and bolts tightened properly.	➢ Importance and identification of fasteners, nuts, bolts, screws and clamps. ➢ Function of fasteners. ➢ Fastening tools and torque wrenches. ➢ Trouble shooting. ➢ Safety precaution.

Required tools/equipment: Mechanics' hand tools set, torque wrench etc.

Safety:

- Apply always practice to pull wrench to tighten the nuts and bolt to avoid bodily injury.
- Use safety precautions when working with mechanic's hand tools.
- Use clean and orderly work area.

Task No: 33: Test electrical accessories.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Consult manual for varying procedures. 2. Inspect electrical system visually. 3. Begin at battery and trace system. 4. Record problems, as they are located. 5. Disconnect any component that may damage the system. 6. Replace the faulty components. 7. Check the continuity and resistance of the cable/wire of the system. 8. Replace wire/cable if necessary. 9. Check poor/ loose connections and earthing. 10. Perform services as necessary. 11. Recheck the electrical system to conform.	**Condition (Given):** A faulty electrical system of a vehicle. **Task (What):** Test electrical accessories. **Standard (How well):** The electrical accessories/system checked completely and all troubles recorded.	➢ Interpret manufacturer's manual. ➢ Familiar with Electrical wiring diagram/symbol. ➢ Importance of basic electricity. ➢ Technical terms associate with electrical accessories. ➢ Causes and effect of malfunctioning electrical system. ➢ Trouble shooting.

Required tools/equipment: Mechanic's hand tools set, manufacturer's service manual, volt-ohmmeter (multimeter), test lamp, or special equipment as required by manufacturer.

Safety:

- Follow correct electrical safety procedures to avoid short circuit and injury.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.

Task No: 34: Adjust RPM.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Start the engine. 2. Warm up the engine for 5 to 10 minutes. 3. Connect RPM tester to their specified terminals according to instruction manual. 4. Read the RPM of the engine. 5. Adjust airscrew and pilot air jet of the carburetor. 6. Turn the adjusting screw clockwise or counter clockwise to increase the RPM or vice versa. 7. Recheck the RPM. 8. Repeat the step no. 5 to 8 for the specified RPM. 9. Stop the engine. 10. Conform the desired RPM has adjusted.	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Adjust RPM of given vehicle. **Standard (How well):** The RPM is adjusted according to service manual.	➢ Safety precaution. ➢ Importance and identification of ignition system and their components. ➢ Ignition timing setting procedure. ➢ Importance of valve clearance and adjusting procedure. ➢ Carburetor tune up process. ➢ Engine trouble shooting process.

Required tools/equipment: Mechanics' hand tools set, RPM Tester, Screwdriver Philips and flat.

Safety:

- Use safety precaution while working in electrical system.
- Ventilate exhaust gases to protect respiratory system.
- Keep clear of radiator fan and other moving parts.
- Be sure that the ignition timing, valve clearance, and spark plug gap is adjusted properly before performing this task.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.

Task No: 35: Change differential oil.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Warm up the differential to pour the oil. 2. Clean the surrounding area of differential filler and drain plug. 3. Place clean tray/jar under the drain plug. 4. Unscrew and remove the drain plug. 5. Remove the filler plug. 6. Wait 15 to 30 minutes to drain the gear oil. 7. Plug up the drain plug. 8. Tighten the drain plug. 9. Refill the specified grade of oil. 10. Wait 5 to 15 minutes to check the oil level. 11. Check the oil level. 12. Top up the gear oil if level is low. 13. Tighten the filler plug.	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Change differential oil of given vehicle. **Standard (How well):** The oil is changed with in specified level.	➢ Importance and identification of lubricating oil/ lubricants. ➢ Types of lubricant. ➢ Properties of gear oil. ➢ Grade and viscosity. ➢ SAE and API specification.

Required tools/equipment: Mechanics' hand tools set, drain plug wrench, tray/jar, filler pipe, funnel

Safety:

- Observe all safety practice while lifting and working under vehicle.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.
- Never use broken seal or loose gear oil. Always use correct grade rating.

Task No: 36: Set/ adjust air pressure.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Collect required tools and materials. 2. Check the air pressure of the tyre. 3. Inflate tyre if the pressure is low. 4. Deflate tyre if the tyre is over inflation. 5. Maintain the pressure according to specification. 6. Start the vehicle if air brake/horn has installed. 7. Race the engine for 15 to 30 minutes. 8. Read the air pressure gauge on the dashboard. 9. Adjust air valve if required.	**Condition (Given):** A serviceable vehicle in a workshop. **Task (What):** Set/adjust air pressure. **Standard (How well):** The air pressure adjusted.	➢ Importance of air. ➢ Terminology used air pressure (Inflation, over inflation and under inflation) ➢ Units and measurement. ➢ Trouble shooting. ➢ Safety precaution.

Required tools/equipment: Mechanics' hand tools set, air pressure gauge
Safety:

- Use clean and orderly work area.
- Don't check the air pressure when the tyre is hot (just run) it gives wrong reading.

Task No: 37: Replace battery.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Disconnect both battery terminals, always do negative terminal first for safety practice. 2. Remove bracket, mounting clamp or cover to gain access to the battery. 3. Clean battery external and top cover. 4. Lift the battery from chassis/body. 5. Dispose the old battery properly. 6. Check the electrolyte level of new battery. 7. Add sulphuric acid or distilled water as per manufacturer's instructions and procedures. 8. Plug the vent plugs properly. 9. Replace the new battery. 10. Clamp or secure the battery in battery tray or case. 11. Connect the battery terminals, always connect positive terminal first. 12. Use petroleum jelly or Vaseline or white grease to the terminal post. 13. Start the vehicle and check the battery performance.	**Condition (Given):** A faulty battery of a vehicle. **Task (What):** Replace battery. **Standard (How well):** The battery repaired as per manufacturer's specifications and procedure.	➢ Interpretation of manufacturer's manual. ➢ Technical terms associate with battery. ➢ Battery testing process. ➢ Operating principles and functions of battery. ➢ Trouble shooting.

Required tools/equipment: Mechanic's hand tools set, manufacturer's service manual, volt-ohmmeter (multimeter), test lamp

Safety:

- Follow correct electrical safety procedures to avoid short circuit and injury.
- Use care when working with mechanic's tools to avoid injury.
  Maintain clean and orderly work area.

Task No: 38: Replace/change lights/bulbs.

Time 6 hrs
Theory 1 hrs
Practical 5 hrs

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Disconnect the negative battery terminal. 2. Determine the wiring circuit as per manufacturer. 3. Locate the blown/fused bulbs/lamps of the lightening system. 4. Disconnect the electrical connectors after marking them with tape for identification when reinstalling. 5. Remove components as necessary to gain access to the blown bulbs/lamps/fuses as per manufacturer's procedure. 6. Clean bulb holder and wiring harness. 7. Remove the bulb/lights/lenses assembly. 8. Check short circuit, loose connection or poor earthing in the wiring. 9. Replace new bulbs/lights as specified watt. 10. Replace bulb cover, lenses assembly. 11. Replace components that were removed to gain access the bulbs/ lights. 12. Connect battery negative terminal. 13. Switch on the switches to check the bulbs.	**Condition (Given):** A faulty ignition system of a vehicle. **Task (What):** Replace bulbs/lights **Standard (How well):** The bulbs/lights replaced, glowed and the wiring worked as per manufacturer's specifications and procedure.	➢ Interpretation of manufacturer's manual. ➢ Electrical wiring diagram/symbol. ➢ Technical terms associate with lighting systems. ➢ Methods of testing wire/bulb. ➢ Trouble shooting. ➢ Safety precaution.

Required tools/equipment: Mechanic's hand tools set, manufacturer's service manual, volt-ohmmeter (multimeter), test lamp.

Safety:

- Follow correct electrical safety procedures to avoid short circuit and injury.
- Use care when working on lighting system to avoid high voltage shock & bodily injury.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.

Task No: 39 Change relay/switch in electrical system.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Disconnect battery negative terminal. 2. Note down carefully the positions in which the various components are fitted in order to ensure the correct replacement on reassembly. 3. Consult the service manual or wiring diagram to locate the relay or switch that you want to replace. 4. Remove cover or other components to gain access to the relay or switch 5. Remove the faulty relay or switch. 6. Check the relay or switch for continuity, voltage or resistance as per service manual. 7. Trace out the fault or defective relay or switch. 8. Replace new relay or switch with correct rating or specifications. 9. Connect battery terminal. 10. Check the operation of the relay/switch.	**Condition (Given):** A faulty head light circuit of a vehicle. **Task (What):** Change relay/switch. **Standard (How well):** The head light relay repaired as per manufacturer's specifications and procedure.	➢ Interpretation of manufacturer's manual. ➢ Electrical circuit. ➢ Technical terms associate with protection devices. ➢ Methods of testing relay. ➢ Working principles, functions and types of relay & switch. ➢ Trouble shooting.

Required tools/equipment: Mechanic's hand tools set, manufacturer's service manual, volt-ohmmeter (multimeter), test lamp, or special equipment as required by manufacturer.

Safety:

- Follow correct electrical safety procedures to avoid short circuit and injury.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.

Task No: 40: Set head light beam.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Adjust air pressure of all tyres as per the manufacturers' recommendation 2. Move vehicle up and down by hand to settle its attitude 3. Move it over a flat surface 4. Set vertical beam alignment by means of the screw provided in head light 5. (Set the head light in such a way that the main beam axis falls on a spot not above the height of head light and not below a height equal to a fifth (1/5) of the head light height.) 6. Set horizontal beam alignment by using screw provided in head light	**Condition (Given):** A serviceable vehicle **Task (What):** Align head light beam **Standard (How well):** The head light vertical beam to be set in such a way that the main beam axis falls on a spot not above the height of head light and not below a height equal to a fifth (1/5) of the head light height. Horizontal beam to be set as per the specification	➢ Interpretation of manufacturer's manual. ➢ Electrical wiring diagram/symbol. ➢ Technical terms associate with lighting systems. ➢ Methods of testing wire/bulb. ➢ Trouble shooting. ➢ Function of head light ➢ Safety precaution.

Required tools/equipment: Mechanic's hand tools set, manufacturer's service manual.

Safety:

- Follow correct electrical safety procedures to avoid short circuit and injury.
- Use care when working on lighting system to avoid high voltage shock & bodily injury.
- Use care when working with mechanic's tools to avoid injury.
- Maintain clean and orderly work area.

Module: 3: Light Vehicle Driving

Description:

This module deals with the knowledge and skills related to driving vehicle and managing time. It consists of tasks related to driving light vehicle. Each task structure consists of performance steps, terminal performance objective, and minimum technical knowledge necessary to know related to the task.

Objectives:

After its completion the trainees will be able:

- To fasten seat belt
- To inspect/ lock / unlock of door
- To start the vehicle
- To move the vehicle
- To control gear
- To control steering
- To look mirror
- To maintain distance
- To performing overtaking
- To driving in sharp turning road
- To follow safety measure
- To drive uphill and downhill
- To drive vehicle in severe condition
- To drive vehicle economically
- To drive in off road by using 4WD

Tasks:

After its completion trainees are expected to get proficiency on the following tasks:

1. Fasten seat belt
2. Inspect/ lock / unlock of door
3. Start the vehicle
4. Move the vehicle
5. Control gear
6. Control steering
7. Look mirror
8. Maintain distance
9. Performing overtaking
10. Driving in sharp turning road
11. Follow safety measure
12. Drive uphill and downhill
13. Drive vehicle in severe condition
14. Drive vehicle economically
15. Drive in off road by using 4WD

Task No: 1: Fasten seat belt.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Seat inside the vehicle 2. Check the functioning of the belt 3. Fasten seat belt 4. Unlock seat belt	**Condition (Given):** Vehicle for driving, normal driving condition **Task (What):** Fasten seat belt **Standard (How Well):** All the steps to be followed	➢ Function of seat belt and its usage .

Safety:

- Follow driving safety rules.

Task No: 2: Inspect/ Lock / Unlock of door.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Use a key to unlock the door 2. Seat inside the vehicle 3. Close the door and lock it 4. Inspect all the door is properly locked 5. Unlock the door and open it 6. Come out from the vehicle 7. Close the door and lock it	**Condition (Given):** Vehicle for driving, normal driving condition **Task (What):** Inspect/ lock/ unlock of door **Standard (How Well):** All the steps to be followed	➢ Function of lock .

Safety:

- Check the key before locking vehicle

Task No: 3: Start the vehicle.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Check the oil and water level of vehicle 2. Check the fuel level in the vehicle 3. Put the parking brake on 4. Put the gear in neutral 5. Crank the engine 6. Run the engine in idle for sometime 7. Switch off the engine.	**Condition (Given):** Vehicle for driving, normal driving condition **Task (What):** Start the vehicle **Standard (How Well):** All the steps to be followed	➢ Basic function of engine and its accessories .

Safety:

- Check oil and water level
- Put the gear position in neutral

Task No: 4: Move the vehicle.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Start the vehicle 2. Press the clutch and put the gear in 1st. 3. Release parking brake 4. See if the front side is clear 5. Slowly release clutch and slowly accelerate vehicle simultaneously 6. Press the brake pedal to stop and press clutch simultaneously. 7. Bring back gear in neutral position 8. Switch off the ignition. 9. Put the parking brake on.	**Condition (Given):** Vehicle for driving, normal driving condition **Task (What):** move the vehicle **Standard (How Well):** While releasing clutch, engine should not be off.	➢ Basic function of clutch, brake and gear.

Safety:

- Driving path should be clear from other objects
- Put seat belt on.

Task No: 5: Control Gear.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. 2. Start the vehicle 3. Move the vehicle in 1st gear 4. Accelerate the vehicle to speed up about 20 KM/ Hr 5. Abruptly press the clutch, put the gear in 2nd and release clutch. 6. Accelerate the vehicle to speed up about 35 – 40 KM/ Hr 7. Abruptly press the clutch, put the gear in 3rd and release clutch. 8. Decelerate engine by control the speed by pressing brake 9. Press the clutch, change gear to 2nd and slowly release clutch maintaining acceleration 10. Repeat step 8 to change to 1st gear. 11. Press the brake pedal to stop and press clutch simultaneously. 12. Bring back gear in neutral position 13. Switch off the ignition. 14. Put the parking brake on.	**Condition (Given):** Vehicle for driving, normal driving condition **Task (What):** Start the vehicle **Standard (How Well):** All the steps to be followed	➢ Basic function of clutch, brake and gear

Safety:

- Driving path should be clear from other objects
- Put seat belt on.

Task No: 6: Control Steering.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Start the vehicle 2. Put the steering in normal position 3. Move the vehicle in 1st gear 4. Rotate steering anti clockwise slowly to turn vehicle left 5. Rotate steering clockwise slowly to turn vehicle right 6. Stop the vehicle 7. Switch off the ignition. 8. Put the parking brake on.	**Condition (Given):** Vehicle for driving, normal driving condition **Task (What):** Start the vehicle **Standard (How Well):** All the steps to be followed	➢ Basic function of steering

Safety:

- Driving path should be clear from other objects
- Put seat belt on.

Task No: 7: Look mirror.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Get into the vehicle 2. Adjust both the rear view mirror in such a way that driver can see small portion of tail and remaining rear roads and its side. 3. Adjust central rear view mirror from which driver should be able to see back side of the vehicle 4. See the rear view mirror before changing lane, overtaking, reversing and stopping vehicle.	**Condition (Given):** Vehicle for driving, normal driving condition **Task (What):** Start the vehicle **Standard (How Well):** All the steps to be followed	➢ Traffic rules

Safety:

- Object seen in side rear view mirror will be closer than the actual distance hence to be careful.
- Rear view mirror should always be very clean.

Task No: 8: Maintain distance.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Start the vehicle 2. Move the vehicle 3. Drive in a correct lane 4. Drive vehicle in speed in which you are confident in controlling 5. Put a sufficient distance with other vehicle in which you are confident in controlling in case of emergency. 6. See the rear view mirror before changing lane and put the blinker on towards the parking lane 7. Take the vehicle in to the parking lane 8. Stop the vehicle 9. Switch off the ignition. 10. Put the parking brake on.	**Condition (Given):** Vehicle for driving, normal driving condition **Task (What):** Start the vehicle **Standard (How Well):** All the steps to be followed	➢ Traffic rules

Safety:

- Put seat belt on while driving.

Task No: 9: Performing overtaking.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Start the vehicle 2. Move the vehicle 3. Drive in a correct lane 4. Drive vehicle in speed in which you are confident in controlling 5. Put a sufficient distance with other vehicle in which you are confident in controlling in case of emergency. 6. Check if any vehicle is coming from opposite direction 7. Give the signal to vehicle which is in front of you before overtaking 8. Wait for that vehicle's response 9. Once they give you overtaking signal, look at the rear view if any vehicle is coming behind you 10. If it is clear, blinker on to change the lane and increase the speed to overtake. 11. After overtaking again use blinker to come to the original lane.	**Condition (Given):** Vehicle for driving, normal driving condition **Task (What):** Start the vehicle **Standard (How Well):** All the steps to be followed	➢ Traffic rules

Safety:

- Put seat belt on while driving.

Task No: 10: Driving in sharp turning road.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Drive vehicle in a correct lane 2. Bring vehicle in lower gear and speed 3. Blow horn in order to inform other vehicle coming from opposite direction 4. Be alert while taking a turn	**Condition (Given):** Vehicle for driving, normal driving condition **Task (What):** Start the vehicle **Standard (How Well):** All the steps to be followed	➢ Traffic rules

Safety:

- Put seat belt on while driving.

Task No: 11: Follow safety measure.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Drive vehicle in speed in which you are confident in controlling 2. Do not tail gate 3. Drive vehicle in proper lane 4. Overtake where you can see the vehicle coming from opposite direction 5. Do not ignore sign and lights while driving 6. Concentrate in driving 7. Avoid using mobile phone while driving 8. Do not play loud music in cabin 9. Avoid driving while drinking alcohol 10. Follow proper loading pattern but do not overload 11. Ensure head light dipping for oncoming traffic during night driving 12. Use headlamps, main and dip beams to alert others at crossroads & turns 13. When parked on road side, keep hazard warning lamps ON. 14. Choose correct gear not to lose momentum while climbing up hill 15. Use hand brakes or wheel chocks for parking in slope	**Condition (Given):** Vehicle for driving, normal driving condition **Task (What):** Drive vehicle **Standard (How Well):** All the steps to be followed	➢ Knowledge of traffic rule ➢ Driving skill ➢ Basic function of vehicle parts

Safety:

- Follow driving safety rules.

Task No: 12: Drive uphill and downhill.

Steps	Terminal Performance Objective	Related Technical Knowledge
Driving Uphill 1. Choose correct gear not to lose momentum 2. Use hand brakes or wheel chocks for parking 3. Do NOT overtake Driving downhill 1. Never switch off engine and / or drive in neutral gear 2. Use the same gear which you will use while climbing up. 3. Give way for upcoming vehicles	**Condition (Given):** Vehicle for driving, hilly road condition **Task (What):** Drive safely in hilly road. **Standard (How Well):** All the steps to be followed	➢ Knowledge of traffic rule ➢ Driving skill ➢ Basic function of vehicle parts

Safety:

- Follow driving safety rules.

Task No: 13: Drive vehicle in severe condition.

Steps	Terminal Performance Objective	Related Technical Knowledge
Driving in rain 1. Ensure proper functioning of wiper 2. Avoid harsh braking and taking sharp turns at high speed 3. Keep headlights ON, if visibility is poor Driving muddy road/ loose soil If rear wheels get stuck and start slipping : 1. Do not attempt to take out vehicle by raising the engine 2. Arrange to tow out the vehicle 3. Alternately, fill with stones, 4. gravel, wooden plank etc and drive slowly	**Condition (Given):** Vehicle for driving, raining condition, muddy road condition **Task (What):** Drive vehicle in severe condition. **Standard (How Well):** All the steps to be followed	➢ Knowledge of traffic rule ➢ Driving skill ➢ Basic function of vehicle parts

Safety:

- Follow driving safety rules.

Task No: 14: Drive vehicle economically.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Check leakage of the vehicle 2. Check spillage from the vehicle 3. Use correct lubricant as per the manufacturer's recommendation 4. Check tyre pressure proportional to the load carrying 5. Do not override clutch 6. Use always genuine filters from vehicle manufacturer's and change in recommended interval 7. Maintain ideal driving speed as per the vehicle manufacturer's recommendation 8. Switch off the vehicle if need to wait for more than 2-3 minutes. 9. Drive on proper gear 10. Keep engine of the vehicle in healthy condition 11. Clean/ change air filter in the recommended interval with manufacturer's genuine filter 12. Rotate wheel at the recommended interval 13. Align wheel at the recommended interval	**Condition (Given):** Vehicle for driving **Task (What):** Drive vehicle economically. **Standard (How Well):** All the steps to be followed	➢ Knowledge of traffic rule ➢ Driving skill ➢ Basic function of vehicle parts ➢ Knowledge of preventive maintenance of vehicle

Safety:

- Follow driving safety rules.

Task No: 15: Drive in off road by using 4WD.

Steps	Terminal Performance Objective	Related Technical Knowledge
1. Stop the vehicle 2. Lock the wheel 3. Apply 4WD 4. Shift the gear into 1st and move the vehicle slowly. 5. To disengage 4WD, stop the vehicle and release 4WD and unlock 4WD.	**Condition (Given):** Vehicle for driving, normal driving condition **Task (What):** Start the vehicle **Standard (How Well):** All the steps to be followed	➢ Function four wheel drive and its application

Safety:

- Put seat belt on while driving.
- Know the function of entire four wheel accessories

Reading materials

- Instructor selected textbooks/ reference books / manuals/ journals and articles available in the marker
- Instructor prepared books, handouts, notes and manuals

Facilities

Building with sufficient facilities

- Administrative rooms
- Equipped adequate Class rooms
- Workshop
- Garage
- Light vehicles
- Library
- Store
- Telephone
- Computer
- OHP
- Teaching Learning materials

Optional

- Vehicle
- Canteen
- Hostel

Tools, materials and equipment

• Wheel Spanner • Open Spanner • Ring Spanner • Common Spanne • Slide Wrench • Socket Wrench • Screw Driver (+/-) • Open/Outer Plier • Inner Close Plier • Monkey Plier • Nose Plier	• Main Plier • Manual Jack • Hydraulic Jack • Hammer • Chisels • Align Key set • Toe chain set • Spot Light • Tyre Lever • Jug Lever

Modules, sub modules and tasks

Module: 1: Related Documents, Tools & Equipment

Sub module: 1: Renewing Related Documents

1. Renew license
2. Renew Blue book
3. Renew Road Permit
4. Renew Route permit
5. Renew Green Sticker (Emission test certificate)

Sub module: 2: Handling tools and equipment

1. Handle Wheel Spanner
2. Handle Open Spanner
3. Handle Ring Spanner
4. Handle Slide Wrench
5. Handle socket wrench
6. Handle screw driver
7. Handle Jack and Handle

Module: 2: Monitoring, inspecting & servicing light vehicles

1. Adjust Brake
2. Bleed hydraulic brake
3. Remove and install parking brake lever
4. Inspect and adjust parking brake
5. Remove and install parking brake cable
6. Service pneumatic brake
7. Change steering oil
8. Rotate tyre
9. Change tubeless tyres
10. Repair tube puncture (flat tyre)
11. Repair tubeless tyre puncture
12. Change rim disc plate
13. Service/ repair spark plug
14. Inspect / change glow plug
15. Adjust idle speed and maximum speed
16. Bleed fuel system

17. Change transmission gear oil
18. Wash Vehicle
19. Grease with grease gun
20. Lubricate with oilcan
21. Change fuel filter
22. Change oil filter
23. Change engine oil
24. Change Coolant
25. Clean/change air filter
26. Drain off condense water from compressed air
27. Change thermostats
28. Adjust brake
29. Adjust Clutch
30. Service battery
31. Adjust fan belts
32. Tighten underbody nuts and bolts
33. Test electrical accessories
34. Adjust RPM
35. Change differential oil
36. Set/ adjust air pressure
37. Replace battery
38. Replace/change lights/bulbs
39. Change relay/switch in electrical system
40. Set head light beam

Module: 3: Light Vehicle Driving

1. Fasten seat belt
2. Inspect/ Lock / Unlock of door
3. Start the vehicle
4. Move the vehicle
5. Control Gear
6. Control Steering
7. Look mirror
8. Maintain distance
9. Performing overtaking
10. Driving in sharp turning road
11. Follow safety measure
    Drive uphill and downhill
12. Drive vehicle in severe condition
13. Drive vehicle economically
14. Drive in off road by using 4WD