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GENERATOR MECHANIC



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CBT Curriculum

National Vocational Certificate Level 2

Version 1 - November, 2019



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Contents

Introduction	3
Purpose of the Training programme.....	3
Overall objectives of the course	4
Competencies to be gained after completion of course.....	4
Job opportunities available immediately and in the future	4
Trainee Entry Level:	5
Minimum Qualification of Trainer.....	5
Recommended Trainer: Trainee ratio.....	5
Medium of Instruction:	5
Duration of course (total time, Theory & Practical)	6
Overview of the Curriculum for Generator Mechanic (Level 2).....	7
Module 5: Module: General Faults	10
Module 6: Identify Mechanical Fault	12
Module 7: Identify Electrical Fault	15
List of Tools and Equipment.....	18

Introduction

Generators are machines that transform mechanical energy into electrical energy; they can be used to run a variety of electrical appliances for home or commercial use. There are numerous types of generators; some rely on natural gas, diesel or petrol as energy sources. This generator mechanic course is provided to train the unskilled trainees to service/repair/install engines and generators for home or industrial use. This course is aimed at introducing and developing the basic skills with an understanding of different energy sources, power quality and its influences on standby generator sets, different loads, startup and running of a standby generator. Set, size and select the most appropriated standby generator set of the application and provide the trainees with electrical and electronic principles to enable effective fault finding of the standby generators and associated systems alongside the installation of different types of generators. The trainees are encouraged to experiment with a focus on acquiring a wide range of new skills. They are also exposed to the commercial market and taught how to deal with clients and their demands.

In order to improve the quality of training and to ensure relevance, National Vocational & Technical Training Commission (NAVTTTC) through Qualification Development Committee (QDC) developed National Competency Standards for generator mechanic. The learning outcomes provided in this curriculum form the basis of this instruction, which are in accordance with the approved National Competency Standards for generator mechanic. The curriculum can be implemented in a variety of pathways and provides flexible learning opportunities.

Purpose of the Training programme

In this training program trainee will learn and acquire specialized knowledge and particle skills required to function as a generator mechanic both at public and private levels. The specific objectives of developing these qualifications are as under:

- 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 current 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.

Overall objectives of the course

The prime objective of this one-year certificate in Generator mechanic is to provide the trainee with a comprehensive introduction and skill oriented practical work of generator at workplace. It develops trainee's abilities, interests and offers an outstanding opportunity for an intense engagement with various stages of installation, overhauling, maintenance work of generator. It encourages individual creativity while giving a solid ground in terms of identification of faults, maintenance of faulty parts, overhauling, earthing and installation alongside the skill to perform winding, work plan, documentation and develop professionalism by using appropriate technology. Part of the task is to help the trainees realize their commercial viability as an independent generator mechanic or an employee in a commercial setup. They are also made aware of the ever changing and evolving demands and challenges of market trends. This course is open to students of all levels and experiences under following main objectives.

Competencies to be gained after completion of course

The detail of the competency standards included in this qualification are given below:

National Vocational Certificate level 2, in "Generator Mechanic"

1. Comply with Personal Health and Safety Guidelines
2. Communicate the Workplace Policy and Procedure
3. Perform Basic Communication (Specific)
4. Perform Basic Computer Application (Specific)
5. Identify General Fault
6. Identify Mechanical Fault
7. Identify Electrical Fault

Job opportunities available immediately and in the future

The Pass outs of this course may find job / employment opportunities in the following areas:

- Work as a Generator Mechanic Assistant (Level 2)

Trainee Entry Level:

The entry for National Vocational Certificate level 2, Generator Mechanic is given below:

Title	Entry requirements
National Vocational Certificate level 2, in Generator Mechanic	Entry for assessment for this qualification is open. However entry into formal training institute for this qualification is person holding National Vocational Certificate level 1, "Generator Mechanic" in (Mechanical Sector)

Minimum Qualification of Trainer

- 2 years of teaching/ professional experience after Diploma/Bachelors
- 1 year of teaching/ professional experience after B-Tech
- Trainers or technical staff should have the ability to communicate and impart technical and conceptual skills
- Academic qualification should be DAE or B-Tech

Recommended Trainer: Trainee ratio

The recommended trainer and trainee ratio are 1:24 per class

Medium of Instruction:

Urdu, English or Local Language

Duration of course (total time, Theory & Practical)

The proposed curriculum is composed of **07** modules that will be covered in **310** hrs. It is proposed that the course may be delivered in a **Three months** period. The distribution of contact hours is given below:

- **Theory:** (18.39%) **Practical** (81.61%)
- **Theory:** 57 hours
- **Practical:** 253 hours
- **Total:** 310

11. Sequence of the modules

Following is the structure of the course:

NVQF Level	Module #	Title	Category	Theory (hours)	Practical (hours)	Total (hour)	Credits hours	Total Credit Hours
2	1	Comply with Personal Health and Safety Guidelines	Generic	06	24	30	03	31
	2	Communicate the Workplace Policy and Procedure	Functional	04	16	20	02	
	3	Perform Basic Communication (Specific)	Generic	06	24	30	03	
	4	Perform Basic Computer Application (Specific)	Generic	08	32	40	04	
	5	Identify General Faults	Technical	10	50	60	06	
	6	Identify Mechanical Faults	Technical	13	47	60	06	
	7	Identify Mechanical Faults	Technical	10	60	70	07	
			Total	57	253	310	31	31
Percentage.				18.39%	81.61%			

Overview of the Curriculum for Generator Mechanic (Level 2)

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of Modules
<p>Module 1: Comply Personal Health and Safety Guidelines</p> <p>Aim: This Competency Standard identifies the competencies required to protect/apply occupational Safety, Health and Environment at workplace according to the industry's approved guidelines, procedures and interpret environmental rules/regulations. Trainee will be expected to identify and use Personal Protective Equipment (PPE) according to the work place requirements. The underpinning knowledge regarding Observe Occupational Safety and Health (OSH) will be sufficient to provide the basis for the job at workplace.</p>	<p>LU1: Identify Personal Hazard at work place</p> <p>LU2: Apply personal protective and safety equipment (PPE)</p> <p>LU3: Comply with occupational safety and health (OSH)</p> <p>LU4: Dispose of hazardous waste/materials from the designated area</p>	06	24	30
<p>Module 2: Communicate the Workplace Policy and Procedure</p> <p>Aim: This unit describes the performance outcomes, skills and knowledge required to develop communication skills in the workplace. It covers gathering, conveying and receiving information, along with completing assigned written information under direct supervision.</p>	<p>LU1. Identify workplace communication procedures</p> <p>LU2. Communicate at workplace</p> <p>LU3. Draft Written Information</p> <p>LU4. Review Documents</p>	04	16	20

<p>Module 3: Perform Basic Communication (Specific)</p> <p>Aim: This unit describes the skills and knowledge required to assist in the development of communication competence by providing information regarding different forms of communication and their appropriate use.</p>	<p>LU1. Communicate in a team to achieve intended outcomes</p> <p>LU2. Follow Supervisor’s instructions as per organizational SOPs</p> <p>LU3. Develop Generic communication skills at workplace</p>	06	24	30
<p>Module 4: Perform Basic Computer Application (Specific)</p> <p>Aim: This unit describes the skills and knowledge required to use spreadsheet to prepare a page of document, develops familiarity with Word, Excel, email, and computer graphics basics.</p>	<p>LU1. Create Word Documents</p> <p>LU2. Create Excel Documents</p> <p>LU3. Use internet for Browsing</p>	08	32	40
<p>Module 5: Identify General Fault</p> <p>Aim: After completing this learning module, the learner will be able to check physical conditions of Generator, take history of faulty generator, check battery, check self-starter, check self-starter, check alternator charger, check control panel, document fault for identifying generator fault.</p>	<p>LU1: Check physical condition of generator</p> <p>LU2. Take History of faulty generator</p> <p>LU3. Check battery</p> <p>LU4. Check self-starter</p> <p>LU5. Check Alternator charger</p> <p>LU6. Check control Panel</p>	10	50	60

	LU7. Document fault			
<p>Module 6: Identify Mechanical fault</p> <p>Aim: After completing this learning module, the learner will be able to inspect/service lubrication system, inspect/service cooling system, inspect/service air intake system, inspect and service fuel system, inspect and service exhaust system, inspect safety equipment and service cam timing system for identifying mechanical fault in generator.</p>	<p>LU1. Inspect and service lubrication system</p> <p>LU2. Inspect and service cooling system</p> <p>LU3. Inspect and service air intake system</p> <p>LU4. Inspect and service fuel system</p> <p>LU5. Inspect and service exhaust system</p> <p>LU6. Inspect safety equipment</p>	13	47	60
<p>Module 7: Identify Electrical Fault</p> <p>Aim: After completing this learning module, the learner will be able to inspect and service ignition system, inspect and service alternator, inspect and service display panel, inspect and service governor /Actuator System, inspect and service charging system, inspect and service warning system, to diagnose electric fault (s) in generator.</p>	<p>LU1. Inspect and service Ignition system</p> <p>LU2. Inspect and service alternator</p> <p>LU3. Inspect and service display panel</p> <p>LU4. Inspect and service governor /Actuator System</p> <p>LU5. Inspect and service charging system</p> <p>LU6. Inspect and service warning system</p>	10	60	70
TOTAL		57	253	310

GENERATOR MECHANIC



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Module-5

CBT Curriculum

National Vocational Certificate Level 2

Version 1 - November, 2019

Module 5: Module: General Faults

Objectives: After completing this learning module, the learner will be able to check physical conditions of Generator, take history of faulty generator, check battery, check self-starter, check self-starter, check alternator charger, check control panel, document fault for identifying general generator fault.

Duration:	Total hours	60	Theory	10	Practical	50
Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials (Tools & Equipment) Required	Learning Place	
LU1. Check physical condition of generator	<ul style="list-style-type: none"> • Check foundation and balance of generator • Check earthing of generator • Check canopy and exhaust of generator • Check power cable connections and circuit breaker • Check leakage of lubricants, coolant and fuel 	<ul style="list-style-type: none"> • Knowledge about foundation and balance of generator • Define earthing of generator • Define canopy • Knowledge about power cable and circuit breaker • Knowledge about physical checking 	2 hours Theory 8 hours Practical	<ul style="list-style-type: none"> • Multimeter • Pliers • Screw drivers 	Class Room and workplace	
LU2.	<ul style="list-style-type: none"> • Examine log book 	<ul style="list-style-type: none"> • Describe log book focusing on all 		<ul style="list-style-type: none"> • Log book 	Class	

Take History of faulty generator	<ul style="list-style-type: none"> • Seek information from operator • Prepare report of the faults 	type's entries procedure <ul style="list-style-type: none"> • knowledge and understanding about preparation of report regarding faults 	1 hours Theory 6 hours Practical	<ul style="list-style-type: none"> • Report format 	Room and workplace
LU3. Check battery	<ul style="list-style-type: none"> • Check charge of battery • Check battery electrolyte and terminals • Check battery leads 	<ul style="list-style-type: none"> • Describe methods of battery charging (charging status of battery) • Understand specific gravity of electrolyte • Knowledge about battery leads and terminals 	1 hours Theory 7 hours Practical	<ul style="list-style-type: none"> • Hydrometer • Multimeter 	Class Room and workplace
LU4. Check self-starter	<ul style="list-style-type: none"> • Check physical condition and connections of self-starter • Check battery voltage on self – starter terminals. 	<ul style="list-style-type: none"> • Define self –starter • Describe types and functions of self-starter 	1 hours Theory 7 hours Practical	<ul style="list-style-type: none"> • Multimeter 	Class Room and workplace
LU5. Check Alternator charger	<ul style="list-style-type: none"> • Check charging generator belt • Check generator wires 	<ul style="list-style-type: none"> • Define battery charging alternator • Describe types of charging alternator • Explain functions of charging alternator 	2 hours Theory 7 hours Practical	<ul style="list-style-type: none"> • Multimeter 	Class Room and workplace
LU6. Check control Panel	<ul style="list-style-type: none"> • Check AC/DC supply • Check fuses/breakers • Check parameters and wiring 	<ul style="list-style-type: none"> • Describe control panel and its functions • Define different fuses and breakers • Knowledge and understanding measuring instruments/gauges of 	2 hours Theory 9 hours Practical	<ul style="list-style-type: none"> • Multimeter 	Class Room and workplace

		<p>control panel</p> <ul style="list-style-type: none"> • Describe measuring techniques of various gauges in control panel 			
<p>LU7. Document fault</p>	<ul style="list-style-type: none"> • Note fault in log book • Report to supervisor 	<ul style="list-style-type: none"> • Describe techniques/procedure to update log book 	<p>1 hours Theory</p> <p>6 hours Practical</p>	<ul style="list-style-type: none"> • Log book 	<p>Class Room and workplace</p>

GENERATOR MECHANIC



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Module-6

CBT Curriculum

National Vocational Certificate Level 2

Version 1 - November, 2019

Module 6: Identify Mechanical Fault

Objectives of the module: After completing this learning module, the learner will be able to inspect/service lubrication system, inspect/service cooling system, inspect/service air intake system, inspect and service fuel system, inspect and service exhaust system, inspect safety equipment and service cam timing system for identifying mechanical fault in generator.

Duration:	Total hours	60 hours	Theory	13 hours	Practical	47 hours
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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials (Tools & Equipment) Required	Learning Place
LU1. Inspect and service lubrication system	<ul style="list-style-type: none"> • Locate lubricant filling cap and drainage plug • Check oil level of engine • Adjust oil level • Identify leakage and report to supervisor 	<ul style="list-style-type: none"> • Define lubricant and its importance • Describe lubricant grading 	2 hours Theory 8 hours Practical	<ul style="list-style-type: none"> • Lubricant • Generator 	Class Room and workplace
LU2. Inspect and service	<ul style="list-style-type: none"> • Adopt appropriate safety 	<ul style="list-style-type: none"> • Define coolant 		<ul style="list-style-type: none"> • Coolant 	Class Room and

<p>cooling system</p>	<p>measures</p> <ul style="list-style-type: none"> • Ensure unobstructed air flow of radiator • Maintain coolant level • Replace fan belts and hose pipe • 	<ul style="list-style-type: none"> • Describe functions of radiator • Define antifreeze solution • Describe importance of fan belts and house pipe 	<p>2 hours Theory</p> <p>8 hours Practical</p>	<ul style="list-style-type: none"> • Radiator fan • Fan belt • Water body • Generator 	<p>workplace</p>
<p>LU3. Inspect and service air intake system</p>	<ul style="list-style-type: none"> • Locate components to be inspected • Check air service indicator • Select appropriate tools/equipment • Clean primary air filter • Replace intake hoses and clamps 	<ul style="list-style-type: none"> • Describe functions of intake components of air intake system • Describe checking techniques for air intake system 	<p>2 hours Theory</p> <p>8 hours Practical</p>	<ul style="list-style-type: none"> • Air filter • Air intake indicator • Hoses and clamps • Generators 	<p>Class Room and workplace</p>
<p>LU4. Inspect and service fuel system</p>	<ul style="list-style-type: none"> • Locate components to be inspected • Identify fuel gauges and level indicators • Select appropriate tools • Perform basic maintenance such as cleaning of fuel stain/fuel tank/carbonator 	<ul style="list-style-type: none"> • Differentiate engines using petrol, diesel and gas • Define of types of fuel gauges • Define carburetor • Describe different circuit of Carburetor 	<p>2 hours Theory</p> <p>8 hours Practical</p>	<ul style="list-style-type: none"> • Fuel gauge • Carburettor • Fuel stain • Fuel tank • Carburettor • Fuel pump • Fuel filter 	<p>Class Room and workplace</p>

	<ul style="list-style-type: none"> • Identify service need defect and hazardous condition through visuals/physical inception • Report fuel leakage and faults 			<ul style="list-style-type: none"> • Generators 	
LU5. Inspect and service exhaust system	<ul style="list-style-type: none"> • Locate components to be inspected • Check silencer shield • Check blockage & leakage of silencer • Dismantle silencer 	<ul style="list-style-type: none"> • Define silencer • Define Carbon Monoxide Ratio (COR) • Describe dismantling procedure of silencer 	<p>2 hours Theory</p> <p>8 hours Practical</p>	<ul style="list-style-type: none"> • Silencer and silencer shield • Silencer seal • Exhaust gas analyser • Socket box • Generators 	Class Room and workplace
LU6. Inspect equipment safety	<ul style="list-style-type: none"> • Check and clean heat sensor • Check oil pressure sensor • Check and clean air sensor • Check and clean RPM sensor 	<ul style="list-style-type: none"> • Define safety sensors • Describe types and functions of sensors 	<p>3 hours Theory</p> <p>7 hours Practical</p>	<ul style="list-style-type: none"> • Heat sensor • Pressure sensor • Air sensor • RPM sensor • Tachometer • Engine analyser • Generators 	Class Room and workplace

GENERATOR MECHANIC



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Module-7

CBT Curriculum

National Vocational Certificate Level 2

Version 1 - November, 2019

Module 7: Identify Electrical Fault

Objectives: After completing this learning module, the learner will be able to inspect and service ignition system, inspect and service alternator, inspect and service display panel, inspect and service governor /Actuator System, inspect and service charging system, inspect and service warning system, to diagnose electric fault (s) in generator.

Duration:	Total hours 70	Theory 10	Practical 60
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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials (Tools & Equipment) Required	Learning Place
LU1. Inspect and service Ignition system	<ul style="list-style-type: none"> Identify the tools and equipment Check Direct Current (DC) power supply of ignition coil and distributor Check High Tension (HT) leads Check spark plug 	<ul style="list-style-type: none"> Describe functions of ignition coil and distributor Describe High Tension (HT) Leads Describe different types of spark plug Describe cleaning /gauging procedure of spark plug 	2 hours Theory 12 hours Practical	<ul style="list-style-type: none"> Ignition coil Distributor High Tension (HT) leads Spark plug Tool kit 	Class Room and workplace
LU2. Inspect and service alternator	<ul style="list-style-type: none"> Identify the tools and equipment Check DC output voltage Check belt connections of alternator 	<ul style="list-style-type: none"> Describe functions of DC alternator Describe belt adjustment techniques. 	2 hours Theory 10 hours Practical	<ul style="list-style-type: none"> Alternator Belt Tool kit 	Class Room and workplace

<p>LU3. Inspect and service display panel</p>	<ul style="list-style-type: none"> • Identify tools and equipment • Check gauges, circuit breakers, relays and wiring as per standard parameters 	<ul style="list-style-type: none"> • Describe function of various gauges on display panel. • Describe measuring techniques of various gauges on Control Panel. • Knowledge about circuit breakers, switches and relays. 	<p>1 hours Theory 10 hours Practical</p>	<ul style="list-style-type: none"> • Gauges • Circuit breakers • Relays and harness wires • Toolkit 	<p>Class Room and workplace</p>
<p>LU4. Inspect and service governor /Actuator System</p>	<ul style="list-style-type: none"> • Identify the tools and equipment • Check Actuator card supply • Check magnetic pick up sensor • Check power supply on Actuator/Governor 	<ul style="list-style-type: none"> • Describe functions of Governor / Actuator, Actuator card, magnetic pick up sensor and power supply 	<p>2 hours Theory 10 hours Practical</p>	<ul style="list-style-type: none"> • Actuator card supply • Magnetic pick up sensor • Actuator/Governor • Tool kit 	<p>Class Room and workplace</p>
<p>LU5. Inspect and service charging system</p>	<ul style="list-style-type: none"> • Identify the tools and equipment • Check battery power leads • Check charging circuit of alternator 	<ul style="list-style-type: none"> • Describe functions of charging system 	<p>1 hours Theory 8 hours Practical</p>	<ul style="list-style-type: none"> • Battery leads • Charging alternator • Charging IC • Tool kit 	<p>Class Room and workplace</p>
<p>LU6. Inspect and service warning system</p>	<ul style="list-style-type: none"> • Identify tools and equipment • Check oil sensor • Check temperature sensor • Check fuel sensor 	<ul style="list-style-type: none"> • Describe warning system • Knowledge about oil, temperature and fuel sensors • Knowledge about current, voltage, and frequency due to under and over load 	<p>2 hours Theory 10 hours Practical</p>	<ul style="list-style-type: none"> • oil sensor • Temperature sensor • Fuel sensor • Over/under load module • Tool kit 	<p>Class Room and workplace</p>
	<ul style="list-style-type: none"> • Check over/under load module 	<p>conditions</p>			

List of Tools and Equipment

Sr. No	A. Testing instruments	Quantity,24-25 students
1.	Volt meter	10
2.	Clamp on mater	10
3.	Phase sequence meter	10
4.	Pressure gauge (oil)	10
5.	vacuum gauge	10
6.	PH meter	10
7.	Growler	10
8.	Bench power supply (variable DC)	5
9.	Megger/insulation tester,	10
10.	Frequency meter	10
11.	Temperature mater	10
12.	Tachometer	10
13.	Watt meter	10
14.	Multimètre	10
15.	Power factor meter	10
Tools and Equipment		
1.	Timing light	5
2.	Engine analyzer	5 set
3.	Electronic Fuel Injection (EFI) engine diagnostic scanner	2
4.	Compression gauge	10
5.	Cylinder leakage tester	10
6.	Fuel injection test device	5
7.	Fuel injector pressure tester	5
8.	Glow plug analyzer	10
9.	Smoke diagnostic tool kit	10
10.	Heat gun	10

National Vocational Qualifications Level 2 in Generator Mechanic

11.	Torque wrench	15
12.	Open end spanner set	15
13.	Combination spanner set	15
14.	Ring spanner set	15
15.	Socket box	15
16.	Adjustable screw wrench set	15
17.	Vice grip pliers	15
18.	Universal pliers	15
19.	Nose pliers	15
20.	Combination pliers	15
21.	Inside circlip pliers	15
22.	Outside circlip pliers	15
23.	Bearing puller inside	15
24.	Bearing puller outside	15
25.	Ring installer	15
26.	Ring remover	15
27.	Ridge remover	15
28.	C clamp	15
29.	Ring compressor	15
30.	Hammer set(steel)	15
31.	Hammer set (plastic/rubber)	15
32.	Allen key set	15
33.	Screw driver set (star, flat)	15
34.	Feeler gauge	15
35.	Micrometer	15
36.	Vernier caliper	15
37.	Winding machine	10
38.	Hydrometer	15
39.	Bench vise	10
40.	Hand hacksaw frame	25
41.	Scriber	25
42.	Scraper (triangular & flat)	25 set
43.	Surface gauge	10
44.	Surface plate	10
45.	Air blower	10

National Vocational Qualifications Level 2 in Generator Mechanic

46.	Hand drill machine	10
47.	Oil cane	15
48.	valve re-facer machine	2
49.	Filter chain	25
50.	Oil drain plug spanner	25
51.	Spark plug spanner	25
52.	Hand grinder machine	5
53.	Tap and die set (inch & millimeter)	25 set
54.	Nipple forming set	25
55.	Tri square	25
56.	Hand file set	25
57.	Needle file set	25
58.	Cross cut chisel	25
59.	Flat chisel	25
60.	Round chisel	25
61.	Centre punch	25
62.	Pin punch set	25
63.	Insulation remover	25
64.	Thimble press	25
65.	Funnel	25
66.	Pipe wrench set	10
67.	Portable petrol and diesel generator	5
68.	Label maker (wire, tape, plastic)	10 Dozen
69.	Soldering iron (25W & 100 W)	15
70.	Lifts (scissor, Paper cutter)	25
71.	Air compressor with full accessoires	2
72.	Personale Protective Equipment	25
73.	High voltage gloves, (rubber and leather)	25
74.	Materials safety Data Sheets (MSDS)	25
75.	Temperature sensor	25
76.	Tool box (23 pieces)	25
77.	Tool belt (13 pieces)	25
78.	Silicone gun	25
79.	Heat sensor	25
80.	Oil pressure sensor	25

81.	RPM sensor/magnetic pickup	25
82.	Mallet	25
	Rawhide mallet	25
83.	Battery (200 Ah) and battery charger	2 each
84.	Hydraulic jack (portable, 200kg)	5
85.	AVR	10
86.	Fuel solenoid switch	10
87.	Tool trolley	5
LIST OF CONSUMABLE SUPPLIES		
1.	Spark plug	10 Dozen
2.	Atomizer nozzle	24
3.	Filter (air, oil, fuel, water)	10
4.	Lubricants	5 *4
5.	Overhauling kit	5
6.	Belts different sizes	50
7.	Bearings different sizes	50
8.	Radiator hose pipes	15
9.	Engine alternator foundation	15
10.	Bridge set/diode plates	25
11.	Enamel copper wire different SWG	5 KG each
12.	Insulation paper with different SWG	10 KG each
13.	Varnish	10 liters
14.	Wire sleeves different sizes	100 No. each
15.	Valve lapping stick	25
16.	Emery pastes	10 tin
17.	Emery paper different sizes	25 No. each
18.	Slip rings	10
19.	Carbon brushes different sizes	15 set each
20.	Insulation taps	200.No
21.	Cables (3/29, 7/29,7/36, 4)	300 meter each
22.	Cables (7/44, /7/52,7/64) etc.	300 meter each

National Vocational Qualifications Level 2 in Generator Mechanic

23.	Flexible cable different sizes	200 meter each
24.	Multi core cables different sizes	100meter each
25.	Cotton tap	100 No.
26.	Flexible pipes	10
27.	Circuit breaker different rating	50
28.	Relays	25
29.	Selector switch	25
30.	Bulbs	50
31.	Fuses different rating	50 No. each
32.	Magnetic contactor different rating	5 No. each
33.	Penal box	5
34.	High tension lead	15 set
35.	High tension tap	15 set
36.	Soap	25 No
37.	Detergent etc.	25 No
38.	Cotton waste	10 Dozen

