Technical Education, Vocational and Entrepreneurship Training Authority (TEVETA)

DIPLOMA IN SCIENCE LABORATORY TECHNOLOGY

YEAR II

Physics Techniques II

Record of Practical Assessment

Learner`s Name:_____

Learner`s NRC no.:_____

Learner`s TEVETA No.:_____

Assessment Period:_____

PREFACE

The Technical Education, Vocational and Entrepreneurship Training Authority (TEVETA) is an institution created under the Technical Education, Vocational and Entrepreneurship Training Act Number13 of 1998, as amended by the Technical Education, Vocational and Entrepreneurship Training (Amendment) Act Number 11 of 2005.

The Act among other things provides that TEVETA shall:

(a) regulate and conduct national examinations and assessments relating to technical education, vocational and entrepreneurship training;

(b) charge and collect fees in respect of examinations, assessments and other services provided by the Authority;

(c) award certificates to persons who succeed in examinations and assessments undertaken under this Act

(d) do all such things connected with or incidental to the functions of the Authority under this Act.

Through this mandate, the Assessment and Qualifications Division of TEVETA has developed Practical Assessment Tool Kits to enable learners achieve the competences that are congruent with the demand of the workplace tasks. These tool kits in part are also intended to ensure that similar conditions under which all students in TEVET are assessed and examined apply wherever the course is undertaken in Zambia.

The Trainers shall work with theLearnersto collect evidence of competence, using the benchmarks provided by the unit standards.During the year, the Learners shall be required to undertake a series of practical assessment tasks. It is the sum of all these assessments tasks that deems a Learner to be competent (or not).

This approach to assessment is not a one-off event but one that giveslearners many opportunities to demonstrate skill and allow for the capturing and recording of these demonstrations.

For the Learner to be deemed competent, they must demonstrate competency in every aspect of the practical tasks being undertaken. It must however be understood by the Trainer that Competency does not mean expert. It means that the candidate has attained sufficient skill and knowledge to perform the activity or service to a degree and quality that is acceptable to the industry and the customer in a time within which a competent person at the level could reasonably be expected to perform the task.

While this will be undertaken at institutional level, it is therefore envisaged that the Assessment principles of VALIDITY, RELIABILITY, FAIRENESS and FLEXIBILITY shall at all times be adhered to.

Pre-Assessment

Assessment process explained to the employee (✓ if Yes).	☐
Any appeal relating to the outcome of the assessment or the way in which the assessment was conducted shall be made through the company's *fair treatment policy* as explained to the employee (✓ if Yes).	☐

Employee/Trainee	**Assessor**	
Employee/Trainee name: _____ (Print) Employee/Trainee comments:	Assessor name: _____ (Print) Assessor comments:	
I fully understand the assessment and appeals process.	Theory assessment sighted and checked as satisfactory.	☐
Signature: _____ Date: _____	Signature: _____ Date: _____	

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(unit code) 671 Physics Techniques

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Prepare for the practical assessment

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Work Health and Safety

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Customising the assessment

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Resources required

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Range of variables

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Observation Checklist

1. DEPENDANCE OF RESISTANCE ON LENGTH AND CROSS SECTIONAL AREA	**Satisfactory**			**Not Satisfactory**		
During observation of work activities, the candidate demonstrated that they can:	**Attempt No**			**Attempt No**		
	1	**2**	**3**	**1**	**2**	**3**
a) Determining the dependence of Resistance on length of conductor. This includes - Setting up circuit correctly with 1m Nichrome wire and Ameter in series with another fixed resistor. - Connecting a voltmeter to a jokey and fix at one end of Nichrome wire. - Make the jokey have contact with the wire at four (4) different points. - Each time a contact is made, measure and record voltage, current and length. - Calculating values of resistance. - Drawing graph of Resistance against Length - Stating the mathematical relationship between Resistance and Length. b) Determining the dependence of Resistance on Cross-sectional area. This includes - Connecting circuit correctly with Nichrome wire in series with a fixed resistor. - Connecting the voltmeter across the nichrome wire. - Switching on circuit and measure voltage, current and diameter of Nichrome wire. - Replace with another Nichrome wire of different and measure voltage, current and diameter. - At least four wires of different diameters shall be used. - Calculating the values of Resistance and values of $\frac{1}{Area}$. - Plotting a graph of Resistance against $\frac{1}{Area}$ - Stating the mathematical equation that Connects Resistance and Area. - Combine the two equations and Determining the value of this constant in the combined equation with its units.	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: Trainee:

2. CHARGING AND DISCHARGING OF A CAPACITOR	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	2	1	2	3
a) Verify the time constant of a capacitor by considering its discharge curve. This includes - Setting up circuit correctly with the power supply charging the capacitor through a low value resistor. - When the first ammeter reading is low and constant, flip Switching to second circuit and take current reading of second ammeter every five second. - Plotting a graph of Current against time. - Calculating the gradient. - By comparing with discharge equation find the time constant and its percentage error	☐			☐		

Assessor comments:

Signed: Assessor: _____ Trainee: _____

3. DETERMINING THE TEMPERATURE DEPENDANCE OF RESISTANCE.	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	2	1	2	3
a) Determining the relationship between resistance and temperature of a resistor. This includes - Setting up circuit correctly with the resistor properly placed in a watery bath. - Setting the water bath temperature and record the temperature, voltage and current. - Adjust waterbath temperature and when it stabilizes, record temperature, voltage and current. - Repeat the temperature adjustment and recording until five (5) Settings of data are available and spread over a wide range of temperature. - Plotting a graph of Resistance against Temperature. - From graph Determining gradient and vertical intercept. - By comparison with Resistance – temperature equation, obtain values of R_o and α.	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: _____ Trainee: _____

4. DETERMINATION OF CAPACITIVE REACTANCE IN RC-CIRCUIT	**Satisfactory**			**Not Satisfactory**		
During observation of work activities, the candidate demonstrated that they can:	**Attempt No**			**Attempt No**		
	1	**2**	**2**	**1**	**2**	**3**
a) Determining the Capacitive Reactance in RC circuit. This includes - Setting up circuit correctly with ac voltmeter and ac ammeters correctly. - Setting the functional generator to 50Hz and measure source voltage, capacitor voltage and current correctly. - Repeat with frequency increase of 100Hz or more correctly. - Calculating values of Circuit resistance and $\frac{1}{frequency}$ correctly. - Determining the gradient and vertical intercept correctly. - By comparing with impedance equation, Calculating the values of Capacitance and fixed resistor correctly. - Calculating percentage error in your values correctly.	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: _____ Trainee: _____

5. DETERMINATION OF INDUCTIVE REACTANCE IN RL-CIRCUIT	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	2	1	2	3
a) Determining the Inductive Reactance in Rl circuit. This includes - Setting up circuit correctly with ac voltmeter and ac ammeters correctly. - Setting the functional generator to 50Hz and measure source voltage, capacitor voltage and current correctly. - Repeat with frequency increase of 100Hz or more correctly. - Calculating values of Circuit resistance correctly. - Determining the gradient and vertical intercept correctly. - By comparing with impedance equation, Calculating the values of Inductance and fixed resistor correctly. - Calculating percentage error in your values correctly..	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: _____ Trainee: _____

6. DETERMINING WAVEFORMS OF RECTIFICATION CIRCUITS	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	2	1	2	3
a) Determining the output wave of Half-wave rectifier. This includes - Connecting the circuit correctly. - Connecting the Dual Channel Oscilloscope to both input and output terminals of circuit correctly. - By adjusting the time-base and voltage Settingtings for both channels correctly, view both waveform on the Oscilloscope. - Drawing the wave forms for both input and output correctly. b) Determining the output wave of Full-wave rectifier. This includes - Connecting the circuit correctly. - Connecting the Dual Channel Oscilloscope to both input and output terminals of circuit correctly. - By adjusting the time-base and voltage Settings for both channels correctly, view both waveform on the Oscilloscope. - Drawing the wave forms for both input and output correctly.	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: Trainee:

7. DETERMINATION OF TRANSISTOR SWITCHINGING VOLTAGE	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	2	1	2	3
a) Determining experimentally the base Switchinging of the transistor. This includes - Connecting the circuit correctly. - Adjusting the variable resistor correctly. - Recording the base voltage at which the LED on the collector terminal comes on. - Suggesting circuit types that can apply the transistor as a Switching.	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: _____ Trainee: _____

8. RC COUPLED TRANSISTOR AMPLIFIER	**Satisfactory**			**Not Satisfactory**		
During observation of work activities, the candidate demonstrated that they can:	**Attempt No**			**Attempt No**		
	1	**2**	**2**	**1**	**2**	**3**
a) Build an RC coupled transistor amplifier and test its operation. This includes - Connecting the circuit correctly. - Connecting the signal tracking cables from the Oscilloscope correctly. - Feeding in a signal from a Signal Generator and monitor input and output correctly. - Drawing both input and output signals correctly. - Scanning the frequency range of the amplifier correctly.	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: _____ Trainee: _____

9. OPERATIONAL AMPLIFIER AS INVERTING AMPLIFIER	Satisfactory			Not Satisfactory		
During observation of work activities, the candidate demonstrated that they can:	Attempt No			Attempt No		
	1	2	2	1	2	3
a) Build, Test and Operate an Op-Amp based Inverting Amplifier. This includes - Drawing a correct design of Inverting Op-Amp amplifier. - Setting up circuit correctly with both input and output terminals tracked by oscilloscope. - Feeding input with signal generator correctly. - Drawing the input and output signals in real time correctly. - Stating on use of the op-amp amplifier in this mode.	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: _____ Trainee: _____

10. OPERATIONAL AMPLIFIER AS DIFFERENTIAL AMPLIFIER	**Satisfactory**			**Not Satisfactory**		
During observation of work activities, the candidate demonstrated that they can:	**Attempt No**			**Attempt No**		
	1	**2**	**2**	**1**	**2**	**3**
a) Build, Test and Operate an Op-Amp based Differential Amplifier. This includes - Drawing a correct design of Differential Op-Amp amplifier. - Setting up circuit correctly with both input and output terminals tracked by oscilloscope. - Feeding input with signal generator correctly. - Drawing the input and output signals in real time correctly. - Stating on use of the op-amp amplifier in this mode.	☐	☐	☐	☐	☐	☐

Assessor comments:

Signed: Assessor: _____ Trainee: _____

Final Assessment Summary

Note: refer to mapping document if required

Practical assessment summary		Satisfactory	Not Satisfactory
1.	Dependence Of Resistance On Length And Cross Sectional Area	☐	☐
2.	Charging And Discharging Of Discharging Of A Capacitor	☐	☐
3.	Determining The Temperature Dependence Of Resistance	☐	☐
4.	Determination Of Capacitive Reactance In RC-Circuits	☐	☐
5.	Determination Of Inductive Reactance In RL Circuits	☐	☐
6.	Determining Waveforms Of Rectification Circuits	☐	☐
7.	Determination Of Transistor Switchinging Voltage	☐	☐
8.	RC Coupled Transistor Amplifier	☐	☐
9.	Operational Amplifier As Inverting Amplifier	☐	☐
10.	Operational Amplifier As Differential Amplifier		

Assessor comments:

Signed: Assessor: Trainee:

Assessment Outcome

Satisfactory ☐

Not Satisfactory ☐

Employee/Trainee	**Assessor**
Employee/Trainee name: _____ (Print)	Assessor name: _____ (Print)
Employee/Trainee comments:	**Assessor comments:**
Signature: _____ Date: _____	Signature: _____ Date: _____

VALIDATION OF THE ASSESSMENT

NAME:…….. DATE:……..

POSITION: **PRINCIPAL/HEAD OF INSTITUTION** SIGNATURE:……..

NAME INSTITUTION:…….

STAMP: