**National Competency Standards Level -2**

**Jr. Mechanic Motorcycle**

**TABLE OF CONTENTS**

Contents

[INTRODUCTION 3](#_Toc136509702)

[Direct Instruction Method: 3](#_Toc136509703)

[Discussion Method: 3](#_Toc136509704)

[Small Group Method: 4](#_Toc136509705)

[Problem Solving Method: 4](#_Toc136509706)

[Research Method: 4](#_Toc136509707)

[PURPOSE OF THE QUALIFICATION 4](#_Toc136509708)

[DATE OF VALIDATION 5](#_Toc136509709)

[CODE OF QUALIFICATION 5](#_Toc136509710)

[MEMBERS OF QUALIFICATIONS DEVELOPMENT/REVIEW COMMITTEE 5](#_Toc136509711)

[ENTRY REQUIREMENTS 6](#_Toc136509712)

[PROPOSED SCHEME OF STUDIES 6](#_Toc136509713)

[A. Follow Occupational Health and Safety Practices 7](#_Toc136509714)

[B. Demonstrate basic Communication skills 9](#_Toc136509715)

[C. Maintain Tools and Equipment at workplace 10](#_Toc136509716)

[D. Maintain Motorcycle Engine 11](#_Toc136509717)

[E. Maintain Fuel System 13](#_Toc136509718)

[F. Maintain Cooling system 14](#_Toc136509719)

[G. Maintain ignition System 15](#_Toc136509720)

[H. Maintain Brake System 16](#_Toc136509721)

[I. Maintain Electrical system 18](#_Toc136509722)

[J. Maintain Lubrication system 20](#_Toc136509723)

[K. Adopt Green Practices at Workplace 21](#_Toc136509724)

**INTRODUCTION**

Pakistan is the 5th largest motorcycle market in the world after China, India, Indonesia and Vietnam. With 7,500 new motorcycles being sold every day, Pakistan is also amongst the world's fastest growing two-wheeler markets soaring at rates of over 20% a year. Nearly 2.3 million motorcycles have rolled off the factories in Pakistan in the last 10 months. The production of motorcycles jumped 22.34 percent in the first four months of fiscal year 2017-18 (FY18), over the corresponding period of in FY17, according to the latest data from Pakistan Bureau of Statistics (PBS).

Keeping in view of the above, the competency based national vocational qualifications have been reviewed/upgraded the level-2(CBT) by NAVTTC to train the unskilled human resource on the technical and entrepreneurial skills to be employed / self-employed and inevitably set sustainable impact on their lives by increase in their livelihood income.

Training Course is based on competency standards which are defined by the industry and the traditional role of a trainer changes and shifts towards the facilitation of training. A trainer encourages and assists trainees to learn for themselves. Trainees are likely to work in groups (pairs) and all doing something different. Some are doing practical tasks in the workshop, some writing, some not even in the classroom or workshop but in another part of the building using specialist equipment, working on computers doing research on the Internet or the library. As trainees learn at different pace they might well be at different stages in their learning, thus learning must be tailored to suit individual needs. The following facilitation methods (teaching strategies) are generally employed:

**Direct Instruction Method:**

This might be effective when introducing a new topic to a larger group of trainees in a relative short amount of time. In most cases this method relies on one-way communication, hence there are limited opportunities to get feedback on the trainee’s understanding.

**Discussion Method:**

This allows trainees to actively participate in sharing knowledge and ideas. It will help the trainer to determine whether trainees understand the content of the topic. On the other hand, there is a possibility of straying off topic under discussion and some trainees dominating others on their views.

**Small Group Method:**

Pairing trainees to help and learn from each other often results in faster knowledge/skill transfer than with the whole class. The physical arrangement of the classroom/workshop and individual assessment may be challenging. Analogy method should be in corporate.

**Problem Solving Method:**

This is a very popular teaching strategy for the training. Trainees are challenged and are usually highly motivated when they gain new knowledge and skills by solving problems (Contingency skills). Trainees develop critical thinking skills and the ability to adapt to new learning situations (Transfer skills). It might be time consuming and because trainees sometimes work individually, they may not learn all the things that they are expected to learn.

**Research Method:**

This is used for workshops and laboratory tasks, field experiments, and case studies. It encourages trainees to investigate and find answers for themselves and to critically evaluate information. It however requires a lot of time and careful planning of research projects for the trainee.

 PURPOSE OF THE QUALIFICATION

The purpose of the training is to provide skilled manpower to improve the existing motorcycle industry. This will improve the quality in servicing of motorcycles by motorcycle mechanics and the availability of skilled motorcycle mechanics will bring socio-economic benefits to all stakeholders. The specific objectives of developing these qualifications are as under:

* Improve the professional competence of motorcycle mechanics.
* Capacitate the local community and trainers in modern CBT trainings, methodologies and processes as envisaged under NVQF.
* Provide flexible pathways and progressions in the auto mobile sector.
* Enable the trainees to perform their duties in efficient manner.
* Establish a standardized and sustainable system of training motorcycle mechanics in Pakistan.

 DATE OF VALIDATION/REVIEW/UPGRADATION

These national qualifications have been developed by the Qualifications development Committee (QDC) on dated 15th—19th May 2023 and will remain in currency until May 2026.

CODE OF QUALIFICATION

|  |  |
| --- | --- |
| **Qualification Title** | **Code** |
| **National Vocational Certificate Level-2 in Automobile Technology (Jr. Technician/ Jr. Mechanic Motorcycle)** |  |

# MEMBERS OF QUALIFICATIONS DEVELOPMENT/REVIEW COMMITTEE

The following members participated in the qualification’s development of these qualifications:

|  |  |  |  |
| --- | --- | --- | --- |
| S.No | Name | Designation | Organization |
| 1 | Engr. Abdul Maqsood | DACUM ExpertPrincipal | GPI Mardan/ KP-TEVTA |
| 2 | Mr. Khurram Sohail Asghar | Representative of PVTCCurriculum Department | PVTC |
| 3 | Syed Mansoor Ahmed | NVQF registry In charge | SBTE Sindh |
| 4 | Muhammad Tahir | CBT Certified National AssessorSr. Instructor | Vocational Training Institute Green Town Lahore |
| 5 | Irfan Hussain Mayo | CBT Certified National AssessorInstructor | VTI Kahna Nau Lahore |
| 6 | Waqas Imtiaz | Academia Trade ExpertsLecturer/ Master Trainer | GTTTC Peshawar/KP-TEVTA |
| 7 | Abdul Shakoor Bhullar | Academia Trade ExpertsChief Instructor | GTTI-Mughalpura Lahore |
| 8 | Mr. Ghulam Abbas Afaq | Academia Trade ExpertsInstructor | VTI Green Town Lahore |
| 9 | Muhammad Aasim | Coordinator NAVTTC | NAVTTC |
| 10 | Mian Abdul Atique | CEO, Rehman Auto Engineers | Industry |
| 11 | Muhammad Arslan | Manager | Punjab Small Industries Corporation |

#  ENTRY REQUIREMENTS

The entry requirement to National Vocational Certificate Level-2 in Automobile Technology Jr. Technician/Jr. Mechanic (Motorcycle) is as bellow:

|  |  |
| --- | --- |
| **Title**  | **Entry requirements** |
| **National Vocational Certificate Level-2 in Automobile Technology Jr. Technician/Jr. Mechanic (Motorcycle)** | Entry for assessment of this qualification is open. However, entry into formal training institutes, based on this qualification may require skills and knowledge equivalent to middle (Grade 8). |

# PROPOSED SCHEME OF STUDIES

**Jr. Technician/Jr. Mechanic Motorcycle (Level-2)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Code** | **Name of Subjects** | **Category** | **Contact Hour** | **Credit** |
| **Th** | **Pr** | **Total** |
| 0000000 | Follow Occupational Health & Safety Practices | Generic | 20 | 80 | 100 | 10 |
| 0000000 | Demonstrate Basic Communication Skills | Technical | 10 | 10 | 20 | 2 |
| 0000000 | Maintain Tool and Equipment at Workplace | Technical | 15 | 85 | 100 | 10 |
| 000000 | Maintain Motorcycle Engine | Technical | 20 | 80 | 100 | 10 |
| 0000000 | Maintain Fuel System | Technical | 15 | 75 | 90 | 9 |
| 0000000 | Maintain Cooling System | Technical | 5 | 45 | 50 | 5 |
| 000000 | Maintain Ignition System | Technical | 5 | 15 | 20 | 2 |
| 0000000 | Maintain Brake System | Technical | 10 | 40 | 50 | 5 |
| 0000000 | Maintain Electrical System | Technical | 10 | 30 | 40 | 4 |
| 0000000 | Maintain Lubrication System | Technical | 5 | 15 | 20 | 2 |
| 0000000 | Adopt Green Practices at Workplace | Generic | 5 | 5 | 10 | 1 |
|  **Total** | **120** | **480** | **600** | **60** |

# A. Follow Occupational Health and Safety Practices

**Overview:**

This competency standard covers the skills and knowledge required to Ensure use of personal protective equipment (PPE), Maintain First-aid Box, Maintain Fire Extinguisher and Respond to emergencies

|  |  |
| --- | --- |
| Competency Units | Performance Criteria |
| A1. Ensure use of personal protective equipment (PPE) | 1. Identify risk associated with job to be done
2. Select PPE's according to job
3. Check PPE’s for any damage
4. Wear PPE's according to job
5. Store PPE's at Designated place after use
 |
| A2. Maintain First Aid Box | **P1**. Identify first aid box**P2.** Check first aid box for requisite emergency items**P3.** Check expiry of medicines |
| A3. Maintain Fire Extinguisher | **P1.** Carry out visual inspection of fire extinguisher**P2.** Check that fire extinguisher has not been used or tempered with**P3**. Take a pressure gauge reading.**P4**. Remove the discharge HOSE to check for corrosion and blockage.**P5**. Clean the Fire Extinguisher**P6**. Ensure wall Mountings are secure.P7. Operate the Fire Extinguisher |
| A4. Respond to emergencies | **P1.** Perform emergency exercise.**P2**. Follow emergency plan**P3**. Operate emergency equipment and supplies |

**Knowledge & Understanding**

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

* Define ‘hazards’ and ‘risks at work place.
* Explain personal responsibilities and legal duties in respect of health and safety in the workplace
* Describe the hazards which exist in the workplace and the safe working practices which must be followed
* Explain the importance of remaining alert to the presence of hazards in the workplace
* Define physical hazards
* Define chemical hazards
* Define electrical hazards
* Define emergency plan.
* Understanding of the Use of Personal Protective Equipment (PPE).
* Knowledge and understanding of company policy and procedures.
* Describe use of emergency equipment
* Knowledge of first-aid-box items.

**Critical Evidence(s) Required**

The candidate needs to produce the following critical evidence(s) in order to be competent in this competency standard:

* Identify hazards / risks at work place.
* Take corrective measures.
* Record the findings.
* Demonstrate the use of at least one of the PPEs in front of assessor as per assessors’ directions
* Demonstrate first aid treatment as per assessor directions.
* Demonstrate to response in emergencies.
* Operate Firefighting equipment.

**Tool and Equipment**

* Fire Extinguisher
* First Aid Box
* Personal protective equipment's
* Safety equipment's
* Safety shoes
* Safety gloves
* Safety goggles
* Safety helmet
* Ear plugs

# B. Demonstrate basic Communication skills

**Overview:**

This competency standard covers the skills and knowledge required to deal with customers, adopt effective listening and demonstrate interpersonal communication skills.

|  |  |
| --- | --- |
| Competency Units | Performance Criteria |
| B1. Deal with Customer | 1. Maintain welcoming customer environment that reflect company branding and market position.
2. Greet customer warmly according to company policy and procedures.
3. Create effective service environment through verbal and non-verbal interaction according to company policy and procedures.
4. Use questioning and active listening to determine customer needs.
5. Use positive and inclusive language.
6. Recognize personal factors impact on customer service delivery.
 |
| B2. Adopt Effective Listening. | 1. [Practice active listening](https://www.thebalancecareers.com/active-listening-skills-with-examples-2059684).
2. Ask clarifying questions.
3. Listen and empathize with another person
 |
| B3. Demonstrate interpersonal skills | 1. Communicate firmly but politely.
2. Demonstrate sound interpersonal skills.
3. Respect others and their ideas.
 |

**Knowledge & Understanding**

The candidate must possess underpinning knowledge and understanding required to carry out tasks covered in this competency standard. Therefore, he/she must be able to:

* Define effective Listening.
* Describe various types of effective listening.
* Enlist various communication Media.
* Importance of sound interpersonal skills and politeness.

**Critical Evidence(s) Required**

The candidate needs to produce the following critical evidence(s) in order to be competent in this competency standard:

* Adopt effective Listening.
* Develop Confidence
* Pick the right medium
* Ask clarifying questions.

# C. Maintain Tools and Equipment at workplace

**Overview:**

This competency standard covers the skills and knowledge required to maintain tools and equipment's at workplace. You will be able to identify tools and equipment's, arrange tools and equipment, calibrate tools and equipment, lubricate tools and equipment and maintain inventory of tools and equipment's.

|  |  |
| --- | --- |
| Competency Units | Performance Criteria |
| C1. Arrange required tools and equipment | 1. Identify the required tools and equipment.
2. Select the Required tools.
 |
| C2 Clean tools and Equipment | 1. Collect the tools and equipment.
2. Arrange the cleaning materials.
3. Clean the tools and equipment.
 |
| C3. Calibrate tools and equipment | 1. Check the desired tools and equipment for zero error.
2. Perform adjustment of the error.
 |
| C4 Lubricate tools and equipment | **P1.** Identify the required tools and equipment**P2.**  Select the Required tools and equipment to be lubricated.**P3.** Arrange the lubricating materials.P4. Perform greasing/ Oiling of the tools |
| C5. Maintain inventory of tools and equipment | **P1** Count the tools and equipment**P2.** Perform storing of the tools and equipment at their designated place.**P3.** Update inventory of the tools and equipment |

**Knowledge & Understanding**

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

* Identification tools and Equipment's.
* Arrangement procedure of tools and equipment.
* Cleaning method of tools and equipment.
* Calibration procedure of too; and equipment.
* Lubrication of tools and equipment
* Record keeping / inventory of tools and equipment.

**Critical Evidence(s) Required**

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

* Identify tools and Equipment.
* Follow the procedure used for cleaning, calibration, lubrication and inventory of tools and equipment.
* Clean tools and equipment's
* Calibrate equipment's
* Lubricate tools and equipment's
* Maintain inventory of tools and equipment's

**Tool and Equipment**

* Personal Protective Equipment (PPEs).
* Double open end spanner
* Off-set ring spanner
* Combination spanner
* Flat Screw driver
* Philips screw driver
* Hammer
* T-spanner
* Combination Pliers
* Long nose plier
* Valve spring compressor
* Multi meter
* Vernier calliper.
* Micrometer
* Impact screw driver
* Torque wrench
* Different pullers
* Chain link remover.

# D. Maintain Motorcycle Engine

**Overview:**

This competency standard will provide skills and knowledge to Replace air filter and air cleaner assembly, clean/replace spark plug,Adjust valve Clearance , Adjust Carburettor and Clean Exhaust system by Jr. Technician/Mechanic motorcycle, in accordance with the manufacturer's Manual.

|  |  |
| --- | --- |
| Competency Units |  Performance Criteria |
| D1. Replace air filter and air cleaner assembly. | **P1.** Arrange the required tools for service air cleaner.**P2.** Remove side cover as per shop manual.**P3.** Remove air filter cover as per shop manual.**P4.** Replace or clean air filter as per shop manual.**P5.** Refit air filter assembly as per shop manual. |
| D2. Clean/replace spark plug. | **P1.** Arrange the required tools and equipment’s to service Spark plug.**P2.** Remove spark plug cap and inspect for damage and deterioration.**P3.** Remove spark plug and inspect in order to judge Engine condition.**P4.** Clean the spark plug with appropriate tool to scratch carbon.**P5.** Adjust spark plug gap as per shop manual.**P6.** Refit spark plug to the engine as per set standards. |
| D3. Adjust valve Clearance | **P1.** Arrange the required tools and equipment’s to adjust valve clearance.**P2.** Remove engine crank case cover as per shop manual.**P3.** Verify piston position at Top Dead Centre (T.D.C) on compression stroke by Rotating the flywheel in the specific direction.**P4.** Adjust and verify the valve clearance as per shop manual. |
| D4.Adjust Carburettor | **P1.** Arrange the required tools and equipment’s to Service/Adjust Carburettor.**P2.** Remove carburettor and disassemble as per shop manual**P3.** Check float, needle valve, butterfly and jets as per shop manual**P4.** Adjust float level as per shop manual**P5.** Reassemble carburettorP6. Install carburettor to engine as per shop manual**P7.** Adjust mixture setting and idle RPM as per shop manual |
| D5. Clean Exhaust system | **P1.** Arrange the required tools for Service exhaust system**P2.** Check noise to identify abnormal sound**P3.** Remove muffler as per shop manual**P4.** Install muffler to the engine P5. Verify its correct operation. |

**Knowledge & Understanding**

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge

* The use and handling of basic tools and equipment
* Knowledge about securing measuring tools
* Types of engines
* Schedule of Motorcycle Maintenance
* Cleaning process of different Motorcycle parts / Components.
* Adjustment of Motorcycle parts /Components
* Replacement of Motorcycle Parts / Components

**Critical Evidence(s) Required**

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

* Replace air filter and its assembly
* Clean or replace spark plug as per shop manual
* Adjust valve clearance as per shop manual
* Adjust carburettor as per shop manual
* Clean exhaust system.

**Tool and Equipment**

* Combination spanner
* Feeler gauge
* Screw driver
* Pliers
* Shop manual

# E. Maintain Fuel System

**Overview:**

This competency standard will provide skills and knowledge to Maintain Motorcycle Fuel system by Jr. Technician/Mechanic motorcycle, in accordance with the manufacturer's Manual. You will be able to maintain fuel system through service of fuel tank, service of carburettor and service of EFI system.

|  |  |
| --- | --- |
| Competency Units |  Performance Criteria |
| E1. Perform service of fuel tank and its components. | **P1.** Arrange the required tools for Service fuel tanks and its components**P2.** Remove fuel tank of motorcycle as per set standards**P3.** Service fuel tank, fuel cap, fuel cock and sender unit as per set standards**P4.** Install fuel tank and components as per shop manual to verify correct operation of fuel tank and components. |
| E2. Perform service of carburettor | **P1.** Arrange required tools for Service carburettor**P2.** Remove carburettor from engine to identify faults in carburettor.**P3.** Check float, needle valve, butterfly and jets as per shop manual**P4.** Adjust float level as per shop manual**P5.** Reassemble carburettor**P6**. Install carburettor to engine as per shop manual**P7.** Adjust mixture setting and idle RPM as per shop manual |
| E3. Perform service of EFI system | **P1**. Arrange the required tools for service EFI system.**P2**. Remove fuel injector from engine.**P3.** Clean fuel Injector by fuel injector cleaner.**P4.** Reinstall the injector on engine as per shop manual and check working.P5. Check performance of EFI system with the help of scanner. |

**Knowledge & Understanding**

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

* Use and handling of basic tools and equipment
* Knowledge about securing measuring tools
* Schedule of Motorcycle Maintenance
* Cleaning process of Fuel injector.
* Working principal of fuel system.
* Replacement of Fuel System Parts / Components.
* Servicing of EFI system.

**Critical Evidence(s) Required**

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

* Service fuel tank and its components.
* Service carburettor as per shop manual
* Service EFI system

**Tool and Equipment**

* Combination spanner
* Feeler gauge
* Screw driver
* Pliers
* Shop manual
* EFI Scanner
* Fuel injector cleaner

# F. Maintain Cooling system

**Overview:**

This competency standard will provide skills and knowledge to Maintain Motorcycle Cooling system by Jr. Technician/Mechanic motorcycle, in accordance with the manufacturer's Manual. You will be able to perform service of Air Cooled system, and service of liquid cooled system.

|  |  |
| --- | --- |
| Competency Units |  Performance Criteria |
| F1. Perform service of Air cooled System. | **P1**. Arrange the desired tools and equipment for Service of Air Cooled system. **P2**. Perform Service of Air cooled system as per shop manual.**P3.**Check metal fins in air cooled system as per shop manual |
| F2. Perform service of liquid cooled system | **P1**. Arrange the desired tools and equipment for Service of liquid Cooled system. .**P2**. Check leakage in liquid cooled system.**P3.** Check radiator pressure cap.**P4.** Perform Service of radiator as per shop manual.  |

**Knowledge & Understanding**

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

* Proper use and handling of basic tools and equipment
* Knowledge about securing measuring tools
* Types of engines
* Schedule of Motorcycle Maintenance
* Cleaning process of Cooling system.
* Working of cooling system.
* Replacement of Cooling system Parts / Components.
* Service of Air Cooled system
* Service of liquid cooled system.

**Critical Evidence(s) Required**

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard

* Perform service of Air Cooled system.
* Perform service of liquid cooled system.

**Tool and Equipment**

* Combination spanner.
* Double open end spanner.
* Off-set ring spanner.
* Philips Screw driver.
* Flat screw driver.
* Pliers.
* Shop manual.
* Socket set.
* Cotton rugs.

# G. Maintain ignition System

**Overview:**

This competency standard will provide skills and knowledge to Maintain Motorcycle ignition system by Jr. Technician/Mechanic motorcycle, in accordance with the manufacturer's Manual. You will be able to maintain Ignition system through replacement of stator assembly, replacement of CDI unit, replacement of Ignition coil and replacement of ignition switch.

|  |  |
| --- | --- |
| Competency Units |  Performance Criteria |
| G1. Replace stator assembly | **P1.** Arrange the desired tools/equipment**P2**. Remove the damaged stator assembly as per shop manual**P3.** Install the functional/new stator assembly as per shop manual. |
| G2. Replace CDI Unit. | **P1.** Arrange the desired tools/equipment**P2.** Remove the damaged CDI unitP3. Install CDI unit as per set standards for replacement |
| G3. Replace Ignition Coil. | **P1.** Arrange the desired tools/equipment**P2.** Remove ignition coil to measure resistance **P3.** Measure resistance of primary coil and compare with its specific value to verify the coil condition **P4.** Check spark plug adaptor as per shop manual. **P5.** Measure resistance of secondary coil with and without plug cap and compare with its specific value to verify the coil condition **P6.** Replace ignition coil as per set standards |
| G4. Replace ignition switch. | **P1.** Arrange the desired tools/equipment**P2.** Remove head light and disconnect ignition connectors to measure connectivity between terminals as per shop manual **P3.** Replace ignition switch. |

**Knowledge & Understanding**

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of

* Proper use and handling of basic tools and equipment
* Knowledge about securing measuring tools
* Types of engines
* Schedule of Motorcycle Maintenance.
* Working of Ignition system.
* Replacement techniques of ignition system Parts / Components.

**Critical Evidence(s) Required**

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

* Replace Stator assembly.
* Replace CDI unit
* Replace ignition coil
* Replace ignition switch.

**Tool and Equipment**

* Combination spanner.
* Double open end spanner.
* Off-set ring spanner.
* Philips Screw driver.
* Flat screw driver.
* Pliers.
* Shop manual.
* Multi meter.
* Cotton rugs.

# H. Maintain Brake System

**Overview:**

This competency standard will provide skills and knowledge to Maintain Motorcycle Brake system by Jr. Technician/Mechanic motorcycle, in accordance with the manufacturer's Manual. You will be able to maintain Mechanical brake system through performing service of Mechanical brake system, replace faulty components of Mechanical brake system, service Hydraulic brake system and replace faulty components of hydraulic brake system.

|  |  |
| --- | --- |
| Competency Units |  Performance Criteria |
| H1. Perform service of Mechanical brake system. | **P1.** Arrange the desired tools/equipment**P2**. Dismantle front wheel assembly to inspect brake shoes, for damage or worn-out. **P3.** Service front wheel brake shoes and reinstall to verify correct operation of braking system. **P4.** Dismantle Rear wheel assembly to inspect brake shoes, for damage or worn-out. **P5.** Service rear wheel brake shoes and reinstall to verify correct operation of braking system. |
| H2. Replace faulty components of Mechanical Brake System | **P1** Arrange the desired tools/equipment**P2.** Test Drive motorcycle to check mechanical braking function.**P3.** Test drive motorcycle and press pedal / lever rear / front brake to identify drum brake operation.P4. Replace rear and front wheel brake shoes and reinstall to verify correct operation of braking system. |
| H3. Perform Service of Hydraulic Brake System | **P1.** Arrange the desired tools/equipment**P2.** Test Drive motorcycle to check hydraulic braking function.**P3.** Test drive motorcycle and press pedal rear brake and front brake lever to identify disk brake operation.**P4.**  Perform checks and measurements to identify leakage, air gap and disk pads and brake disk function of hydraulic brake system. |
| H4. Replace faulty components of Hydraulic Brake System | **P1.** Arrange the desired tools/equipment.**P2.** Dismantle front / rear wheel assembly to inspect Disc pads, for damage or worn-out.**P3.** Dismantle master cylinder, wheel cylinder to identify fault in hydraulic brake system.**P4.** Replace/Repair Master cylinder, wheel cylinder as per set standards. **P5.** Install hydraulic brake system to verify correct brake operation. |

**Knowledge & Understanding**

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

* Proper use and handling of basic tools and equipment
* Knowledge about securing measuring tools
* Schedule of Motorcycle Brake Maintenance.
* Working of mechanical Brake system.
* Working of hydraulic brake system.
* Replacement/repair techniques of brake system Parts / Components (Mechanical Brake system/ Hydraulic brake system.

**Critical Evidence(s) Required**

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

* Perform service of Mechanical Brake system/components.
* Replace faulty components of Mechanical Brake system.
* Perform service of Hydraulic Brake system.
* Replace faulty components of Hydraulic Brake system.
* Replace pads brake disk or master and wheel cylinder, piston and piston seals

**Tool and Equipment**

* Combination spanner.
* Double open end spanner.
* Off-set ring spanner.
* Philips Screw driver.
* Flat screw driver.
* Pliers.
* Shop manual.
* Brake bleeding gun
* Micro meter.
* Cotton rugs.

# I. Maintain Electrical system

**Overview:**

This competency standard will provide skills and knowledge to Maintain Electrical system of motorcycle by Jr. Technician/Mechanic motorcycle, in accordance with the manufacturer's Manual. You will be able to maintain Electrical system through Perform Service of starting system, maintain battery, replace battery, Replace components of Charging System, Repair/Replace switches, Repair/Replace Horn, indicators & Lights , and Repair /Replace wiring harness.

|  |  |
| --- | --- |
| Competency Units |  Performance Criteria |
| I1. Perform Service of starting system | **P1.** Arrange the desired tools/equipment’s**P2**. Measure continuity of wiring harness and push button to identify faults in wiring harness.**P3.** Service self-starter as per set standards. **P4.** Refit self-starter and start engine for verifying its correct function as per set standards. |
| I2. Maintain Battery | **P1.** Arrange the desired tools/equipment’s\P2. Check water levelP3. Check the specific gravity of battery with the help of hydro meter.P4. Check terminals of battery for rusting/smooth conduction.P5. Check wires grip of the battery for lose connectionsP6. Tight grip of terminals. |
| I3. Replace Battery | P1 Arrange the desired tools/equipmentP2. Remove the non-functional battery P3. Install new batteryP4. Connect battery terminalsP5.Check battery for smooth functioning  |
| I4. Replace components of Charging System | P1 Arrange the desired tools/equipmentP2. Replace the charging coilsP3. Replace the regulator / rectifier. |
| I5. Repair/Replace switches | **P1.** Arrange the desired tools/equipment’s.**P2.** Measure continuity of grip switches to verify proper operationP3. Service grip and verify correct connection of wires/switches.P4. Re assemble grip and verify correct operation of switchesP5. Replace the damaged/non-functional switches |
| I6. Repair/Replace Horn, indicators & Lights | **P1.** Arrange the desired tools/equipment’s.**P2.** Inspect all bulbs physically and replace fused bulbs as per set standards.P3. Inspect horn for any short circuit.P4. Change the non-functional hornP5. Inspect indicator Flasher relay for correct functionP6. Change damaged indicatorsP7. Change the damaged headlight.P8. Change the tail light  |
| I7. Repair /Replace wiring harness | **P1.** Arrange required tools to Service wiring harness **P2.** Disconnect all connections and measure continuity of wiring harness. **P3.** Repair wiring harness as per set standards. **P4.** Connect electrical connections to verify correct function. |

**Knowledge & Understanding**

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

* Proper use and handling of basic tools and equipment
* Knowledge about securing measuring tools
* Schedule of Motorcycle Maintenance.
* Working Electrical system.
* Repair/Replacement techniques of various Parts / Components used in Electrical system.

**Critical Evidence(s) Required**

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

* Perform service of starting system.
* Check battery for water level.
* Remove carbons of terminals
* Check electrolyte by hydro meter.
* De-assemble battery.
* Install battery.
* Connect the terminals of battery.
* Repair and replace switches.
* Repair and replace horn, indicators & lights for their functionality.
* Repair and replace wiring harness.

**Tool and Equipment**

* Combination spanner.
* Double open-end spanner.
* Off-set ring spanner.
* Wire cutter
* Test lamp
* Multimeter
* Philips Screw driver.
* Flat screw driver.
* Pliers.
* Shop manual.
* Brake bleeding jar.
* Cotton rugs.

# J. Maintain Lubrication system

**Overview:**

This competency standard will provide skills and knowledge to Maintain lubrication system of Motorcycle by Jr. Technician/Mechanic motorcycle, in accordance with the manufacturer's Manual. You will be able to maintain Lubrication system through Maintain Engine Oil, Change Engine Oil, and Oil Filter and Replace Engine oil pump.

|  |  |
| --- | --- |
| Competency Units |  Performance Criteria |
| J1. Maintain Engine Oil | P1. Arrange the required tools/equipmentP2. Check Engine oil with Dipstick P3**.** Observe level of Engine oilP4. Observe color of Engine oilP5. Check Viscosity of Engine Oil with fingers.. |
| J2 Change Engine Oil, and Oil Filter | P1 Arrange the required tools/equipmentP2. Put oil drain panP3. Open the drain boltP4. Open the oil filter cap P5. Drain the oil P6. Change the filterP7. Install the drain bolt with new drain washerP8. Install new oil filter and tight the filter capP9. Refill new engine oil as per company standardsP10. Tight the dipstick |
| J3. Replace Engine oil pump | P1. Arrange the desired tools/equipment**P2.** Remove right side crank case coverP3. Open clutch assemblyP4. Open oil pump assemblyP5. Inspect oil pump assembly for damage of oil pump body and wear and tear.P6. Replace with new oil pump |

**Knowledge & Understanding**

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

* Function of Lubrication
* Type of Oil Specification
* Function of Oil Pump
* Type of Oil Pump
* Type of Oil Filter
* Function of Oil Filter
* Techniques of Engine Oil, and Oil Filter change
* Understanding of level, colour and viscosity of engine oil
* Replacement techniques of new oil pump.

**Critical Evidence(s) Required**

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

* Change engine Oil.
* Replace Oil Filter
* Check the Condition of Oil
* Replace engine Oil Pump

**Tool and Equipment**

* Combination spanner.
* Lock Plier
* Philips Screw driver.
* Flat screw driver.
* Pliers.
* Shop manual.
* T-Handle.
* Special Socket

# K. Adopt Green Practices at Workplace

**Overview:**

This competency standard covers the skills and knowledge required to adopt green practices at workplace through environment friendly policies. Jr .Mechanic motorcycle can play an important role to Identify types of waste ,Implement waste reduction strategies and Conserve Resources by selecting environmentally friendly materials.

|  |  |
| --- | --- |
| Competency Units | Performance Criteria |
| K1. Identify types of waste | **P1.** Identify the following wastes:* 1. General waste (everyday waste produced in the workplace e.g. paper, cardboard, and non-hazardous materials).
	2. Construction and demolition waste (produced during construction and demolition activities e.g. concrete, bricks, wood, etc).
	3. Hazardous waste (which poses a threat to human health and the environment, e.g. chemicals, batteries, etc).
	4. Industrial waste (produced through industrial processes e.g. manufacturing, mining, and oil and gas operations, etc).

**P2.** Handle types of wastes identified during operation as per Standard Operating Procedures according to company policy.**P3.** Dispose of wastes as per the Standard Operating Procedures according to company policy. |
| K2. Implement waste reduction strategies | P1. Identify techniques to reduce waste as per the Standard Operating Procedures.P2. Implement strategies of waste reduction:**a.** Reuse the material from generated waste at the work place. **b.** Arrange a designated place /waste bin for the materials to be recycled. **c.** Send the recycling materials to the designated place/waste d. Reduce the use of environmental adversely affecting materials |
| K3. Conserve Resources | 1. Identify techniques to conserve resource as per the Standard Operating Procedures according to company policy.
2. Implement resource of conservation techniques as per the Standard Operating Procedures.
 |

**Knowledge & Understanding**

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

* Identification of various types of waste.
* Importance of waste reduction strategies.
* Identification of Environment adversely affecting materials
* Principles of six R,s in greening
* Waste reduction techniques

**Critical Evidence(s) Required**

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

* Enlist types of wastes.
* Handle at least one type of waste.
* Identify Environment adversely affecting materials
* Dispose-off one type of waste.
* Explain different waste reduction techniques.
* Explain resource conservation techniques.

**Tool and Equipment**

* Personal Protective Equipment (PPEs).
* Waste handling SOP of the organization.
* Waste bins/brooms/dustpans/garbage bags.
* Shovels (assorted range).
* Waste handling toolkits.
* Trolley/lifters for handling waste.
* Waste recycling equipment (if applicable to relevant industry).