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GENERATOR MECHANIC



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LEARNER GUIDE

National Vocational Certificate Level 1

Version 1 - November, 2019



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Introduction

Welcome to your Learner's Guide for the *Generator Mechanic Level 1* Program. It will help you to complete the program and to go on to complete further study or go straight into employment.

The *Generator Mechanic Level 1* program is to engage young people with a program of development that will provide them with the knowledge, skills and understanding to start this career in Pakistan. The program has been developed to address specific issues, such as the national, regional and local cultures, the manpower availability within the country, and meeting and exceeding the needs and expectations of their customers.

The main elements of your learner's guide are:

- **Introduction:**
 - This includes a brief description of your guide and guidelines for you to use it effectively
- **Modules:**
 - The modules form the sections in your learner's guide
- **Learning Units:**
 - Learning Units are the main sections within each module
- **Learning outcomes:**
 - Learning outcomes of each learning units are taken from the curriculum document
- **Learning Elements:**
 - This is the main content of your learner's guide with detail of the knowledge and skills (practical activities, projects, assignments, practices etc.) you will require to achieve learning outcomes stated in the curriculum
 - This section will include examples, photographs and illustrations relating to each learning outcome
- **Summary of modules:**
 - This contains the summary of the modules that make up your learner's guide
- **Frequently asked questions:**
 - These have been added to provide further explanation and clarity on some of the difficult concepts and areas. This further helps you in preparing for your assessment.
- **Multiple choice questions for self-test:**
 - These are provided as an exercise at the end of your learner's guide to help you in preparing for your assessment.

Overview of the program

Course: <i>Generator Mechanic Level 1</i>	Total Course Duration: 240 Hours
Course Overview:	
<p>In this training program trainee will learn and acquire specialized knowledge and practical skills required to function as a Generator mechanic both at domestic and commercial levels. Generator Mechanic will be responsible to maintain personal safety standards and maintain tools and equipment. Generator Mechanic will be responsible for ensuring PPE's, Maintaining First aid box and Fire extinguisher, ensuring safeguard of machines, adopting company policies and procedures, adopting environmental regulations, attaining health and safety training, preparing and responding for emergencies, arranging tools and equipment, maintaining toolbox, insulating tools and equipment, calibrating measuring tools, and managing inventory of tools and equipment. The specific objectives of developing these qualifications are as under:</p> <ul style="list-style-type: none">• Improve the overall quality of training delivery and setting national benchmarks for training of generator mechanic in the country• Provide flexible pathways and progressions to learners enabling them to receive relevant, up-to-date and recent skills• Provide basis for competency-based assessment which is recognized and accepted by employers• Establish a standardized and sustainable system of training for generator mechanic in the country	

Module Title and Aim	Learning Units	Theory hours	Workplace hours	Timeframe of Modules
<p>Module 1: Comply with Work Health and Safety Policies</p> <p>Aim: After completing this module, the learner will be able to know skills and knowledge required to apply general work health and safety requirements in the workplace. Communicate work and health safety assess at work place. It describes generic work health and safety responsibilities applicable to employees without managerial or supervisory responsibilities.</p>	<p>LU-1: Work safely at work place LU-2: Communicate work health and safety (WHS) assess at work place LU-3: Minimize risks to personal safety at work place LU-4: Minimize risks to public safety</p>	06	24	30
<p>Module 2: Obey the Workplace Policies and Procedures</p> <p>Aim: After completing this module, the learner will be able to obey the workplace personal appearance and hygiene, follow work ethics, Demonstrate the workplace behavior, Communicate the workplace policy and procedure and review the implementation of workplace policy and procedures.</p>	<p>LU-1: Obey the workplace personal appearance and hygiene LU-2: Follow work ethics LU-3: Demonstrate the Work place behaviors LU-4: Communicate workplace policy & procedures LU-5: Review the implementation of workplace policy & procedures</p>	04	16	20
<p>Module 3: Follow Basic Communication Skills (General)</p> <p>Aim: After completing this module, the learner will be able to listen attentively, develop non-verbal communication, and identify communication barriers, interview preparation for job and different communication platforms in the workplace and throughout your career.</p>	<p>LU-1: Adopt Effective listening to Skills LU-2: Develop Nonverbal communication with peers LU-3: Prepare for Interview to get a job LU-4: Use communication platform at workplace LU-5: Identify communication barriers to improve interpersonal skills</p>	10	40	50

<p>Module 4: Operate Computer Functions (General).</p> <p>Aim: After completing this module, the learner will be able to have skills and knowledge required to setup a computer system, organize files in folders, and shutdown a computer system.</p>	<p>LU1. Set up the computer for use LU2. Organize files in folder LU3. Shut down computer system</p>	10	40	50
<p>Module 5: Identify Tools & Equipment</p> <p>Aim: After completing this module, the learner will be able to arrange tools/equipment, maintain tool box, calibrate measuring tools and manage proper inventory of used/unused tools/equipment</p>	<p>LU1: Arrange Tools and Equipment LU2: Maintain Tool Box LU3: Insulate Tools and Equipment LU4: Calibrate measuring tools LU5: Manage Inventory of tools and equipment</p>	16	34	50
<p>Module 6: Identify Generators & its Components</p> <p>Aim: After completing this module, the learner will be able to identify generator and its engine parts, identify components/attachments, identify capabilities of Generator and Identify basic tools and supplies</p>	<p>LU1. Identify generator and its engine LU2. Identify components & attachments LU3. Identify capacity of generator LU4. Identify capabilities of generator LU5. Identify basic tools and supplies associated with generator</p>	10	30	40
TOTAL		56	184	240

GENERATOR MECHANIC



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Module-5

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Module 5: Maintain Tools & Equipment

Objective of the module: The aim of this module is to develop the knowledge, skills and understanding needed to maintain Tools and Equipment.

Duration: 50 hours **Theory:** 16 hours **Practical:** 34 hours

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
LU1: Arrange Tools and Equipment	The student will be able to: Identify tools and equipment Interpret job card Prepare list of tools and equipment as per requirement Collect tools and equipment from store	Knowledge and understanding of: <ul style="list-style-type: none"> • Different tools and equipment such as : <ol style="list-style-type: none"> a) Ampere meter b) Voltmeter c) Multi-meter d) Clamp Meter e) Megger f) Tachometer g) Frequency Meter • functions of different tools • job card • Tools for specific task and their collection from store. 	<ul style="list-style-type: none"> • Learning guide • Job card • Ammeter • Voltmeter • Multi meter • Megger • Clamp meter • Frequency meter
LU2: Maintain Tool Box	The student will be able to: Check physical conditions of tools and equipment before use Perform preventive maintenance as per standards Perform corrective maintenance of tools as per requirements Clean tools and equipment after use Place tools and equipment at	Knowledge and understanding of : <ul style="list-style-type: none"> • Types of tools and equipment, • Checking the condition of different sorts of tools and equipment, including usage, major or minor damage, testing and dismantling, frequency of checks. • The implications of not maintaining tools and equipment, including breakdowns, loss of service, accidents and injuries • The implications of not keeping tools and equipment clean, including failures, breakdowns 	Learning guide Tool box

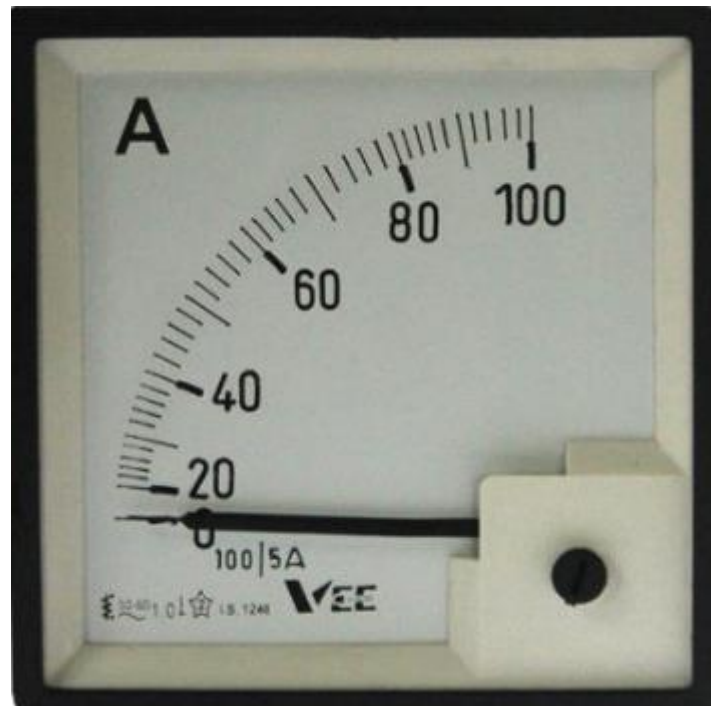
Learning Unit	Learning Outcomes	Learning Elements	Materials Required
	appropriate place	<ul style="list-style-type: none"> • Storing tools and equipment properly, including proximity to area of use, cleanliness of storage area. • Recognizing tools and equipment that are damaged or need maintenance, including poor operation, frayed cables. • Potential hazards that can arise from defective and faulty tools and equipment, including misuse, poor maintenance or storage. 	
LU3: Insulate Tools and Equipment	The student will be able to: Select insulated tools and equipment Adopt insulated tools and equipment as per standards	Knowledge and understanding of : <ul style="list-style-type: none"> • Insulation, importance of insulation. • Importance of insulated tools and equipment. • Safe use of insulated tools. • Adopting insulated tools and equipment as per standards. • insulated tool safety checklist 	Learning guide
LU4: Calibrate measuring tools	The student will be able to: Check calibration status of the measuring tools Perform calibration of measuring tools as per standards Record calibration test results	Knowledge and understanding of : <ul style="list-style-type: none"> • calibration and its purpose equipment that needs calibration • Types of calibration including transducer calibration, data system calibration, physical end to end calibration • Importance of calibration • Methods of equipment calibration • Procedure of calibration • How often tools be calibrated. • calibration frequency • calibration standard • Calibration factor. • Various methods of equipment calibration, recording calibration test results. 	Learning guide Testing instruments as per requirement

Learning Unit	Learning Outcomes	Learning Elements	Materials Required
		•	
LU5: Manage Inventory of tools and equipment	The student will be able to: Check tools and equipment as per record Report for faulty tools and equipment to supervisor Generate demand for deficit tools and equipment Maintain all records of tools and equipment	Knowledge and understanding of: <ul style="list-style-type: none"> • importance of maintaining inventory of tools and equipment • What are the components of inventory, tools used for inventory management, equipment management system, tool management system, Keeping track of tools and equipment • What is inventory, types of inventory , functions of inventory • methods of tools and equipment inventory control • writing of faulty tools and equipment • stock and dead stock record 	Learning guide Inventory Book/ Register

Examples and illustrations:

AMPERE METER:

The meter used for measuring the current is known as the ammeter. The current is the flow of electrons whose unit is ampere. Hence the instrument which measures the flows of current in ampere is known as ampere meter or ammeter.



AMPERE METER

<https://www.indiamart.com/proddetail/ac-analog-ammeter-14408974373.html>

VOLT METER:

A voltmeter, also known as a voltage meter, is an instrument used for measuring the potential difference, or voltage, between two points in an electrical or electronic circuit. Some voltmeters are intended for use in direct current (DC) circuits; others are designed for alternating current (AC) circuits.



VOLTMETER

<https://www.indiamart.com/jyotielectricals-newdelhi/electrical-panel-meter.html>

OHM METER:

The meter which measures the resistance and the continuity of the electrical circuit and their components such type of meter is known as the ohmmeter. It measures the resistance in ohms. The micro-ohmmeter is used for measuring the low resistance and the mega ohmmeter measures the high resistance of the circuit. The ohmmeter is very convenient to use but less accurate.



Ohm Meter

<https://en.wikipedia.org/wiki/Ohmmeter>

MULTI-METER:

A multi-meter is an electronic tool used to measure voltage, amps and resistance across circuits. By attaching two leads to different parts of an electrical system, professionals can use multi-meters to detect levels of voltage and resistance, or changes in electrical currents. This tool may also be known as a volt-ohm meter or volt-ohm-milli-ammeter (VOM).

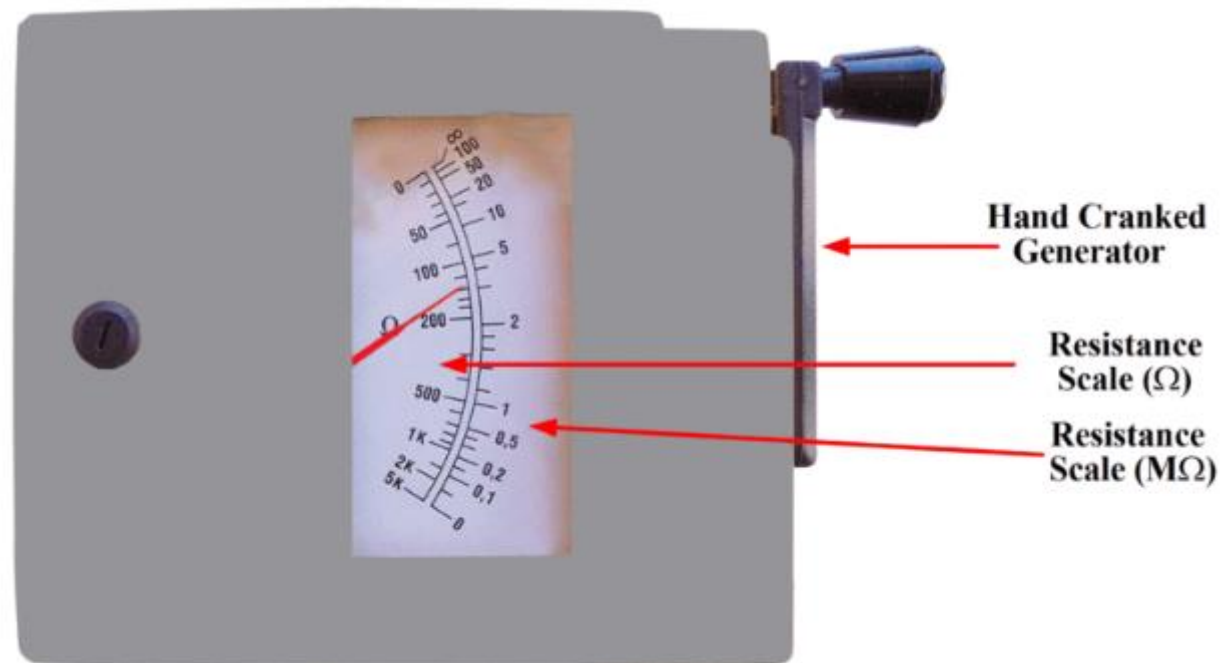


MULTI-METER

<http://www.allgsmtips.com/how-to-use-a-multimeter-in-mobile-phone-repairs/>

MEGGER:

The Megger is the instrument used for measuring the resistance of the insulation. It works on the principle of comparison, i.e., the resistance of the insulation is compared with the known value of resistance. If the resistance of the insulation is high, the pointer of the moving coil deflects towards the infinity, and if it is low, then the pointer indicates zero resistance. The accuracy of the Megger is high as compared to other instruments.



MEGGER

<http://electricalacademia.com/instrumentation-and-measurements/megohmmeter-definition-megger/>

FREQUENCY METER:

Frequency meter is an instrument for measuring the frequency in cycles per second of an alternating current or of a radio wave.



FREQUENCY METER

<https://export.rsdelivers.com/product/sifam-tinsley/zq94-46243n1caw0st/sifam-tinsley-frequency-meter-92mm-x-92mm/8862064>

CLAMP METER:

A clamp meter is an electrical test tool that combines a basic digital multimeter with a current sensor.

Clamps measure current. Probes measure voltage. Having a hinged jaw integrated into an electrical meter allows technicians to clamp the jaws around a wire, cable or other conductor at any point in an electrical system, then measure current in that circuit without disconnecting/de-energizing it.

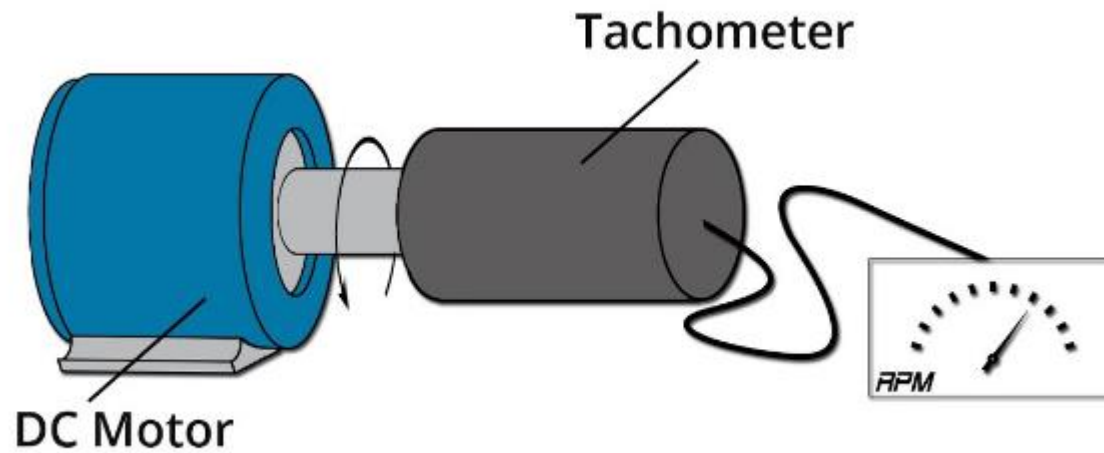


CLAMP METER

<https://www.walmart.com/ip/Etekcity-MSR-C600-Digital-Clamp-Meter-Auto-Ranging-Multimeter-FREE-SHIPPING/737242621>

TACHO METER:

A tachometer is an instrument measuring the rotation speed of a shaft or disk, as in a motor or other machine. The device usually displays the revolutions per minute (RPM) on a calibrated analogue dial, but digital displays are increasingly common.



TACHO METER

INSULATION:

Insulators are used in electrical equipment to support and separate electrical conductors without allowing current through themselves. An insulating material used in bulk to wrap electrical cables or other equipment is called insulation.

Insulated Tools:

Insulated tools are hand tools used by electricians to help protect them from, and reduce electrical related incidents such as: electrocution, arc flash, and arc blasts. The use and application of insulated tools and appropriate PPE (Personal Protection Equipment) by electricians is required by OSHA. Insulated tools are rated at 1000 volts.

Insulated Tool Safety Checklist:

Insulated tools are designed to reduce (will not completely eliminate) the chance of injury should your tool come in contact with an energized source. To avoid injury always turn off or de-energize lines and equipment before use. Apply your lockout-Tag out procedure. Only skilled & qualified electricians may work on live installations and then only in conformance with the relevant industrial safety standards. Failure to observe the safety cautions in this checklist may result in injury or even death.

- Only use insulated tools that are marked with the official international 1000 volt rating symbol.
- Inspect your tools for wear and tear before each use.
- Keep your insulated tools clean and dry at all times.
- Store insulated tools separately from other tools in order to avoid confusion.
- If the orange outer rubber layer is damaged in any way, or if the yellow inner layer is visible, DO NOT USE! Properly dispose of the tool and replace it.
- Never touch an uninsulated part of the tool or any other conductive surface that may make contact with an energized source.
- Have a qualified person inspect your insulated tools regularly for safe use.

Have an arc flash analysis performed on your facility to determine the proper category or level of PPE to use in conjunction with your insulated tools.



Various Insulated Tools

<https://www.specialized.net/cementex-tr-11elk-electrician-s-repair-insulated-tool-set-11-pc.html>

What is Instrument Calibration? Why Should You Calibrate?

The process of evaluating the measurements made by the instrument to be calibrated against an instrument known to be making measurements that surpass the suitable limits of precision and correctness is known as instrument calibration. If any variation is found, then the instrument is calibrated so that it can give exact readings and values. It is common for any instrument to lose its calibration after a long period of usage. After the process of calibration, the instrument is good to use again.

Calibration is necessary for:

1. A crucial measurement
2. If the instrument has undergone adverse conditions and cannot give the right reading.
3. When the output does not match the stand-in instrument.
4. Drastic change in weather
5. Cyclic testing of instruments

When are Instruments Calibrated?

Instruments which measure length, temperature, pressure etc. should be calibrated against some standard measurement at regular intervals as preferred by the manufacturer. Methods of calibration depend on whether the instrument is calibrated regularly or only occasionally for a special task where a highly calibrated instrument is required.

It is essential to get the instruments calibrated every now and then even if they are in good condition to prevent wrong measurements of extremely crucial measurements.

Methods of Calibration:

- **Data Calibration** – This method is akin to accredited calibration except that they are not accredited to the ISO standard and not supplemented by data with doubtful measurements.
- **Standard Calibration** – This is the method used for instruments which are not critical to quality or do not require accreditation. To make sure the standards are operative, it is necessary to document the process.

- **ISO 17025 Accredited Calibration** – This is one of the most rigid forms of calibration. An account of the measurement details is maintained. International Organization of Standardization is a benchmark which shows that the company has maintained its standard rules and regulations to maintain a level of quality. There are 4 things to keep in mind to achieve a level of quality.
1. **Maintaining a Record** – When an instrument is being calibrated it is mandatory to maintain a record of every minute detail of the results before and after the calibration.
 2. **Accurate List of Instruments** – It is necessary to maintain an updated list of instruments if your company abides by ISO Standards. An ISO certification is rejected if the instruments are in the list, but they are not physically available.
 3. **Inspect the Documentation** – Regular inspection of the calibration process is mandatory other than just documenting the process. The changes can easily be detected if the calibration process is closely audited every single time. It is necessary to document the changes as well as to get an ISO certification.
 4. **Well-framed Quality Module** – It is necessary to frame a module to keep the quality in check. The quality professionals need to follow the same code according to the module to make sure there is regularity in the calibration processes. Only the companies with clear quality modules which is documented on a regular basis will be eligible for ISO certification.

Calibration Procedures

- The measurements acquired from the scale are compared with the measurements of the sub-standard instrument and the calibration curve is formed from the obtained values.
- If the measurements from the instruments are parallel to the substandard then it is a good enough calibration. Otherwise the readings will have to be taken multiple times.
- Static input is applied to the instruments and depending on the dynamic response the static calibration is built.



Types of Calibration: There are three types of calibration:

- Transducer calibration which focuses on the transducer input-output relationship
- Data system calibration which simulates or models the input of the entire measurement system
- Physical end-to-end calibration.

References:

1. <https://circuitglobe.com/ammeter.html>
2. <https://en.wikipedia.org/wiki/Voltmeter>
3. <https://www.techopedia.com/definition/2640/multimeter>
4. <https://circuitglobe.com/megger.html>
5. <https://www.fluke.com/en/learn/best-practices/test-tools-basics/clamp-meters/what-is-a-clamp-meter>
6. <https://en.wikipedia.org/wiki/Tachometer>
7. <https://automationforum.co/different-methods-instrument-calibration/>

VIDEOS:

	<p>How to find ammeter and voltmeter reading https://www.youtube.com/watch?v=Ex5z-xVeF98</p>
	<p>How to wire a frequency meter https://www.youtube.com/watch?v=6klsidHWhwg</p>

(Engineering projects with PRAVEEN DEHARI in Hindi)



How to use a multimeter

<https://www.youtube.com/watch?v=rUkvHeXsPWs>

MEGGER TEST



Megger Test

<https://www.youtube.com/watch?v=kep6ewppqLE>

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Module-6

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Module 6: Identify Generators & its Components

Objective of the module: After completing this learning module, the learner will be able to identify generator and its engine parts, identify components/attachments, identify capabilities of Generator and Identify basic tools and supplies

	Total hours	40	Theory	10	Practical	30
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Learning Unit	Learning Outcomes	Learning Elements	Materials (Tools & Equipment) Required
LU1. Identify generator and its engine	<ul style="list-style-type: none"> . Identify petrol engine . Identify diesel engine . Identify gas engine 	<p>Knowledge and understanding of:</p> <ul style="list-style-type: none"> • Engine and it's types • Petrol engine, working principal of petrol engine, parts of a petrol engine, efficiency of petrol engine, cycle used in petrol engine, advantages and disadvantage of petrol engine • Diesel engine, working principal of Diesel engine, parts of a Diesel engine, efficiency of Diesel engine, cycle used in diesel engine, advantages and disadvantages of diesel engine • Gas engine, working principal of gas engine, parts of a gas engine, efficiency of gas engine, cycle used in gas engine, advantages and disadvantages of gas engine • Advantages and disadvantages in comparison to diesel and gas engine • Comparison of petrol, diesel and gas engine 	<ul style="list-style-type: none"> • Petrol generator engine • Diesel generator engine • Gas generator engine
LU2. Identify components & attachments	<ul style="list-style-type: none"> . Identify alternator . Identify fuel pump . Identify water pump 	<p>Knowledge and understanding of</p> <ul style="list-style-type: none"> • parts of Alternator and its function, principal of alternator • Fuel pump and its function • Water pump and its function • Radiator and its function, types of radiator, fluid in a 	<ul style="list-style-type: none"> . Alternator . Fuel pump . Water pump

	<ul style="list-style-type: none"> . Identify radiator . Identify turbo charger/inter cooler 	<ul style="list-style-type: none"> radiator, signs of a bad radiator • Turbo charger and its functions, working principal of turbo charger, components of a turbo charger • Types, parts and function of fuel pump • Parts and function of water pump • Coolant in radiator, purpose of coolant, • Intercooler, function, types of intercooler, components 	<ul style="list-style-type: none"> . Radiator . Turbo charger/inter cooler
LU3. Identify capacity of generator	<ul style="list-style-type: none"> . Check capacity as per manufacturer's specification . Ensure proper capacity of generator 	Knowledge and understanding of <ul style="list-style-type: none"> • Generator capacity. • Specification of different generator sets • Ensuring proper capacity of generator 	Generator manual
LU4. Identify capabilities of generator	<ul style="list-style-type: none"> . Check capability as per manufacturer's specification . Ensure proper capability of generator as per rating . Report to supervisor as per format 	Knowledge and understanding of <ul style="list-style-type: none"> • Generator manufacturing manual • Horsepower HP, Cubic Centimeter CC, and KW/KVA • Basic conversion techniques between HP, CC, and KW/KVA, Conversion of HP to KVA, Relation between HP and W i.e. 1HP is equal to 746W, conversion of KVA to KW, • Understand calculation to find CC, HP, KW/KVA • Power calculators for generators • Reporting to supervisor as per format 	Generator manufacturing Manual

<p>LU5. Identify basic tools and supplies associated with generator</p>	<ul style="list-style-type: none"> . Check standard tools supplies with generators . Check spare/consumable materials . Adopt manufacturer's specifications of tools and equipment 	<p>Knowledge and understanding of:</p> <ul style="list-style-type: none"> • Basic supplies and tools like • Pipe wrench • Tubing cutter • Wire cutters or wire strippers • Adjustable wrench • Screwdriver (Philips and regular) • Solder and Flux • 1-1/16" masonry drill bit • 2-1/2" hole saw for No Touch steam head • Drill motor • Propane torch • Fitting tool(spanner) • cutting tools (cutter, pliers etc.) • measuring tools (clamp meters, Vernier caliper) • spare/consumable materials • tools/equipment's as per specification 	<p>Generator tool kit</p>
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Examples and illustrations:

Engine Components:

Engine is the main automotive component for any automobile. It works as a heart of automobile. A lot of research has been made to improve performance of automobile engine by improving engine components. Some very important engine components in modern automobile engines are engine block, flywheel, crankshaft, piston, etc.

Different Engine Components:

- Crankshaft
- Cylinder Head
- Flywheel
- Cylinder Block
- Carburettor
- Piston
- Exhaust Valve
- Timing Belt Cover
- Con-rod
- Timing Belt
- Fuel Injector
- Oil Pump
- Catalyst Converter
- Oil Seal
- Turbo Charger
- Fuel Tank
- Sensor
- Intake Manifold
- Water Pump
- Exhaust Manifold
- Fan
- Radiator
- Spark Plug

Internal Combustion Engine -

An internal combustion engine is an engine that uses the explosive combustion of fuel to push a piston within a cylinder - the piston's movement turns a crankshaft that then turns the car wheels via a drive chain or drive shaft. Different types of fuels commonly used for car combustion engines are gasoline (or petrol), diesel and CNG.

Functions of some of the Important Engine Components

Flywheel:

Flywheel is one of the most important engine components. It is a large and heavy metal wheel. Flywheel is attached to the back of the crankshaft to smooth out the firing impulses. It provides inertia to keep the crankshaft turning smoothly during the periods when no power is being applied. It also forms a base for the starter ring gear and in manual transmission, for the clutch assembly.

Crankshaft:

Crankshaft is also one of the most engine components. It is a shaft with one or more cranks, or "throws", that are coupled by connecting rods to the engine's pistons. Together, the crankshaft and the connecting rods transform the pistons' reciprocating motion into rotary motion.

Piston:

Piston is another vital engine component. It is a partly hollow cylindrical part closed at one end, fitted to each of the engine's cylinders and attached to the crankshaft by a connecting rod. Each piston moves up and down in its cylinder, transmitting power created by the exploding fuel to the crankshaft via a connecting rod.

Carburettor:

Carburettor is the heart of automobile engine. It is the fuel system engine component that meters and mixes fuel and air in the proper proportion. The carburettor also atomizes this mixture and directs it to the intake manifold that distributes it through passages to each combustion chamber in engine.

Cylinder Block:

It is actually housing where all engine components reside. It is a metal casting containing the cylinders and cooling ducts of an engine. The cylinder block is extremely strong so it can withstand the rigors of engine torque and vibration, while supporting all attached engine accessories and the transmission. Cylinder block is a complicated component at the heart of the engine, with

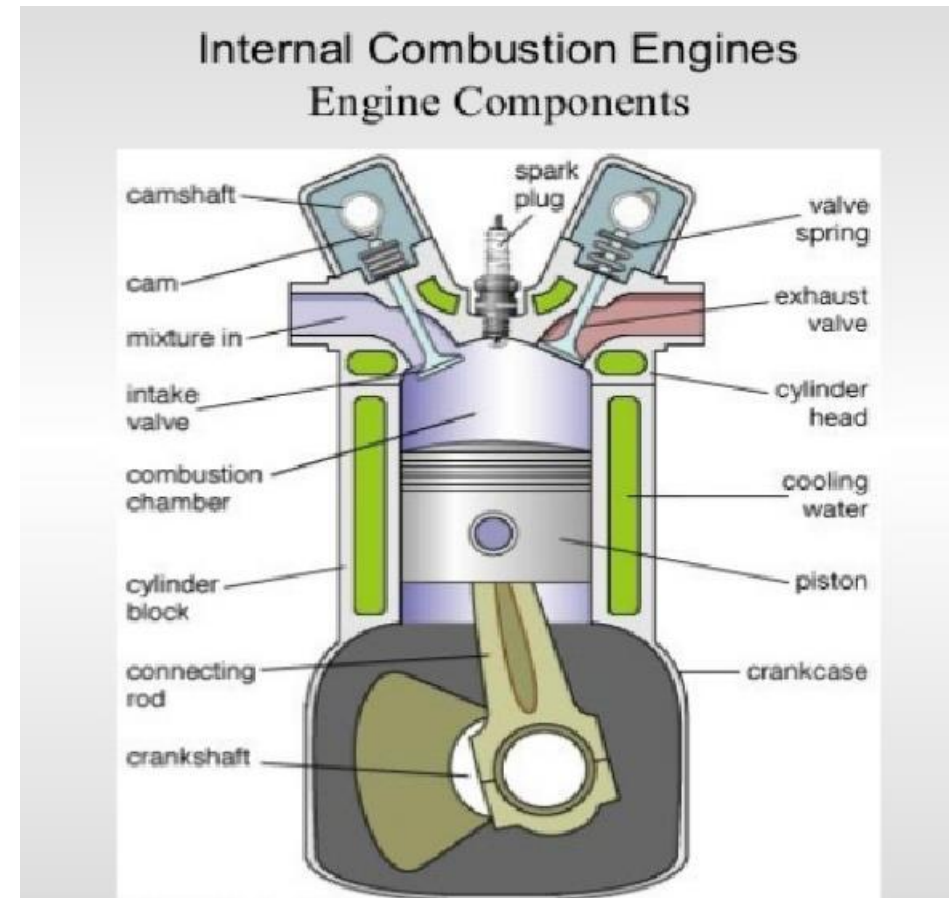
adoption to attach the cylinder head, crankcase, engine mounts, drive housing and engine ancillaries, with passages for coolants and lubricants.

Timing Belt:

Timing Belt, an engine component, is a cogged belt, usually of reinforced rubber. The purpose of a timing belt component is to provide a quiet, flexible connection between the camshaft and crankshaft to keep the engine valves opening and closing in phase with the movement of the engine pistons.

Spark Plug:

Spark Plugs are important engine components. These plugs have two primary functions. Engine spark plug ignites the air/fuel chamber and removes the heat from engine combustion chamber.






<https://www.slideshare.net/MANMEET2591/internal-combustion-engine-61409792>

References:

1. http://www.darcast.com/engine_components.html

Videos:

	<p>How to identify generator components https://www.youtube.com/watch?v=PNtr-Fd-Adg</p>
	<p>Generator sizing https://www.youtube.com/watch?v=JGXWdpVFU2I</p>
	<p>Generator Set main parts https://www.youtube.com/watch?v=3tVyXXvvzYA</p>

Explain the Diesel
Generator, its
parts & functions
in Hindi



Explain Diesel generator and its parts in Urdu/Hindi
<https://www.youtube.com/watch?v=GAhRO7-TdAk>

FREQUENTLY ASKED QUESTIONS:

<p>1. What is Competency Based Training (CBT) and how is it different from currently offered trainings in institutes?</p>	<p>Competency-based training (CBT) is an approach to vocational education and training that places emphasis on what a person can do in the workplace as a result of completing a program of training. Compared to conventional programs, the competency based training is not primarily content based; it rather focuses on the competence requirement of the envisaged job role. The whole qualification refers to certain industry standard criterion and is modularized in nature rather than being course oriented.</p>
<p>2. What is the passing criterion for CBT certificate?</p>	<p>You shall be required to be declared “Competent” in the summative assessment to attain the certificate.</p>
<p>3. What are the entry requirements for this course?</p>	<p>The entry requirement for this course is 8th Grade or equivalent.</p>
<p>4. How can I progress in my educational career after attaining this certificate?</p>	<p>You shall be eligible to take admission in the National Vocational Certificate Level-3 in Leather Products Development Technician (Pattern Maker). You shall be able to progress further to National Vocational Certificate Level-4 in Heavy Construction Machinery Operator Course; and take admission in a level-5, DAE or equivalent course (if applicable). In certain case, you may be required to attain an equivalence certificate from The Inter Board Committee of Chairmen (IBCC).</p>
<p>5. If I have the experience and skills mentioned in the competency standards, do I still need to attend the course to attain this certificate?</p>	<p>You can opt to take part in the Recognition of Prior Learning (RPL) program by contacting the relevant training institute and getting assessed by providing the required evidences.</p>
<p>6. What is the entry requirement for Recognition of Prior Learning program (RPL)?</p>	<p>There is no general entry requirement. The institute shall assess you, identify your competence gaps and offer you courses to cover the gaps; after which you can take up the final assessment.</p>
<p>7. Is there any age restriction for entry in this course or Recognition of Prior Learning program (RPL)?</p>	<p>There are no age restrictions to enter this course or take up the Recognition of Prior Learning program</p>
<p>8. What is the duration of this course?</p>	<p>The duration of the course work is 1,510 hrs. (11 months)</p>
<p>9. What are the class timings?</p>	<p>The classes are normally offered 25 days a month from 08:00am to 01:30pm. These may vary according to the practices of certain institutes.</p>

10. What is equivalence of this certificate with other qualifications?	As per the national vocational qualifications framework, the level-4 certificate is equivalent to Matriculation. The equivalence certificate can be obtained from The Inter Board Committee of Chairmen (IBCC).
11. What is the importance of this certificate in National and International job market?	This certificate is based on the nationally standardized and notified competency standards by National Vocational and Technical Training Commission (NAVTTTC). These standards are also recognized worldwide as all the standards are coded using international methodology and are accessible to the employers worldwide through NAVTTTC website.
12. Which jobs can I get after attaining this certificate? Are there job for this certificate in public sector as well?	You shall be able to take up jobs in the local or overseas construction companies in heavy machinery operator job profile.
13. What are possible career progressions in industry after attaining this certificate?	You shall be able to progress up to the level of supervisor after attaining sufficient experience, knowledge and skills during the job. Attaining additional relevant qualifications may aid your career advancement to even higher levels.
14. Is this certificate recognized by any competent authority in Pakistan?	This certificate is based on the nationally standardized and notified competency standards by National Vocational and Technical Training Commission (NAVTTTC). The official certificates shall be awarded by the relevant certificate awarding body.
15. Is on-the-job training mandatory for this certificate? If yes, what is the duration of on-the-job training?	On-the-job training is not a requirement for final / summative assessment of this certificate. However, taking up on-the-job training after or during the course work may add your chances to get a job afterwards.
16. How much salary can I get on job after attaining this certificate?	The minimum wages announced by the Government of Pakistan in 2019 are PKR 17,500. This may vary in subsequent years and different regions of the country. Progressive employers may pay more than the mentioned amount. The heavy Machinery Operator normally earns 20,000 to 25,000 in the start.
17. Are there any alternative certificates which I can take up?	There are some short courses offered by some training institutes on this subject. Some institutes may still be offering conventional certificate courses in the field.
18. What is the teaching language of this course?	The teaching language of this course is Urdu and English.
19. Is it possible to switch to other certificate programs during the course?	There are some short courses offered by some training institutes on this subject. Some institutes may still be offering conventional certificate courses in the field.

<p>20. What is the examination / assessment system in this program?</p>	<p>Competency based assessments are organized by training institutes during the course which serve the purpose of assessing the progress and preparedness of each student. Final / summative assessments are organized by the relevant qualification awarding bodies at the end of the certificate program. You shall be required to be declared “Competent” in the summative assessment to attain the certificate.</p>
<p>21. Does this certificate enable me to work as freelancer?</p>	<p>You can start your small business by purchasing your own heavy construction machine and can start earning 50,000 per month. You may need additional skills on entrepreneurship to support your initiative.</p>

Test Yourself (Multiple Choice Questions)

MODULE: 5

Q1. Instrument for measurement of voltage is known as:

- a. Ammeter
- b. Voltmeter
- c. Ohmmeter
- d. Power factor meter

Q2. Ampere meter is used to measure

- a. Current
- b. Voltage
- c. Frequency
- d. Power

Q3. Tachometer is an instrument used to measure

- a. Rotation or revolution speed of objects.
- b. Temperature.
- c. Distance between objects.
- d. Voltage.

Q4. Which Instrument is used for insulation resistance test?

- a. Clamp meter
- b. Megger
- c. Power factor Meter
- d. Tachometer

Q5. Which statement is correct regarding preventive maintenance?

- a. To change only lubricant and filter timely
- b. To check only fuel system timely
- c. To maintain the vehicle performance at all time
- d. Only to inspect and replace components.

Q6. Which of the following kinds of maintenance could increase chances of machine operation without breaks for longer duration?

- e. Preventive
- f. Breakdown
- g. Routine
- h. Emergency

MODULE 6:

Q1. In a diesel engine, the fuel is injected by

- a. Spark
- b. Injected fuel
- c. Ignitor
- d. **Heat resulting from compression** air that is supplied from combustion

Q2. A diesel engine has....

- a. One valve
- b. Two valves
- c. **Three valves**
- d. Four valves

Q3. What does a spark plug do?

- a. **Ignites the fuel and air mixture to create energy**
- b. Injects the fuel and air mixture in to combustion chamber
- c. Supply the engine with energy
- d. Injects air in to the intake valve.

Q4. In a petrol engine, the mixture has the lowest pressure at the

- a. Beginning of the suction stroke
- b. **End of suction stroke**
- c. End of compression stroke
- d. Middle of suction stroke

Q5. The radiator is usually made of

- a. Aluminum
- b. **Copper**
- c. Galvanized Iron
- d. Stainless steel

ANSWERS:

MODULE 5: Q1.b Q2.a Q3.a Q4.b Q5.a Q6.c

MODULE 6: Q1.d Q2.c Q3.a Q4.b Q5.b

