



Technical, Entrepreneurship and Vocational Education and Training Authority (TEVETA)

TRADE TEST LEVEL I IN ELECTRICAL ENGINEERING (YEAR 1)

Record of Practical Assessment

Learner`s name: _____

Learner`s NRC no.: _____

Learner`s TEVETA No.: _____

Institution Name: _____

Institution TVA 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 Number 13 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 the Learners to 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 gives learners 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 Trainee (✓ 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 TEVETA <u><i>fair treatment policy</i></u> as explained to the Trainee (✓ if Yes).	☐

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

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TASK 1: APPLICATION SAFETY MEASURES

No	Activity	Satisfactory			Not satisfactory		
		Attempts			Attempts		
During observation of work activities, the candidate demonstrated that they can:		1st	2 nd	3 rd	1st	2 nd	3 rd
	a) Safety precautions to be observed and this should include: • Carrying sharp edged tools • Storage of tools/materials • Use correct tools • Keeping the environment clean • Put on dust coat or work suit • Put on safety boots • Roll up your sleeves • Maintain short hair cut • Hanging tie, bungles and wrist watches not allowed	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

Signed:.....

Signed:.....

Date:.....

Date:.....

Task 2: APPLICATION FASTENING METHODS

No	Activity	Satisfactory			Not satisfactory		
		Attempts			Attempts		
During observation of work activities, the candidate demonstrated that they can:		1st	2 nd	3 rd	1st	2 nd	3 rd
	a) Apply fastening methods and this should include: • Soldering of married joints • Welding of T-joints • Cramping of tail joints • Bolting of joints	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

Signed:.....

Signed:.....

Date:.....

Date:.....

Task 2: materials specifications

1. Soldering wire
2. soldering powder
3. welding rods
4. bolts
5. nuts
6. cables

Task 2: Tools specifications

1. welding machine
2. climping tool
3. pliers
4. cutter
5. spanner
6. adjustable spanner
7. hammer

TASK 3: IDENTIFICATION OF HAND TOOLS

No	Activity	Satisfactory			Not satisfactory		
		Attempts			Attempts		
During observation of work activities, the candidate demonstrated that they can:		1st	2 nd	3 rd	1st	2 nd	3 rd
	a) Identify hand tools and this should include • Screwdriver • Hand files • Pliers • Types of chisels • Hammers • Snipes • Fischer wire • Hacksaws • Stripping • Conduit benders • Cramping tools	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

Signed:.....

Signed:.....

Date:.....

Date:.....

TASK 4: IDENTIFICATION OF MEASURING INSTRUMENTS AND MARKING TOOLS

No	Activity	Satisfactory			Not satisfactory		
		Attempts			Attempts		
During observation of work activities, the candidate demonstrated that they can:		1st	2 nd	3 rd	1st	2 nd	3 rd
	Identify measuring instruments and marking tools and this should include • Spirit level • Measuring tape • Wire gauge • Scriber • Steel rule • Center punch • Compass • Caliper • Micrometer screw gauge • Megger • Multi-meter	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

Signed:.....

Signed:.....

Date:.....

Date:.....

TASK 5: IDENTIFICATION OF DOMESTIC WIRING ACCESSORIES COMPONENTS

No	Activity	Satisfactory			Not satisfactory		
		Attempts			Attempts		
	During observation of work activities, the candidate demonstrated that they can:	1st	2nd	3rd	1st	2nd	3rd
	Identify domestic wiring accessories and this should include • Switches (1G1W, 1G2W, 2G2W, 2G1W, 3G1W, intermediate switch, pull switch, dimmer switch) • Socket outlets (single and Double) • Cooker control unit (3 x 6", 6 x 6") • Geyser switch • Cooker control unit (3 x 6", 6 x 6") • Geyser switch • Lamps (Pin type, Screw type, Fluorescent tube, Sodium vapour lamp, Mercury vapour lamp) • Protective devices (fuse and circuit breaker) • Supply mains intake position • Signalling devices (Siren, Bell) • Layout diagram or site plan read correctly • Material required estimated correctly according to the electrical site plan.	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

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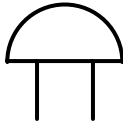
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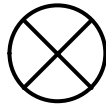
BASIC DOMESTIC SCHEMATIC (INSTALLATION) SYMBOLS

Main control or intake point		Single-pole, one-way switch <i>Note: Number of switches at one point may be indicated</i>	
Main or sub-main switch		Two-pole, one-way switch	
Socket outlet (mains) general symbol		Three-pole, one-way switch	
Switched socket outlet		Cord-operated single-pole one-way switch	
Socket outlet with pilot lamp		Two-way switch	
Multiple socket outlet Example: for 3 plugs		Intermediate switch	
Push button		Lighting point or lamp: general symbol <i>Note: The number, power and type of the light source could be specified</i>	
Luminous push button		Example: Three 40 watt lamps	
Electric bell: general symbol		Lamp or lighting point: wall mounted	
Electric buzzer: general symbol		Emergency (safety) lighting point	
Time switch		Lighting point with built in switch	
Automatic fire detector		Projector or lamp with reflector	
		Spotlight	
		Single fluorescent lamp	

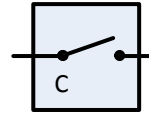
Bell



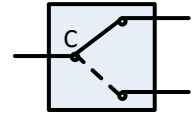
Lamp



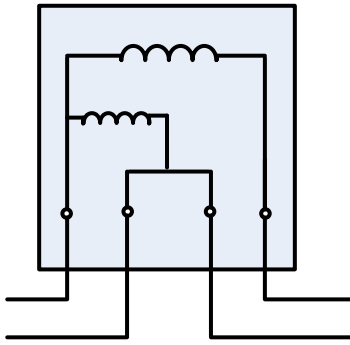
1G1W Switch



1G2W Switch



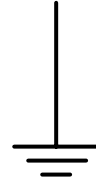
Energy Meter



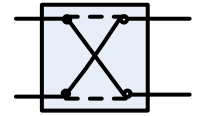
Circuit Breaker



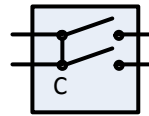
Earth



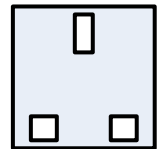
Intermediate Switch



2G1W Switch



Single socket



TASK 6: IDENTIFICATION OF DOMESTIC WIRING ACCESSORIES SYMBOLS

No	Activity	Satisfactory			Not satisfactory		
		Attempts			Attempts		
	During observation of work activities, the candidate demonstrated that they can:	1st	2nd	3rd	1st	2nd	3rd
	a) Identify domestic wiring accessories and this should include • Switches (1G1W, 1G2W, 2G2W, 2G1W, 3G1W, intermediate switch, pull switch, dimmer switch) • Socket outlets (single and Double) • Cooker control unit (3 x 6", 6 x 6") • Geyser switch • Cooker control unit (3 x 6", 6 x 6") • Geyser switch • Lamps (Pin type, Screw type, Fluorescent tube, Sodium vapour lamp, Mercury vapour lamp) • Protective devices (fuse and circuit breaker) • Supply mains intake position • Signalling devices (Siren, Bell) • Layout diagram or site plan read correctly • Material required estimated correctly according to the electrical site plan.	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

Signed:.....

Signed:.....

Date:.....

Date:.....

TASK 7: INTERPRETING DOMESTIC ELECTRICAL DRAWING SYMBOLS

No	Activity	Satisfactory			Not satisfactory		
		Attempts			Attempts		
	During observation of work activities, the candidate demonstrated that they can:	1st	2nd	3rd	1st	2nd	3rd
	Interpret domestic electrical drawing symbols and this should include : • Switches (1G1W, 1G2W, 2G2W, 2G1W, 3G1W, intermediate switch, pull switch, dimmer switch) • Socket outlets (single and Double) • Cooker control unit (3 x 6", 6 x 6") • Geyser switch • Cooker control unit (3 x 6", 6 x 6") • Geyser switch • Lamps (Pin type, Screw type, Fluorescent tube, Sodium vapour lamp, Mercury vapour lamp) • Protective devices (fuse and circuit breaker) • Supply mains intake position • Signalling devices (Siren, Bell) • Layout diagram or site plan read correctly • Material required estimated correctly according to the electrical site plan.	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

Signed:.....

Signed:.....

Date:.....

Date:.....

TASK 8: CARRYING OUT CONDUIT WORKS

No	Activity	Satisfactory			Not satisfactory		
		Attempts			Attempts		
During observation of work activities, the candidate demonstrated that they can		1st	2nd	3rd	1st	2nd	3rd
	a) Carry out conduit works and this should include: • Install and terminate conduit pipes correctly using couplings, female and male bushes • Make 90° bends without kinks • Make offsets, bushes and couplings • Fix saddles • Prepare the wall for installation of conduit pipes ▪ Wall chiselled ▪ Wall plugs installed ▪ Use of Grinding machine ▪ Use of Drilling machine • Use Spirit level for positioning • Plaster wall according to the required standard	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

Signed:.....

Signed:.....

Date:.....

Date:.....

TASK 9: MATERIALS

1. 20mm²PVC conduit pipe
2. 20mm² PVC male and female bushes
3. Saddles
4. Round looping boxes
5. 90° bend PVC
6. Plugs
7. Drilling machine
8. Spirit level
9. Chisel
10. Hammer
11. tape

TASK 9: MOUNTING OF THE ELECTRICAL METER BOX

No	Activity	Satisfactory			Not satisfactory		
		Attempts			Attempts		
During observation of work activities, the candidate demonstrated that they can:		1st	2 nd	3 rd	1st	2 nd	3 rd
	a) Mount an electrical meter box Install the meter box to the required specification and this should include - Energy meter 60A MCB - Lightning arrester Install earthing and this should include - Earth pit - Earth rod - charcoal - salt	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

Signed:.....

Signed:.....

Date:.....

Date:.....

TASK 10: MATERIALS

1. 1 X 5A MCB
2. 1 X OVERLOAD RELAY
3. Energy meter
4. 60A MCB
5. Lightning arrester
6. Earth rod
7. charcoal

TASK 10: MOUNTING OF THE DISTRIBUTION BOX

No	Activity	Satisfactory			Not satisfactory		
		Attempts			Attempts		
	During observation of work activities, the candidate demonstrated that they can	1st	2 nd	3 rd	1st	2 nd	3 rd
	Mount a distribution box and this should include: - meter box - distribution box 60A MCB mains 30A MCB cooker 30A MCB gyser 15A MCB socket outlets 5A MCB lighting - Neutral block - Earth block	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

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Date:.....

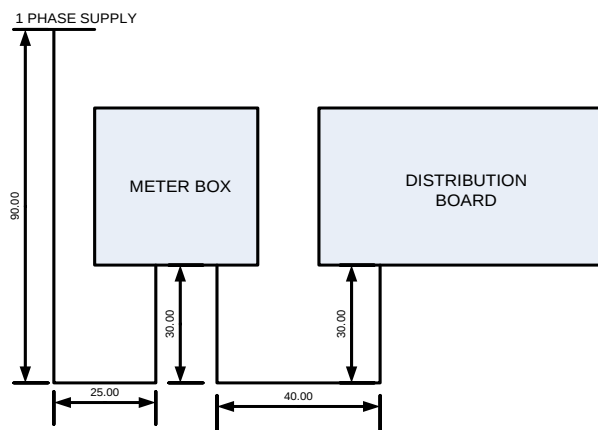
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TASK 10: MATERIAL SPECIFICATIONS

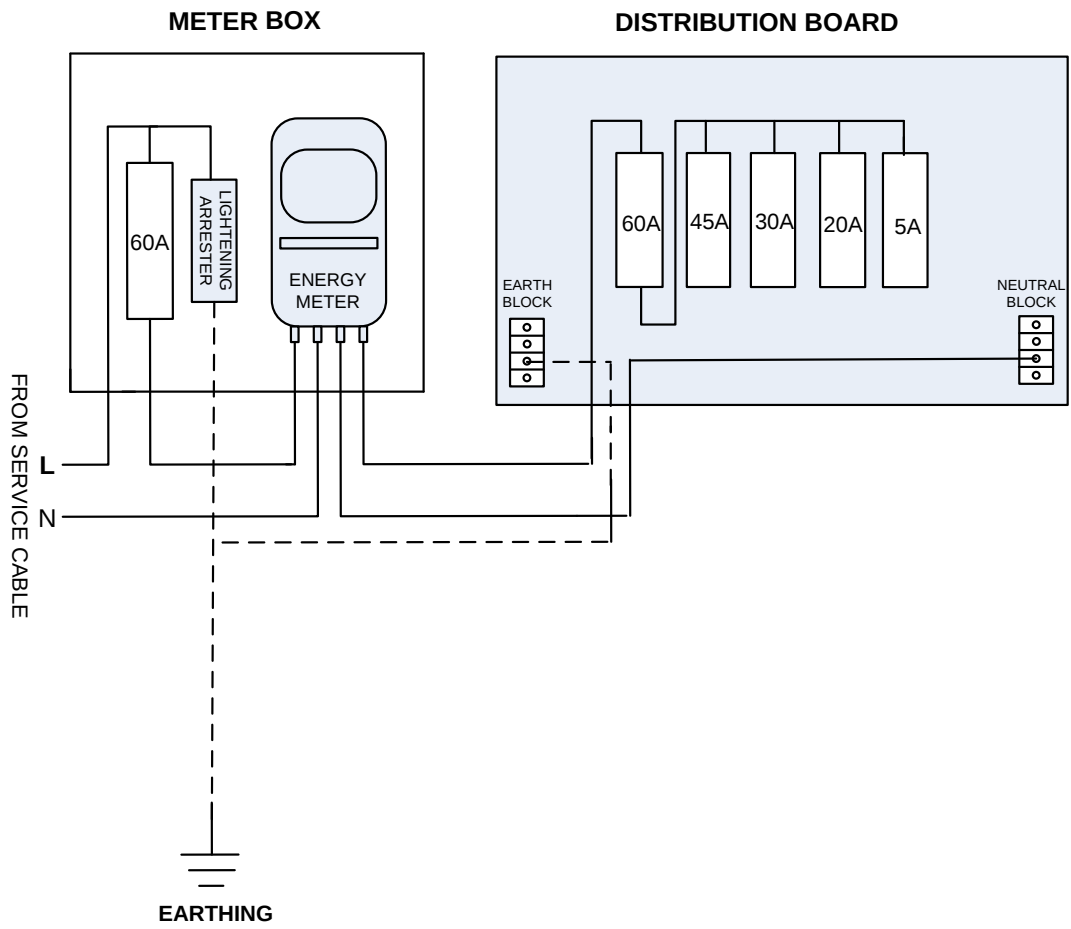
1. 1 x 60A MCB
2. 2 x 30A MCB
3. 1 x 15A MCB
4. 1 x 5A MCB
5. 1 X Neutral block
6. 1 x Earth block

WIRING OF METER BOX AND DISTRIBUTION BOX

LAYOUT DIAGRAM



NOTE: ALL DIMENSIONS ARE IN CM



TASK 11: INSTALLATION OF LIGHTING CIRCUITS

No	Activity	Satisfactory Attempts			Not satisfactory Attempts		
		1st	2nd	3rd	1st	2nd	3rd
During observation of work activities, the candidate demonstrated that they can:							
	a) Install a one way lighting circuit according to layout and wiring diagram and this should include ▪ Correct cable size used ▪ Correct MCB rating used ▪ Correct switch ▪ Lamp holder ▪ Bulb • Carry out polarity test • Carry out continuity test • Carry out insulation resistance test	☐	☐	☐	☐	☐	☐
	b) Install a two way lighting circuit according to layout and wiring diagram and this should include ▪ Correct cable size used ▪ Correct MCB rating used ▪ Two 2-way switches ▪ Lamp holder ▪ Bulb • Carry out polarity test • Carry out continuity test • Carry out insulation resistance test	☐	☐	☐	☐	☐	☐

	c) Install an intermediate lighting circuit according to layout and wiring diagram and this should include ▪ Correct cable size used ▪ Correct MCB rating used ▪ Two 2-way switches ▪ Intermediate switch ▪ Lamp holder ▪ Bulb • Carry out polarity test • Carry out continuity test • Carry out insulation resistance test	☐	☐	☐	☐	☐	☐
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Examiner's comments:

Examiner Name:.....

Learner's Name:.....

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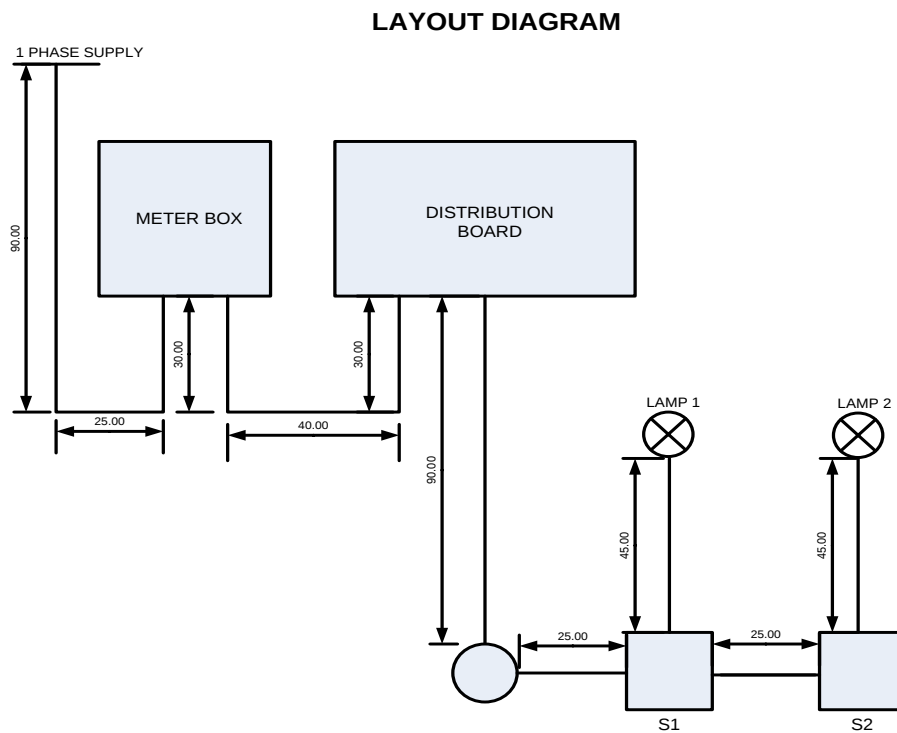
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TASK11A: MATERIAL SPECIFICATIONS:

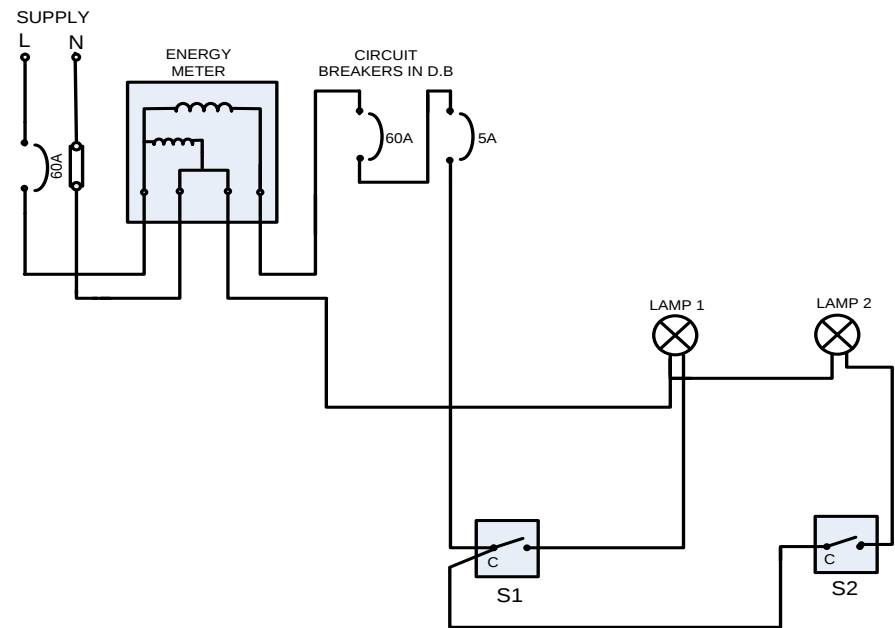
1. 1x5A MCB
2. 1.5mm² red and black
3. 1x1G1W switch
4. 1xLamp

a) ONE WAY LIGHTING CIRCUIT



NOTE: ALL DIMENSIONS ARE IN CM

WIRING DIAGRAM

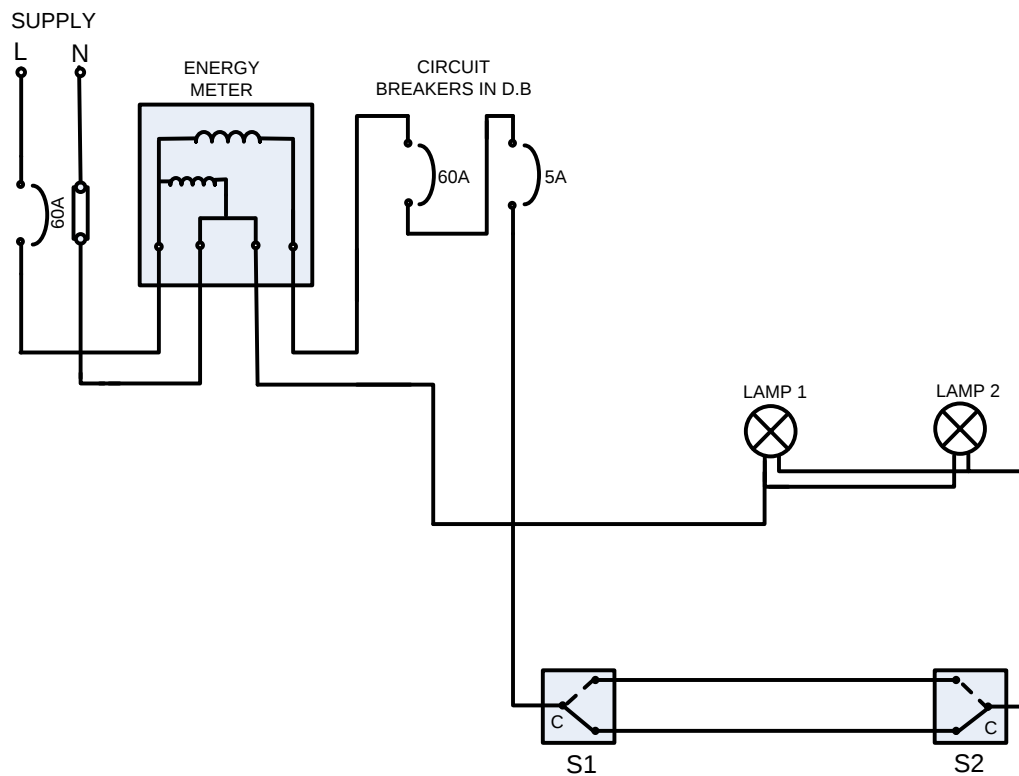


TASK11b: MATERIAL SPECIFICATIONS:

1. 1x5A MCB
2. 1.5mm² red and black
3. 1x1G2W switch
4. 1xLamp

TWO WAY LIGHTING CIRCUIT

WIRING DIAGRAM

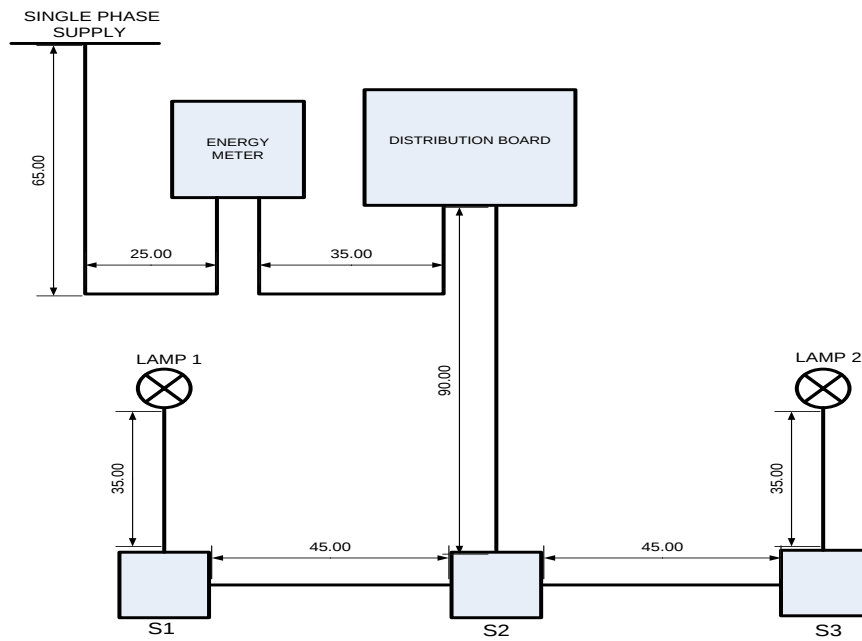


TASK 11 C: MATERIAL LIST:

1. 1x5A MCB
2. 1.5mm² red and black
3. 2x1G2W switch
4. Intermediate switch
5. 1xLamp
6. multimeter

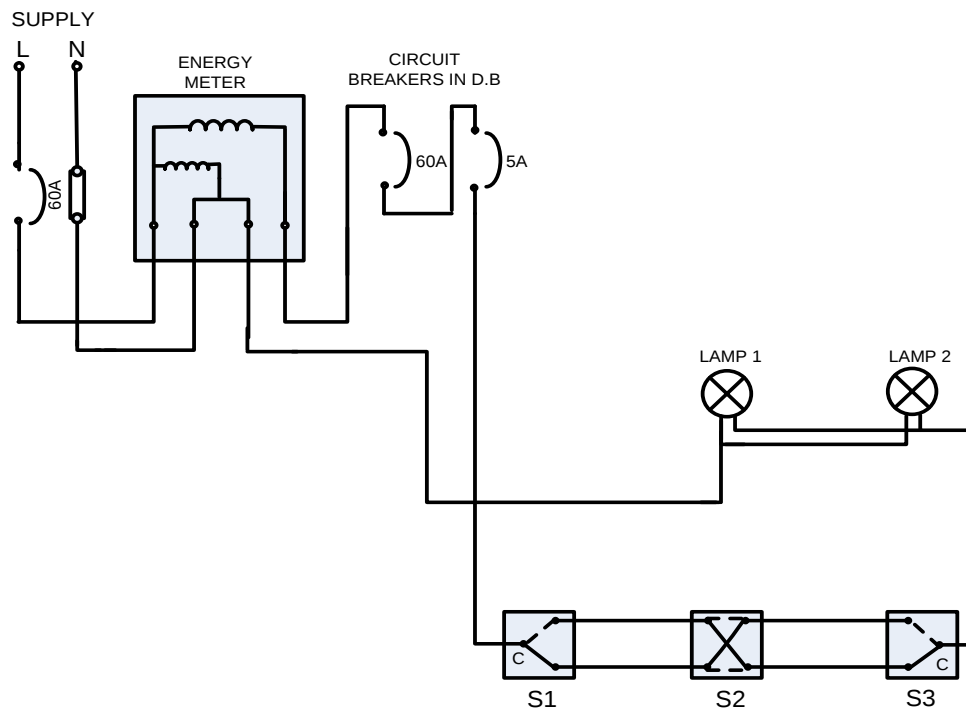
INTERMEDIATE CIRCUIT

LAYOUT DIAGRAM



NOTE: ALL DIMENSIONS ARE IN CM

WIRING DIAGRAM



TASK 12: INSTALLATION OF SOCKET OUTLET CIRCUIT

No	Activity	Satisfactory Attempts			Not satisfactory Attempts		
		1st	2nd	3rd	1st	2nd	3rd
During observation of work activities, the candidate demonstrated that they can:							
	a) Install radial socket outlets circuit according to layout and wiring diagram and this should include: ▪ Correct cable size used ▪ Correct MCB rating used ▪ Correct socket outlets • Carry out polarity test • Carry out continuity test • Carry out insulation resistance test	☐	☐	☐	☐	☐	☐
	b) Install ring socket outlets circuit correctly according to layout and wiring diagram and this should include: ▪ Correct cable size used ▪ Correct MCB rating used ▪ Socket outlets	☐	☐	☐	☐	☐	☐
	(c)Carry out tests and this should include • polarity • continuity • insulation resistance	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

Signed:.....

Signed:.....

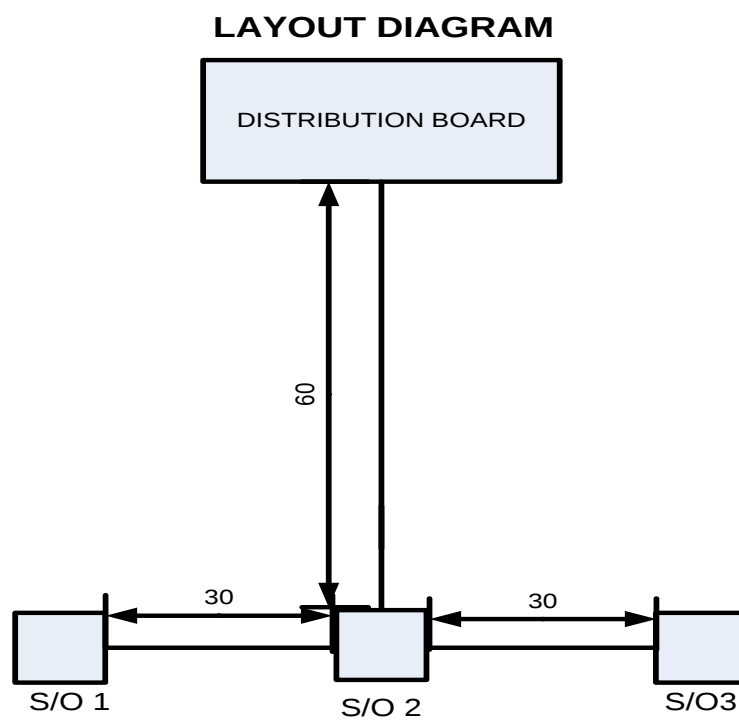
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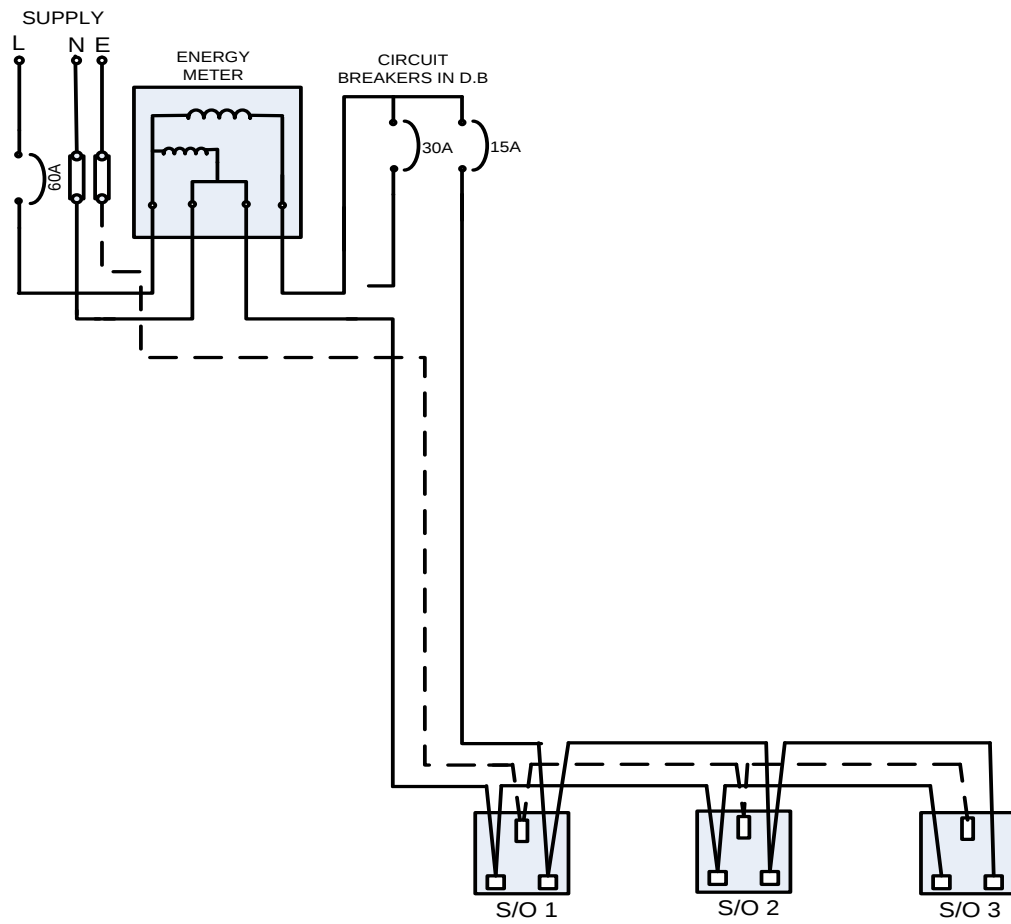
TASK12A: MATERIAL SPECIFICATIONS::

1. 1x15A MCB
2. 2.5mm² red, black and green
3. Socket outlets
4. multimeter

a) RADIAL SOCKET OUTLET CIRCUIT



WIRING DIAGRAM

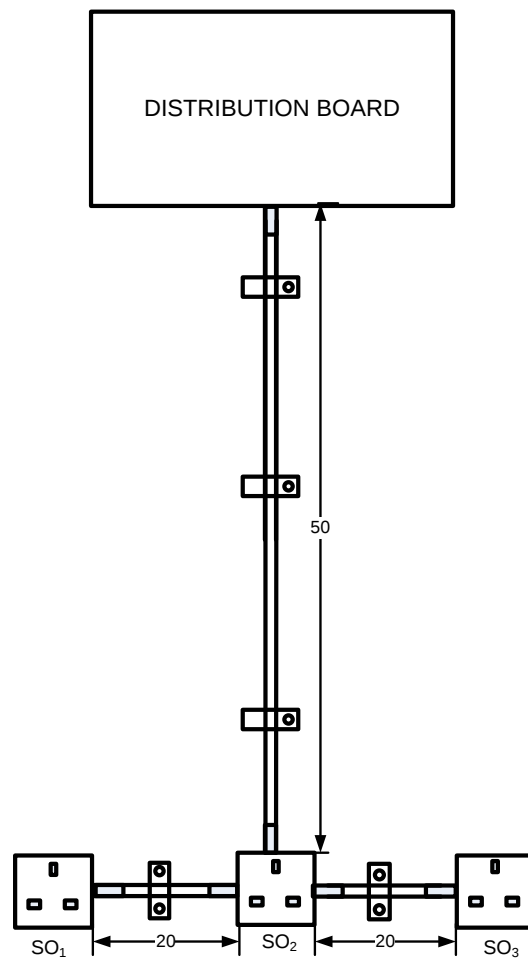


TASK12b: MATERIAL LIST:

1. 1x15A MCB
2. 2.5mm² red, black and green
3. Socket outlets
4. multimeter

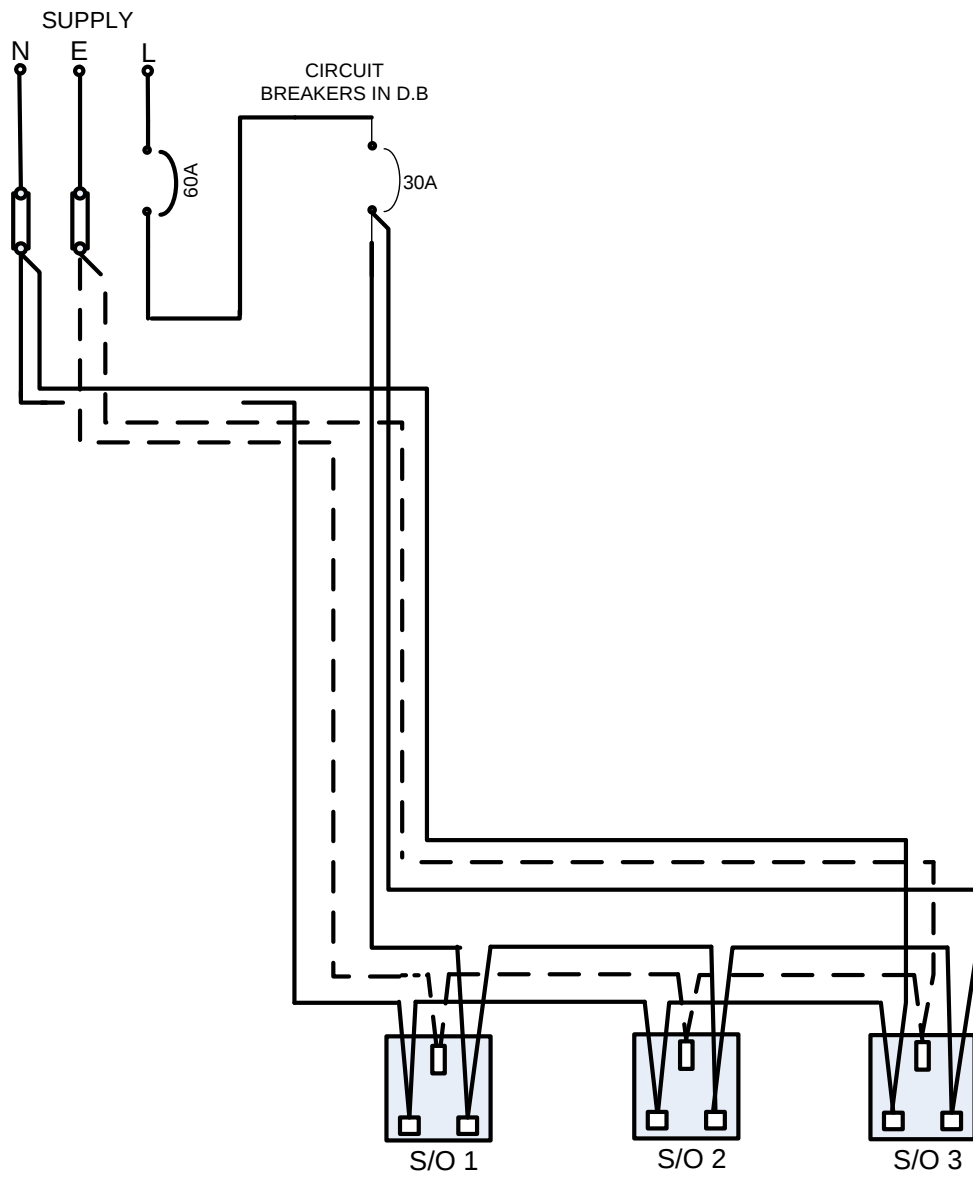
b) RING SOCKET OUTLET CIRCUIT

LAYOUT DIAGRAM



NB: All dimensions are in centimetres and not according to scale

WIRING DIAGRAM



TASK 13: INSTALLATION OF GEYSER AND COOKER CONTROL UNIT CIRCUIT

No	Activity	Satisfactory Attempts			Not satisfactory Attempts		
		1st	2nd	3rd	1st	2nd	3rd
During observation of work activities, the candidate demonstrated that they can:							
	c) Install geyser circuit according to layout and wiring diagram and this should include ▪ Correct cable size used ▪ Correct MCB rating used ▪ Geyser switch • Carry out polarity test • Carry out continuity test • Carry out insulation resistance test	☐	☐	☐	☐	☐	☐
	b) Install cooker control unit circuit according to layout and wiring diagram and this should include ▪ Correct cable size used ▪ Correct MCB rating used ▪ Cooker control unit	☐	☐	☐	☐	☐	☐
	(c) Carry out tests and this should include ▪ polarity ▪ continuity ▪ insulation resistance	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner`s Name:.....

Signed:.....

Signed:.....

Date:.....

Date:.....

TASK 14: INSTALLATION OF GEYSER AND COOKER CONTROL UNIT CIRCUIT

No	Activity	Satisfactory			Not satisfactory		
		Attempts			Attempts		
	During observation of work activities, the candidate demonstrated that they can:	1st	2nd	3rd	1st	2nd	3rd
	Install geyser circuit correctly according to layout and wiring diagram and this should include ▪ Correct cable size used ▪ Correct MCB rating used ▪ Geyser switch • Carry out polarity test • Carry out continuity test • Carry out insulation resistance test Install cooker control unit circuit according to layout and wiring diagram ▪ Correct cable size used ▪ Correct MCB rating used ▪ Cooker control unit • Carry out polarity test • Carry out continuity test • Carry out insulation resistance test	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

Signed:.....

Signed:.....

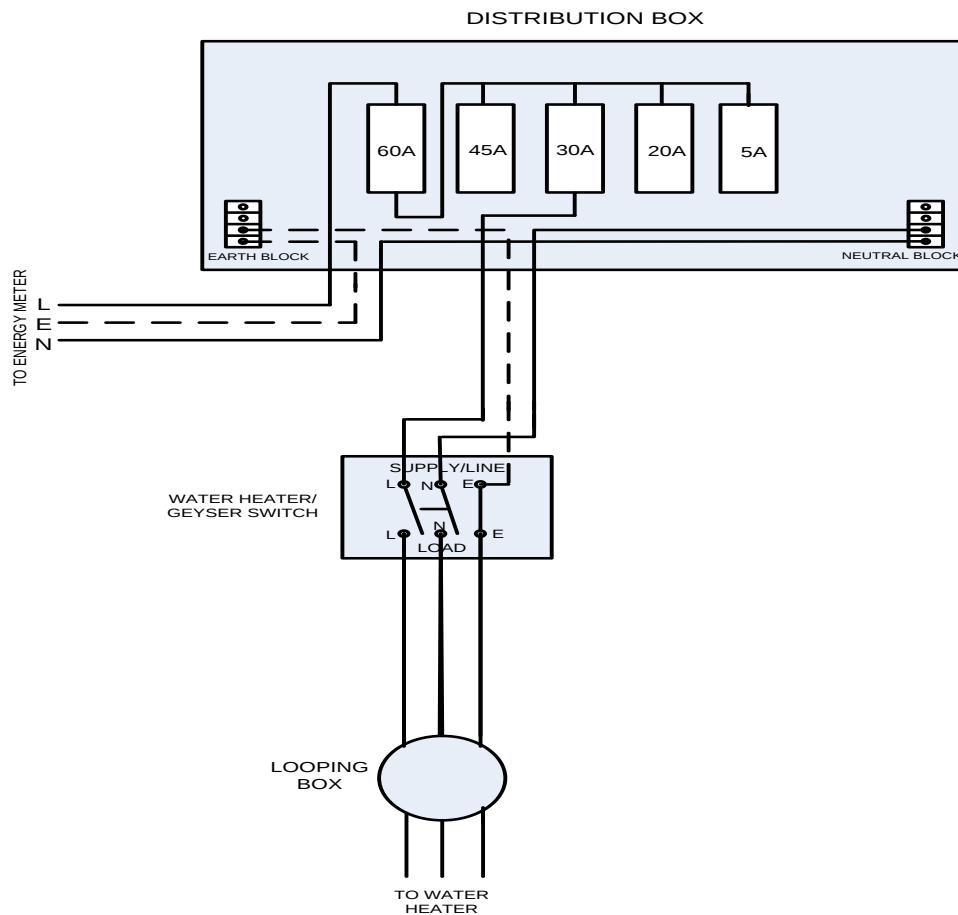
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TASK14A: MATERIAL LIST:

1. 1x30A MCB
2. 4mm² red, black and green
3. geyser
4. multimeter

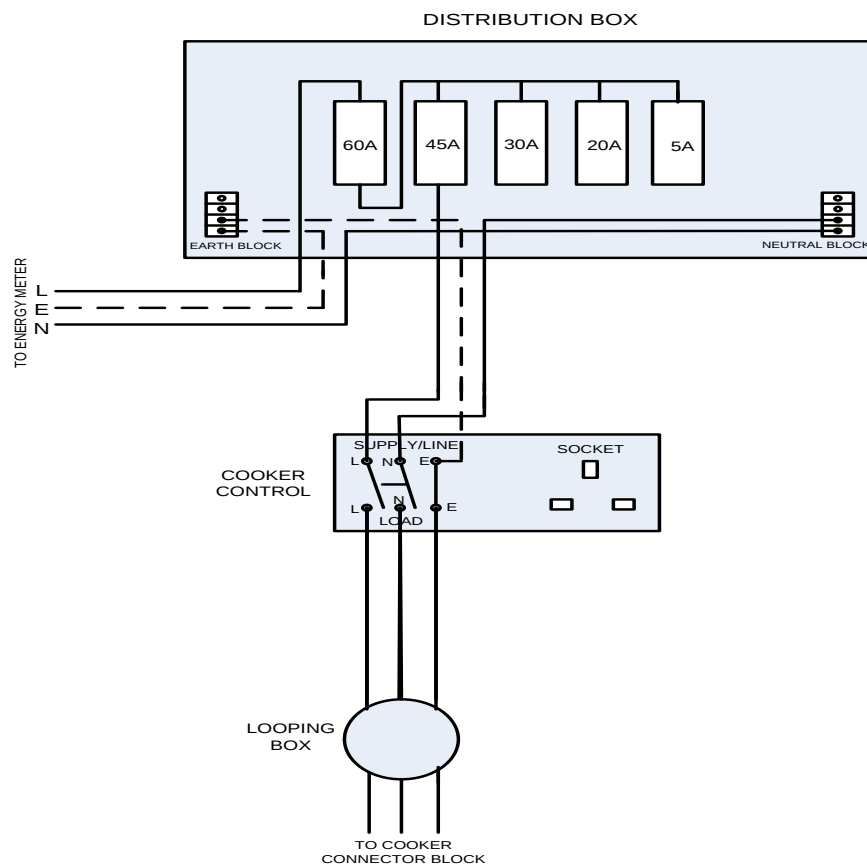
a) GEYSER CIRCUIT



TASK 14b: MATERIAL SPECIFICATION:

1. 1x45A MCB
2. 4mm² red, black and green
3. Cooker control unit
4. Multimeter

b) COOKER CONTROL UNIT CIRCUIT

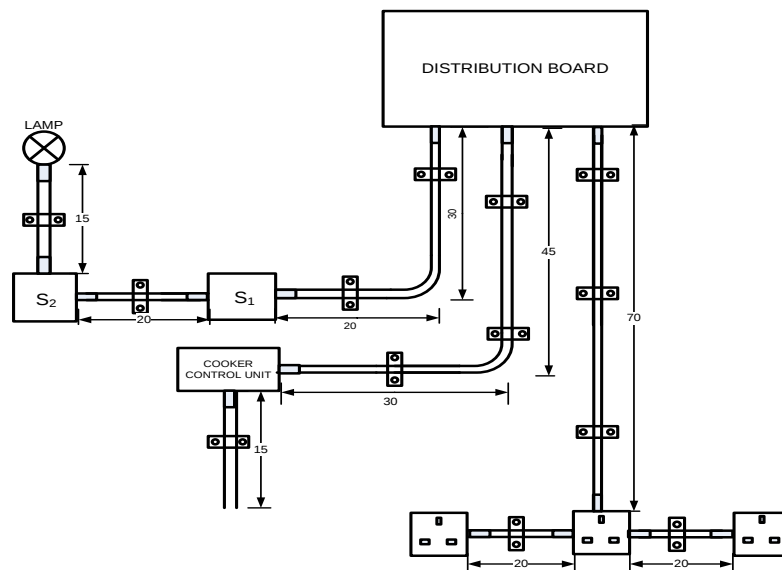


TASK14c: MATERIAL SPECIFICATIONS:

1. 1x60A MCB
2. 2x30A MCB
3. 5A MCB
4. 2x1G2W
5. 1xcooker control unit
6. 3xsocket outlet
7. Lamps
8. 1xneutral block
9. 1xearth block
10. 1.5mm² red and black
11. 2.5mm² red, black and green
12. 4mm² red, black and green
13. Multi-meter

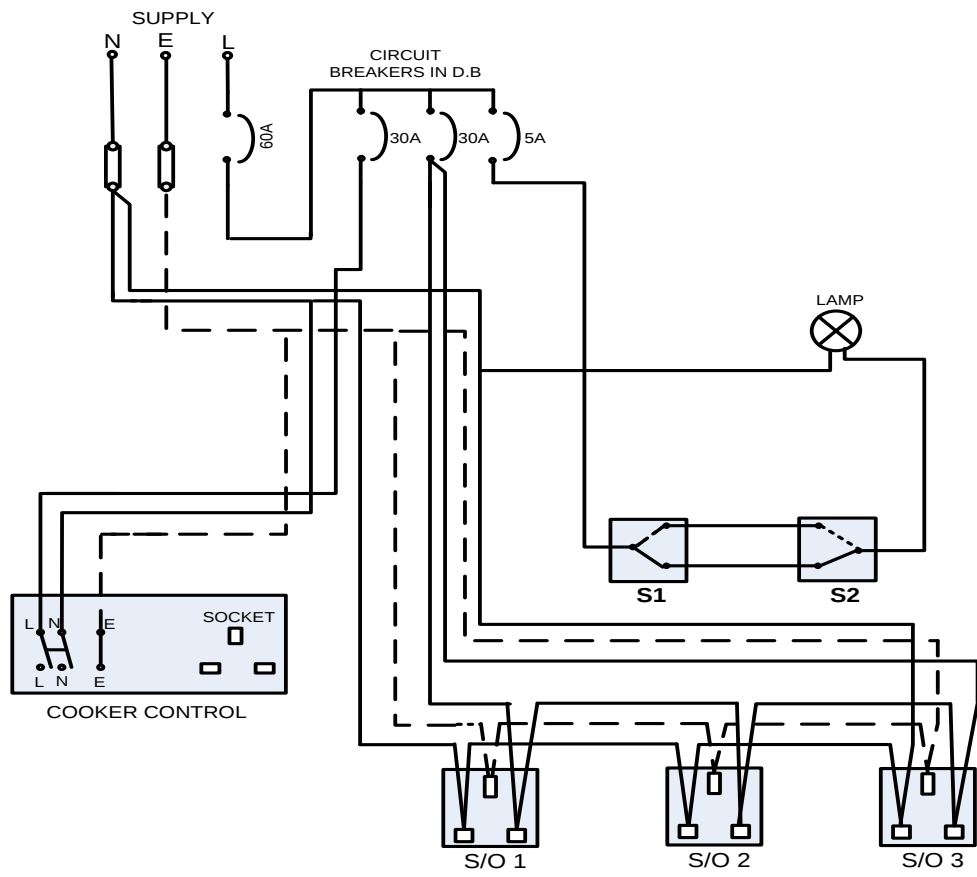
(C) PRACTICAL INCORPORATING THE WIRING OF LIGHTING, SOCKET OUTLETS AND COOKER CONTROL UNIT

LAYOUT DIAGRAM



NB: All dimensions are in centimetres and not according to scale

CIRCUIT DIAGRAM



TASK 15: EARTHING OF INSTALLATION

No	Activity	Satisfactory			Not satisfactory		
		Attempts			Attempts		
	During observation of work activities, the candidate demonstrated that they can:	1st	2nd	3rd	1st	2nd	3rd
	a) Install earthing correctly and this should include - Digging earth pit - Identifying and applying the earth electrode (rod, plate or mat, tape or strip) - Putting alternate layers of charcoal and salt correctly - Using correct cable size	☐	☐	☐	☐	☐	☐
	b) Earthing method carried out according to layout and wiring diagram and this should include - Correct cable size used - T.T earthing - TNC-S or protective or multiple earthing (PME)	☐	☐	☐	☐	☐	☐
	(c) Carry out tests and this should include - polarity test - continuity test - insulation resistance test	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

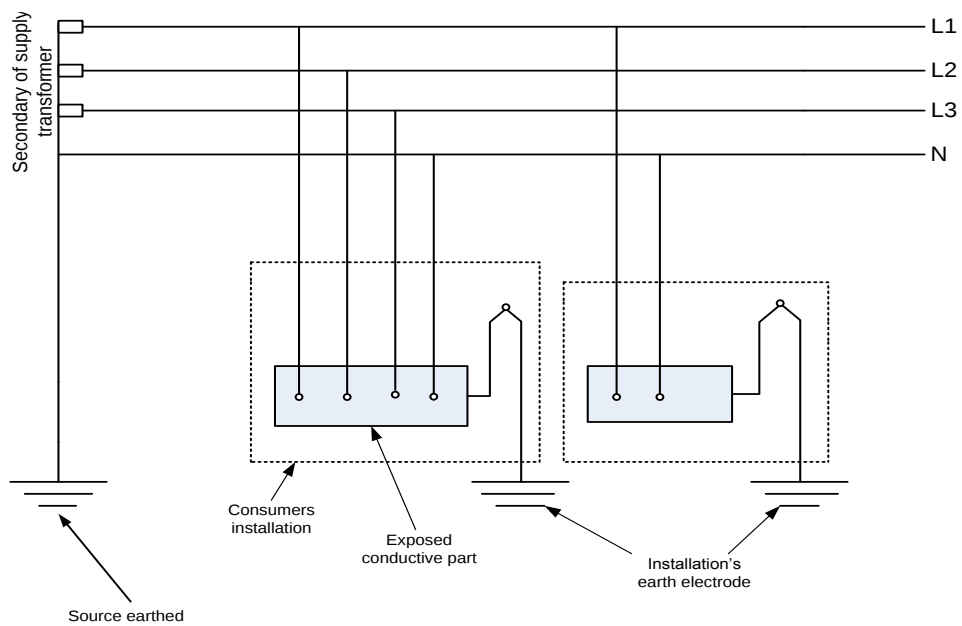
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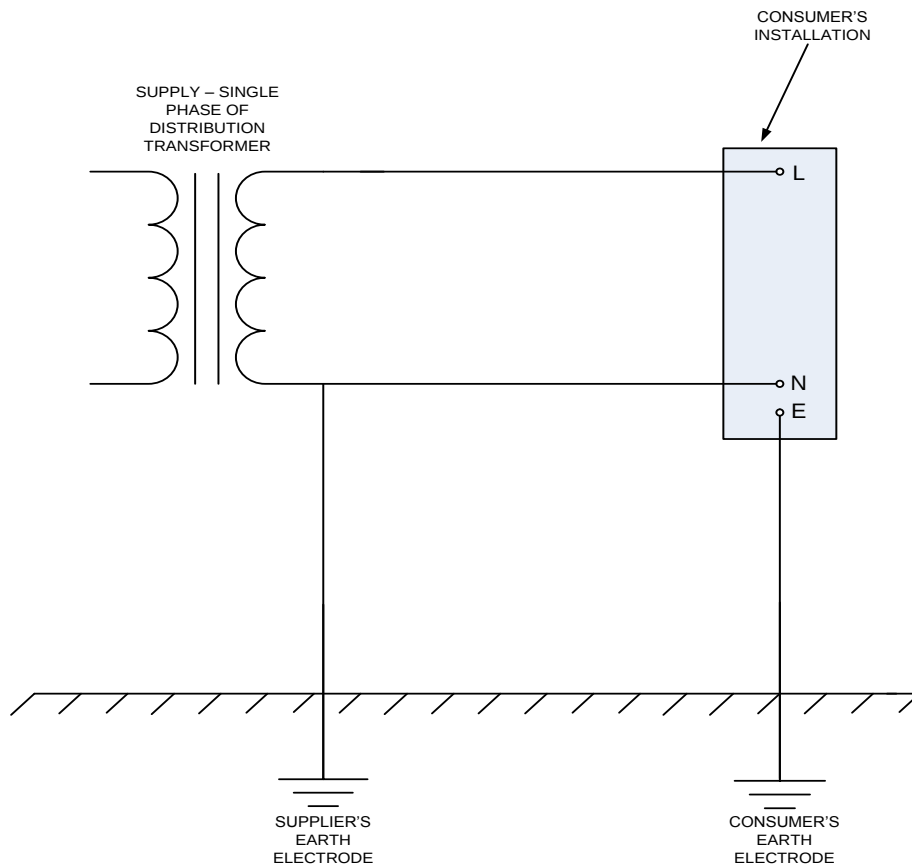
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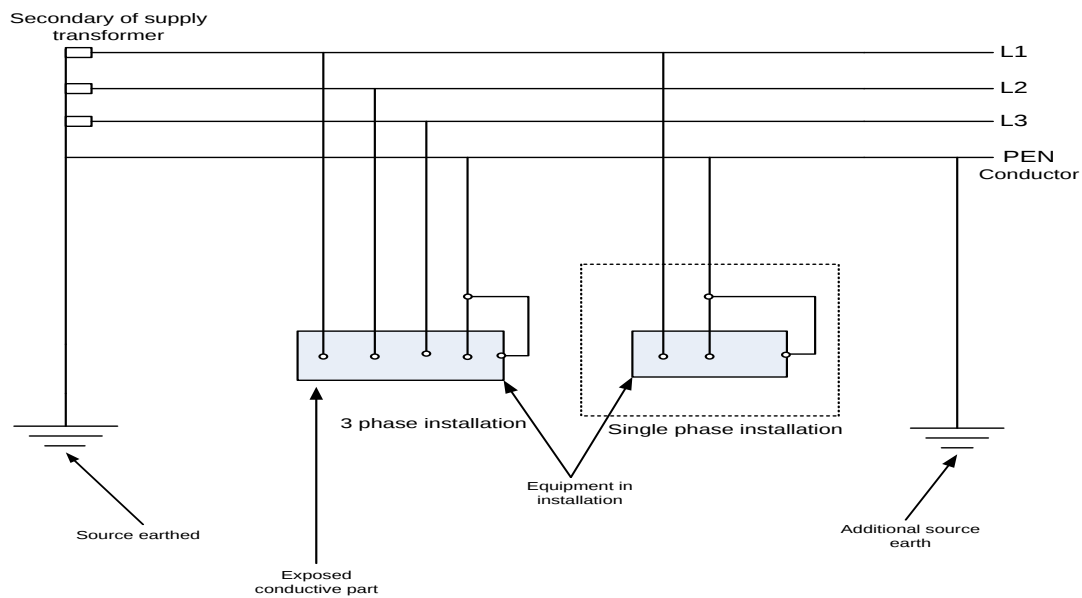
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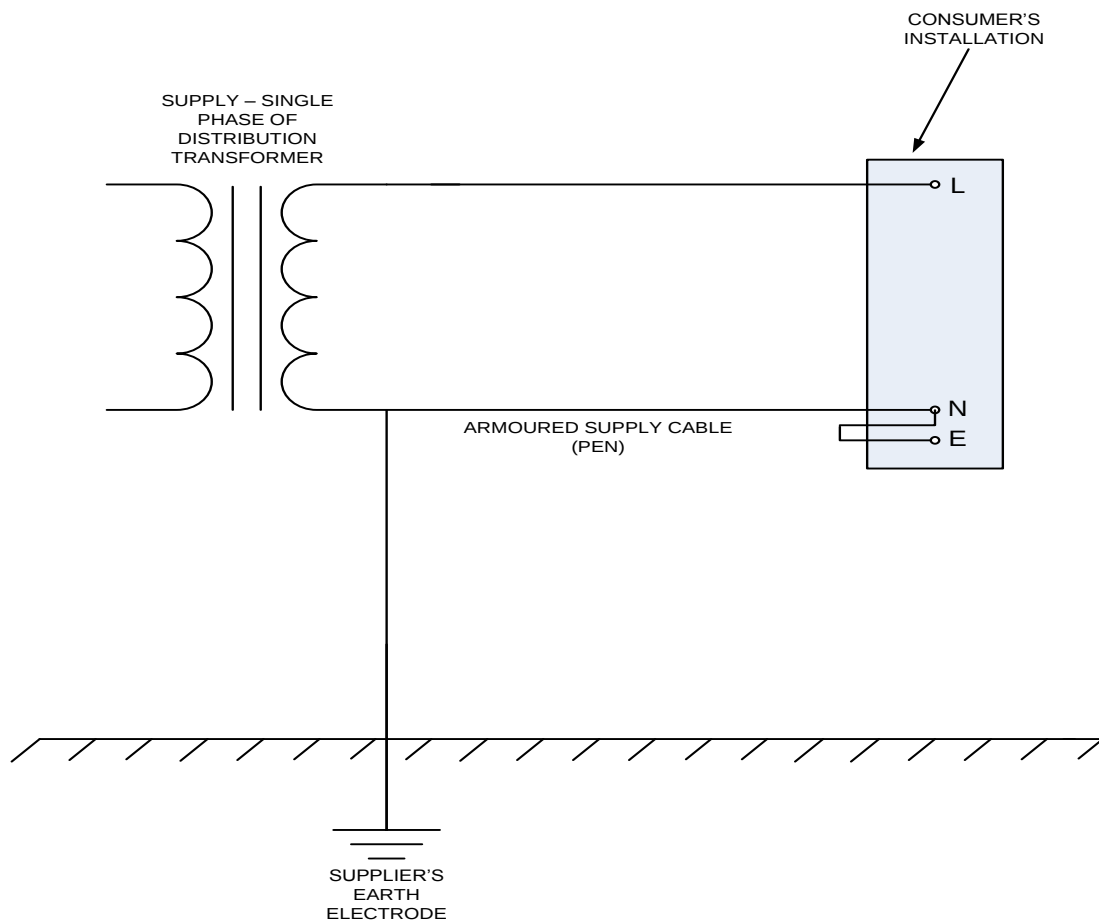
TT SYSTEM





TN-C-S SYSTEM OR PROTECTIVE MULTIPLE EARTHING (PME)





TASK 16: INTERPRETING AND IDENTIFYING BASIC INDUSTRIAL CONTROL AND POWER CIRCUIT SYMBOLS

No	Activity	Satisfactory Attempts			Not satisfactory Attempts		
		1st	2 nd	3 rd	1st	2nd	3rd
During observation of work activities, the candidate demonstrated that they can:							
	a) Identify basic industrial control and power symbols and this should include • Push buttons • Contactors • Overloads • Timers • Indicator lamps • Motors	☐	☐	☐	☐	☐	☐
	b) interpret power and control industrial circuits and this should include • Push buttons • Contactors • Overloads • Timers • Indicator lamps • Motors	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

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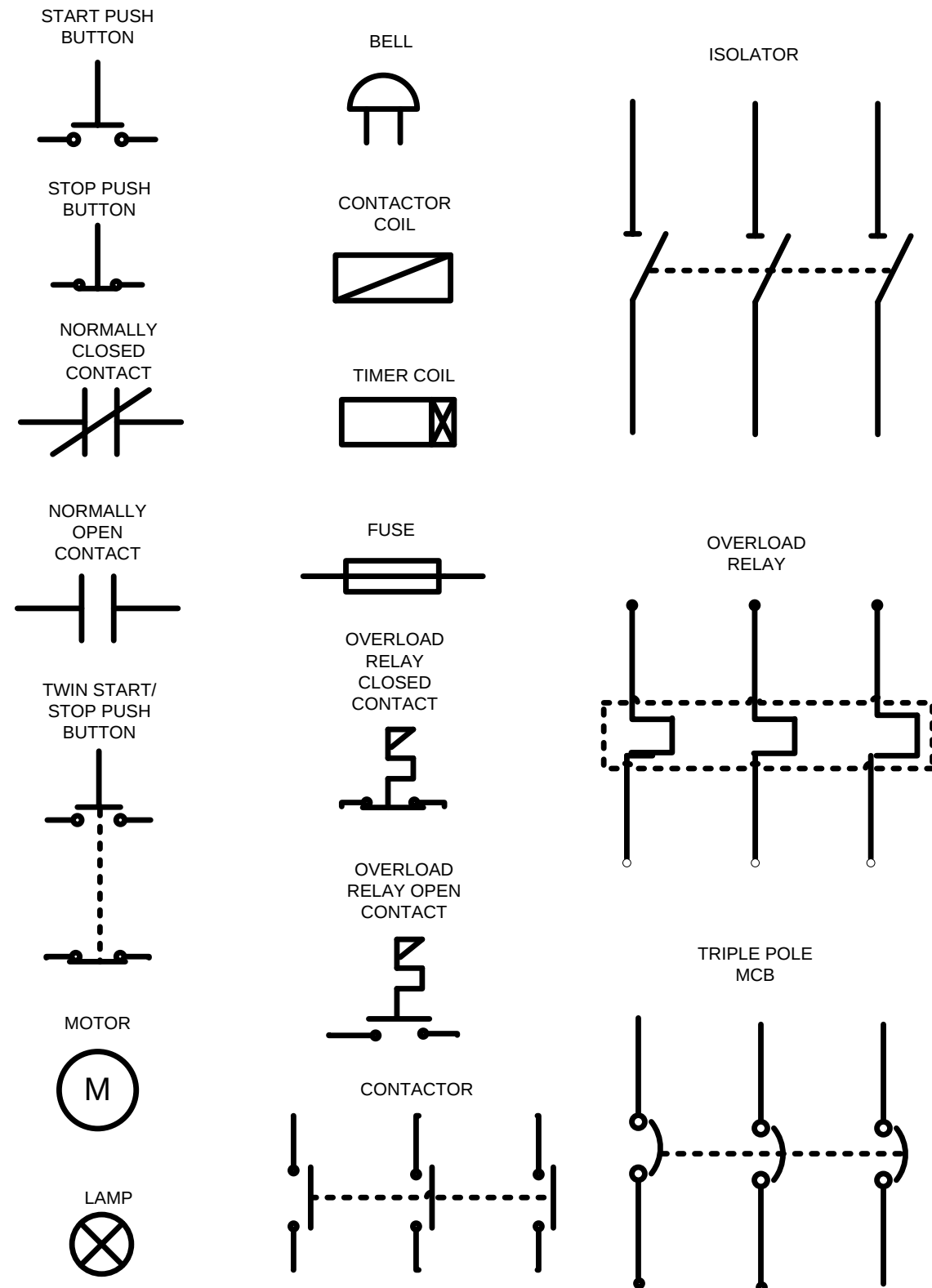
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TASK 16: CIRCUIT SYMBOLS SPECIFICATIONS

BASIC SCHEMATIC SYMBOLS



TASK 17: DESIGNING BASIC INDUSTRIAL CONTROL CIRCUITS

No	Activity	Satisfactory Attempts			Not satisfactory Attempts		
		1st	2nd	3rd	1st	2nd	3rd
During observation of work activities, the candidate demonstrated that he/she can design control circuits							
	This should include	☐	☐	☐	☐	☐	☐
	a) Direct on line circuit (start push button, stop push button, overload, contactor, 5A MCB, two indicator lamps and drawing paper						
	b) Forward and reverse circuit (two start push button, stop push button, overload, two contactors, 5A MCB, three indicator lamps and drawing paper	☐	☐	☐	☐	☐	☐
	c) Star-delta circuit (start push button, stop push button, three contactors, overload, 5A MCB, three indicator lamps, on delay timer and drawing paper prepared neatly and correctly)	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

Signed:.....

Signed:.....

Date:.....

Date:.....

TASK 18: DESIGNING BASIC INDUSTRIAL POWER CIRCUITS

No	Activity	Satisfactory			Not satisfactory		
		Attempts			Attempts		
	During observation of work activities, the candidate demonstrated that he/she can design power circuits correctly according to given specifications	1st	2nd	3rd	1st	2nd	3rd
	This should include:						
	a) Direct on line circuit (isolator, motor, contactor, MCB, overload and drawing paper prepared neatly)	☐	☐	☐	☐	☐	☐
	b) Forward and reverse circuit (isolator, motor, contactor, MCB, overload and drawing paper prepared neatly)	☐	☐	☐	☐	☐	☐
	c) Star-delta circuit (isolator, motor, contactor, MCB, overload and drawing paper prepared neatly)	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

Signed:.....

Signed:.....

Date:.....

Date:.....

TASK 19: INSPECTION OF INDUSTRIAL CONTROL AND POWER CIRCUITS

No	Activity	Satisfactory			Not satisfactory		
		Attempts			Attempts		
	During observation of work activities, the candidate demonstrated that they can inspect industrial control and power circuits by the following steps:	1st	2nd	3rd	1st	2nd	3rd
	This should include: • Checking the cable size • Checking cable termination • Using correct colour code for cables • Checking for the firmness of components installed • Checking for 90o bend • Checking for correct measurements • Checking for offsets • Observing neatness in works carried out	☐	☐	☐	☐	☐	☐

Examiner`s comments:

Examiner Name:.....

Learner`s Name:.....

Signed:.....

Signed:.....

Date:.....

Date:.....

TASK 20: TESTING OF INDUSTRIAL CONTROL AND POWER CIRCUITS

No	Activity	Satisfactory			Not satisfactory		
		Attempts			Attempts		
	During observation of work activities, the candidate demonstrated that they can test industrial control and power circuits by the following steps:	1st	2nd	3rd	1st	2nd	3rd
	This should include: • Polarity test • Continuity test • Insulation resistance test	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

Signed:.....

Signed:.....

Date:.....

Date:.....

TASK 21: INSTALLATION OF A DIRECT ON LINE CIRCUIT

No	Activity	Satisfactory Attempts			Not satisfactory Attempts		
		1st	2nd	3rd	1st	2nd	3rd
During observation of work activities, the candidate demonstrated that they can:							
	a) Wire a direct on line control circuit this should include ▪ Mount a contactor box ▪ Install and terminate conduit pipes correctly using couplings and bushes ▪ Make 90° bends without kinks ▪ Make offsets ▪ Mount saddles ▪ Terminate cables ▪ Identifying the right cable size used for a control and power circuit	☐	☐	☐	☐	☐	☐
	b) Carrying out tests using the right testing instrument. This should include: • Continuity test on components, control and power circuits ▪ Polarity test on control circuit ▪ Insulation resistance test on the motor	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

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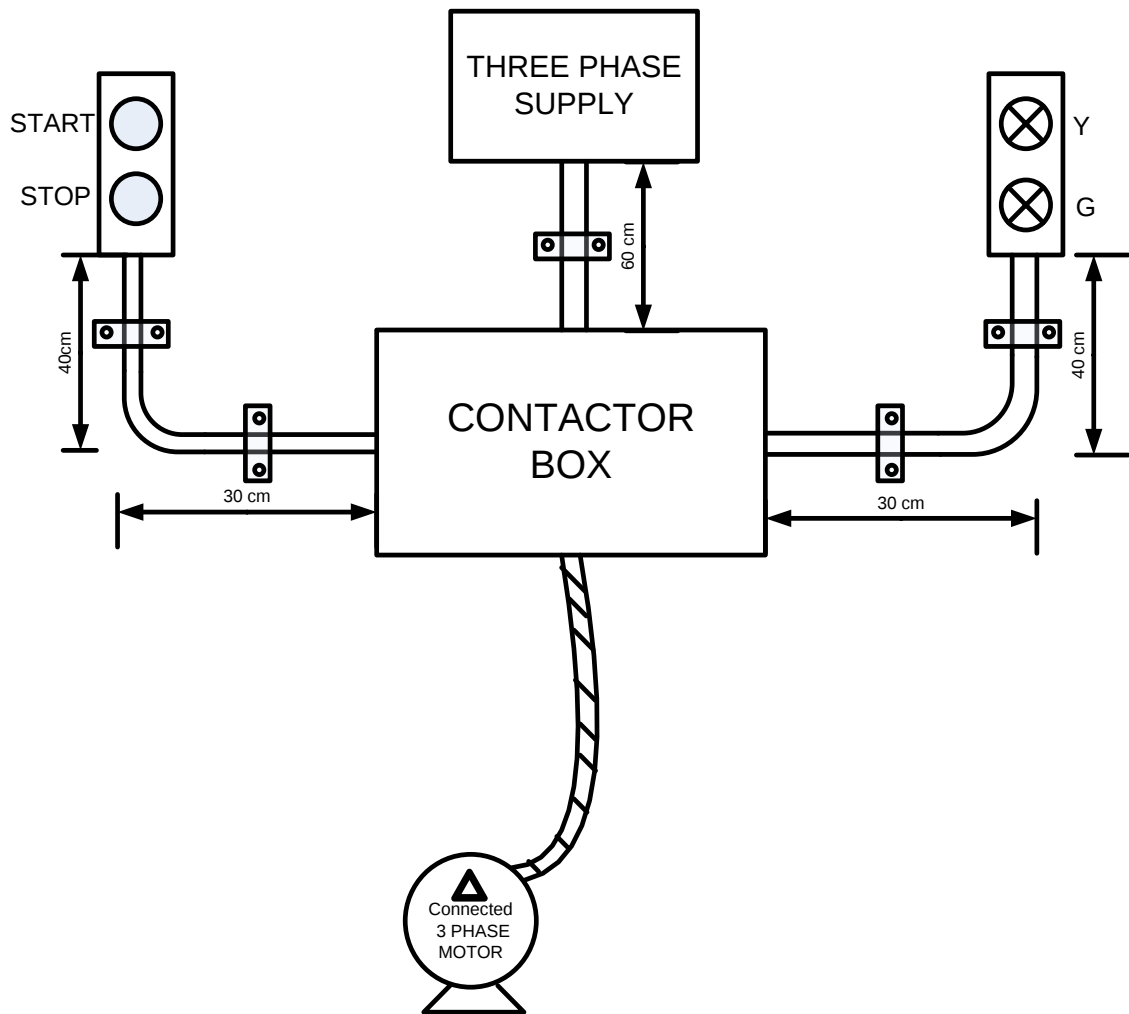
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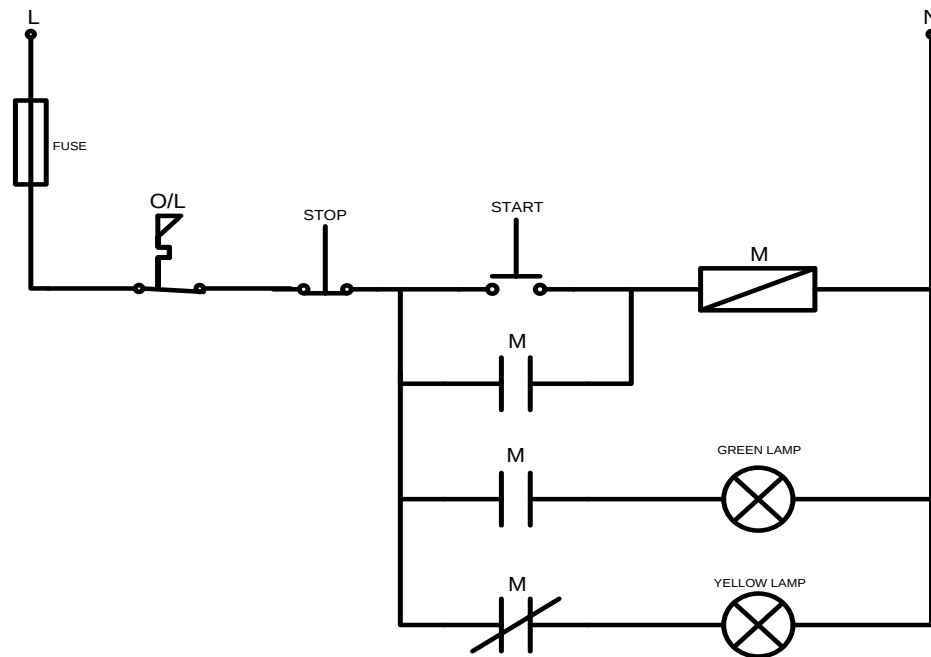
TASK 21: MATERIALS

- 8. 1 X 5A MCB
- 9. 1 X OVERLOAD RELAY
- 10. 1 X STOP PUSH BUTTON
- 11. 1 X START BUTTON
- 12. 1 X CONTACTOR RELAY
- 13. 2 X LAMPS
- 14. 1 X 3PHASE MOTOR

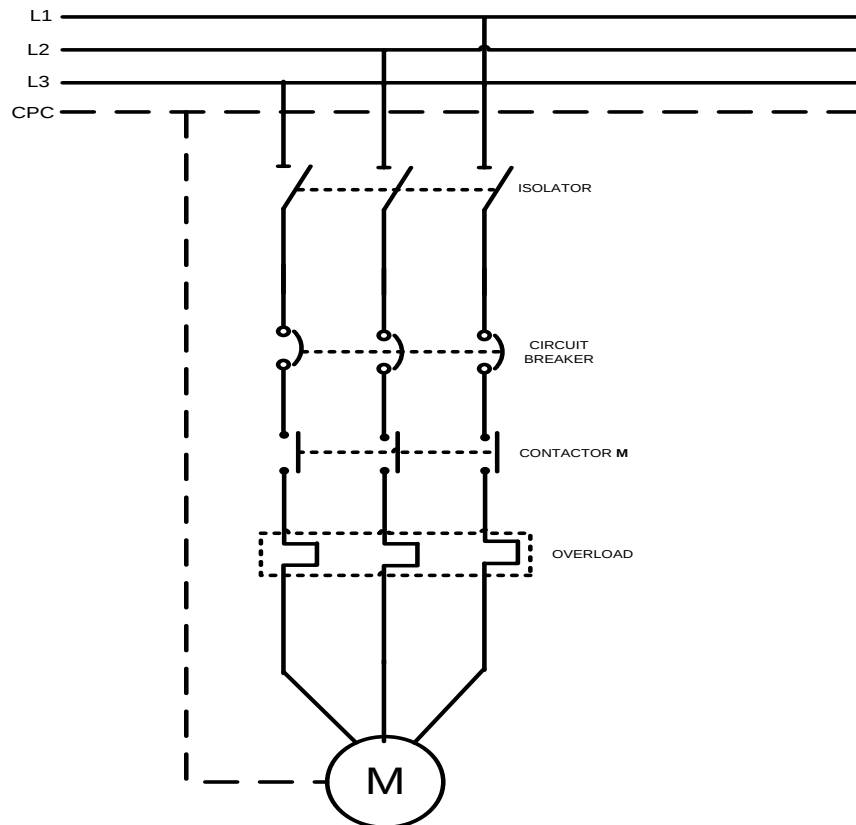
TASK 21: LAYOUT DIAGRAM



TASK 21: CONTROL CIRCUIT



TASK 21: POWER CIRCUIT



TASK 22: INSTALLATION OF A DIRECT ON LINE LOCAL AND REMOTE CIRCUIT

No	Activity	Satisfactory Attempts			Not satisfactory Attempts		
		1st	2nd	3rd	1st	2nd	3rd
During observation of work activities, the candidate demonstrated that they can:							
	- Wire a direct on line local and remote control circuit this should include - Mount a contactor box - Install and terminate conduit pipes correctly using couplings and bushes - Make 90° bends without kinks - Make offsets - Mount saddles - Terminate cables and install - Identify the right cable size used for a control and power circuit	☐	☐	☐	☐	☐	☐
	Carry out tests correctly using the right testing instrument This should include: - Continuity test on components, control and power circuits - Polarity test on control circuit - Insulation resistance test on the motor - Motor connection correctly in star or delta	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

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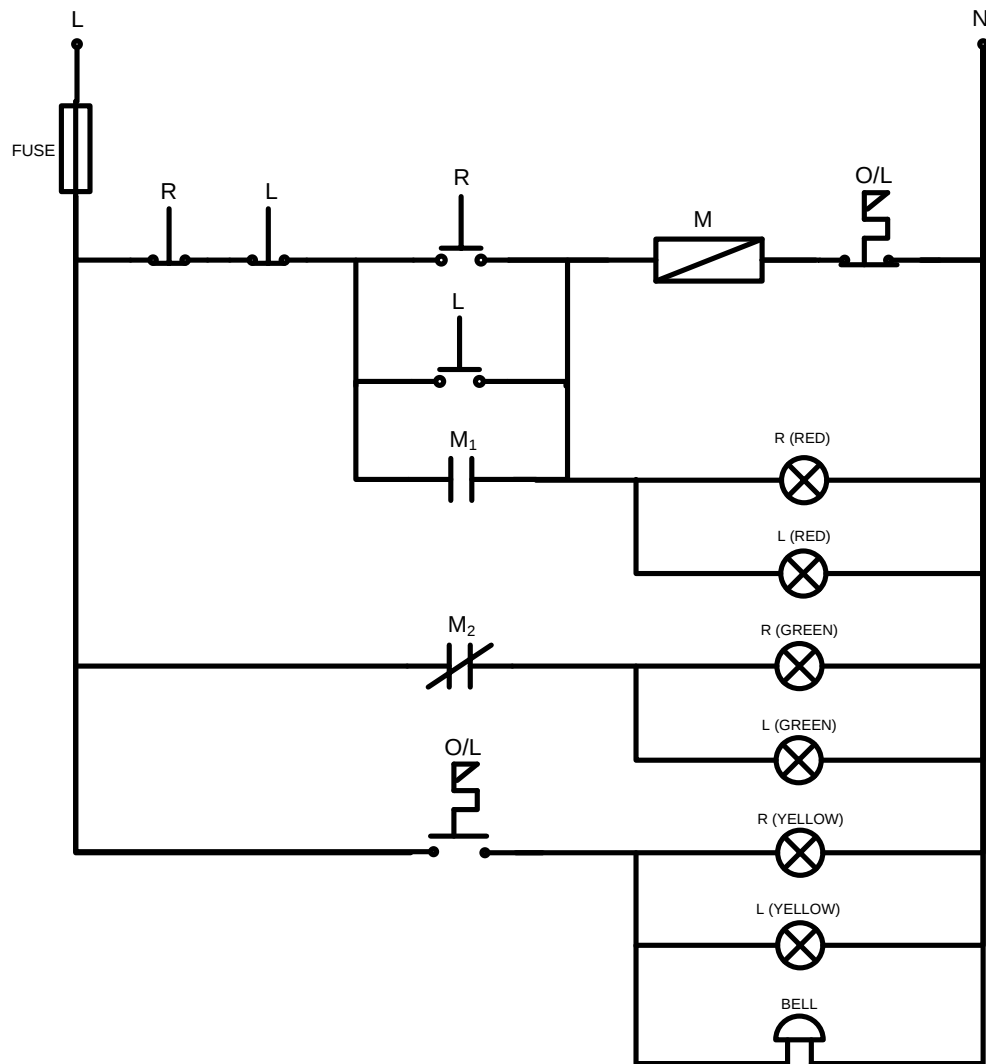
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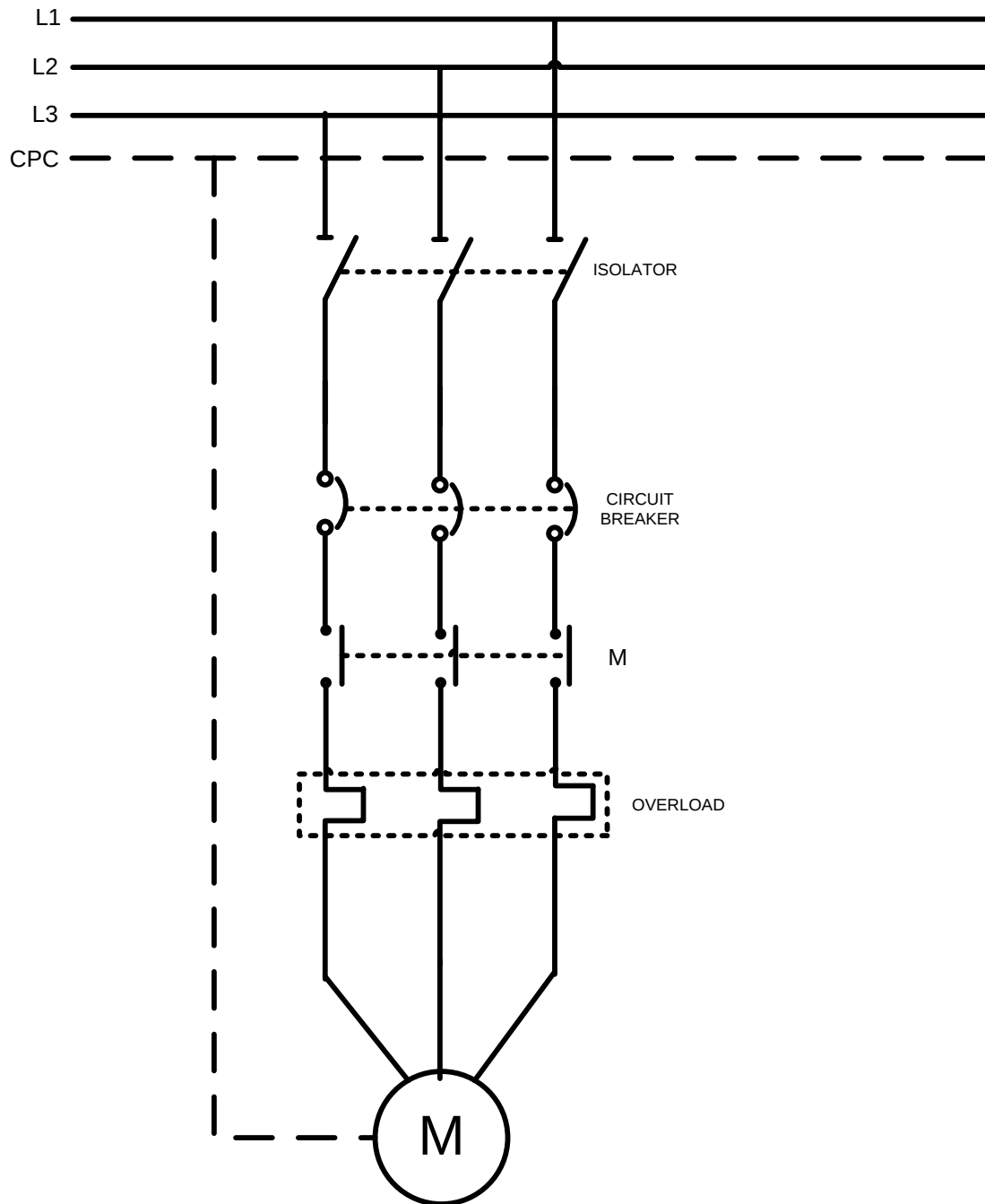
TASK 22: MATERIALS

- 15. 1 X 5A MCB
- 16. 1 X OVERLOAD RELAY
- 17. 1 X STOP PUSH BUTTON
- 18. 1 X START BUTTON
- 19. 1 X CONTACTOR RELAY
- 20. 6 X LAMPS
- 21. 1 X BELL
- 22. 1 X 3PHASE MOTOR

TASK 22: CONTROL CIRCUIT



TASK 22: POWER CIRCUIT



TASK 23: INSTALLATION OF A DIRECT ON LINE JOGGING/INCHING CIRCUIT

No	Activity	Satisfactory Attempts			Not satisfactory Attempts		
		1st	2nd	3rd	1st	2nd	3rd
During observation of work activities, the candidate demonstrated that they can:							
	- Wire a direct on line jogging/inching control circuit this should include - Mount a contactor box - Install and terminate conduit pipes correctly using couplings and bushes - Make 90° bends without kinks - Make offsets - Mount saddles - Terminate cables and install - Identify the right cable size used for a control and power circuit	☐	☐	☐	☐	☐	☐
	Carry out tests correctly using the right testing instrument This should include: - Continuity test on components, control and power circuits - Polarity test on control circuit - Insulation resistance test on the motor - Motor connection in star or delta	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

Signed:.....

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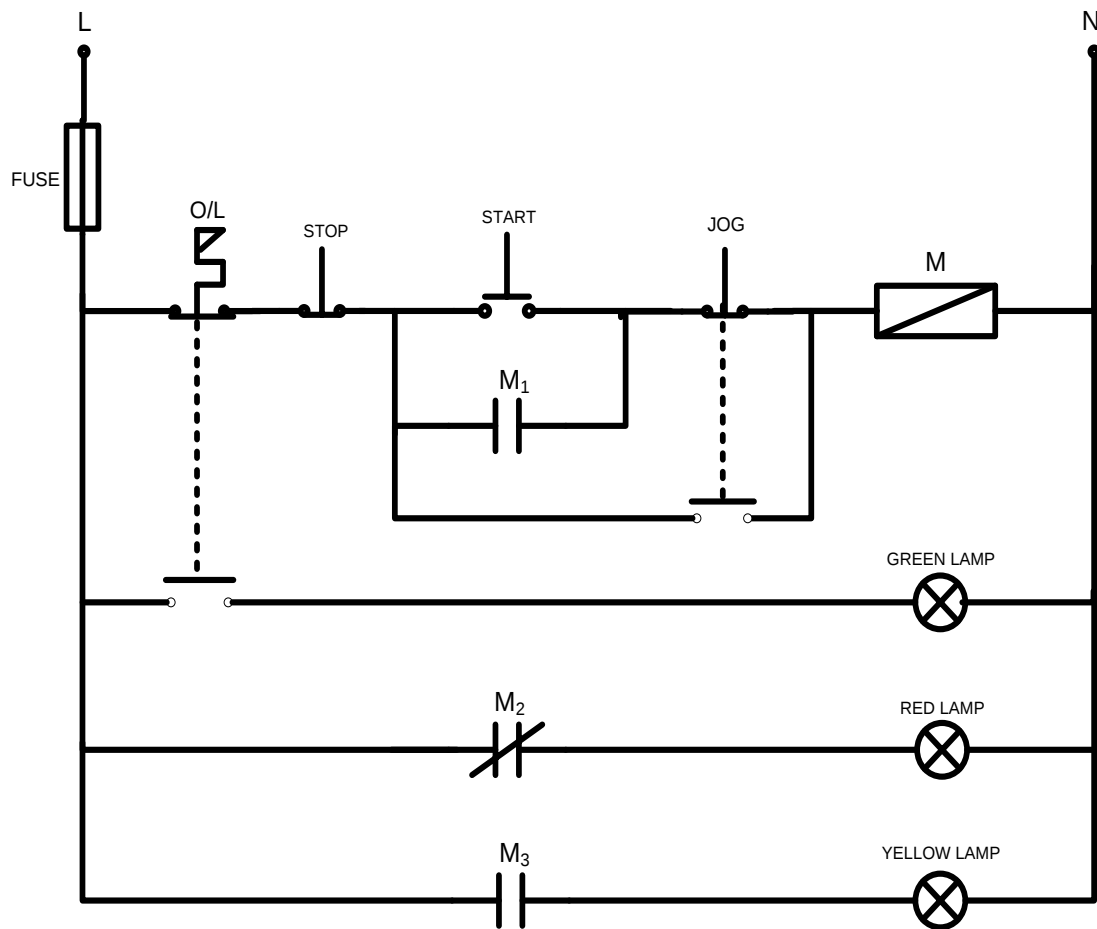
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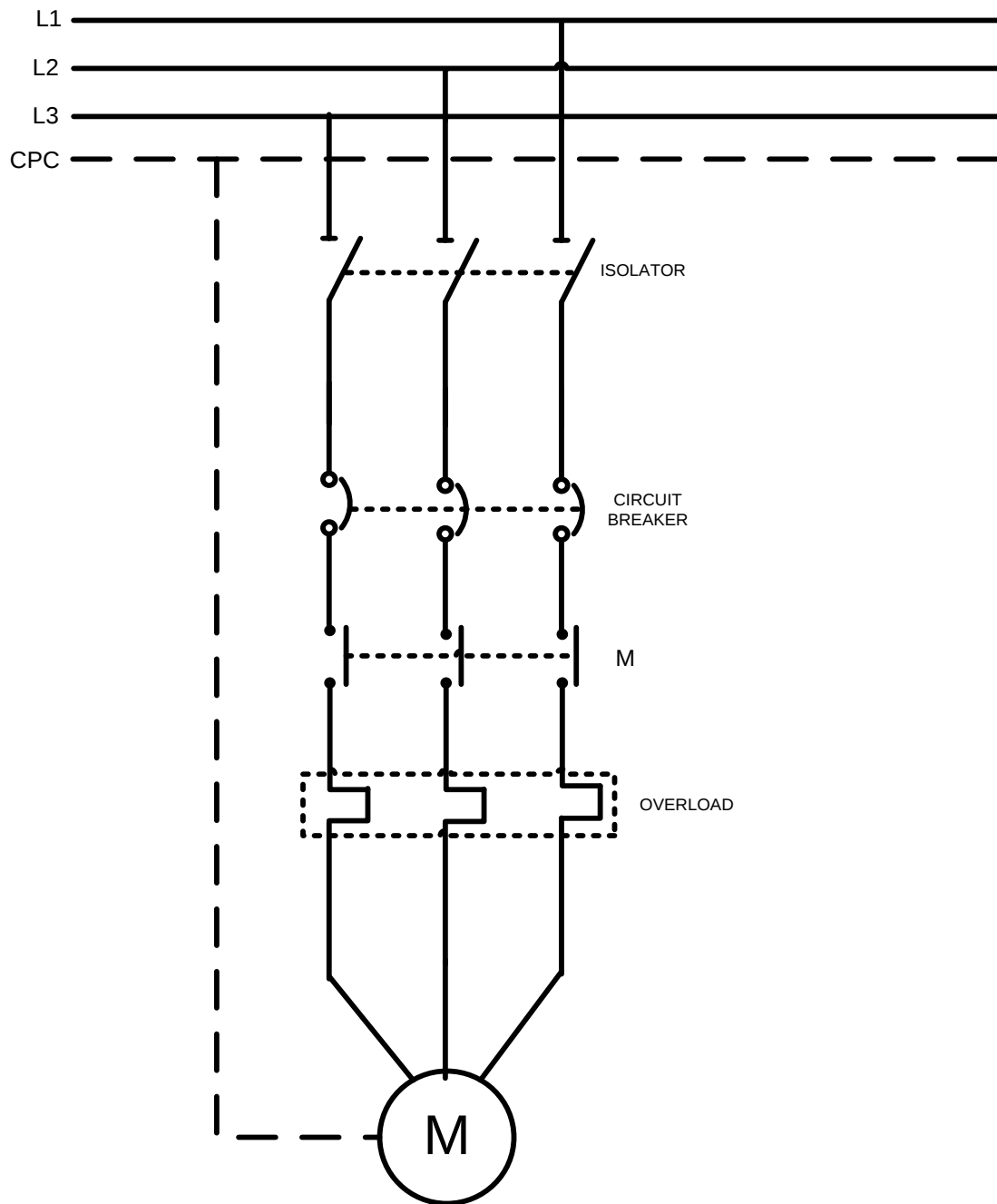
TASK 23: MATERIALS

1. 1 X 5A MCB
2. 1 X OVERLOAD RELAY
3. 1 X STOP PUSH BUTTON
4. 1 X START BUTTON
5. 1 X TWIN PUSH BUTTON
6. 1 X CONTACTOR RELAY
7. 3 X LAMPS

TASK 23: CONTROL CIRCUIT



TASK 23: POWER CIRCUIT



TASK 24: INSTALLATION OF A DOOR BELL RING CIRCUIT

No	Activity	Satisfactory			Not satisfactory		
		Attempts			Attempts		
	During observation of work activities, the candidate demonstrated that they can:	1st	2nd	3rd	1st	2nd	3rd
	- Wire a direct on line local and remote control circuit this should include - Mount a contactor box - Install and terminate conduit pipes correctly using couplings and bushes - Make 90° bends without kinks - Make offsets correctly - Mount saddles correctly - Terminate cables correctly and install neatly - Identify the right cable size used for a control and power circuit	☐	☐	☐	☐	☐	☐
	Carry out tests correctly using the right testing instrument This should include: - Continuity test on components, control and power circuits - Polarity test on control circuit - Insulation resistance test on the motor - Motor connection correctly in star or delta	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

Signed:.....

Signed:.....

Date:.....

Date:.....

TASK 25: INSTALLING A STAR-DELTA SEMI AUTOMATIC CONTROL AND POWER CIRCUIT

No	Activity	Satisfactory			Not Satisfactory		
		Attempts			Attempts		
	During observation of work activities, the candidate demonstrated that they can:	1 st	2 nd	3 rd	1 st	2 nd	3 rd
	Install Star-Delta control circuit correctly ▪ Mount contactor box ▪ Install conduit pipes using couplings and bushes ▪ Bend conduits to 90° ▪ Make Offsets ▪ Mount Saddles ▪ Mount 5A MCB ▪ Mount 220V,50 Hz contactor ▪ On delay timer ▪ Mount overload relay ▪ Mount stop push button ▪ Mount start push button ▪ Mount indicator lamps ▪ Terminate and install cables	☐	☐	☐	☐	☐	☐
	Install Star-Delta power circuit correctly ▪ Mount triple pole isolator ▪ Mount triple pole MCB ▪ Use 2.5 mm² cable ▪ Terminate flexible conduit ▪ Connect motor	☐	☐	☐	☐	☐	☐
	Carryout tests using the right instruments ▪ Continuity test using an ohmmeter ▪ Polarity test using an ohmmeter ▪ Insulation resistance test using a megger	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

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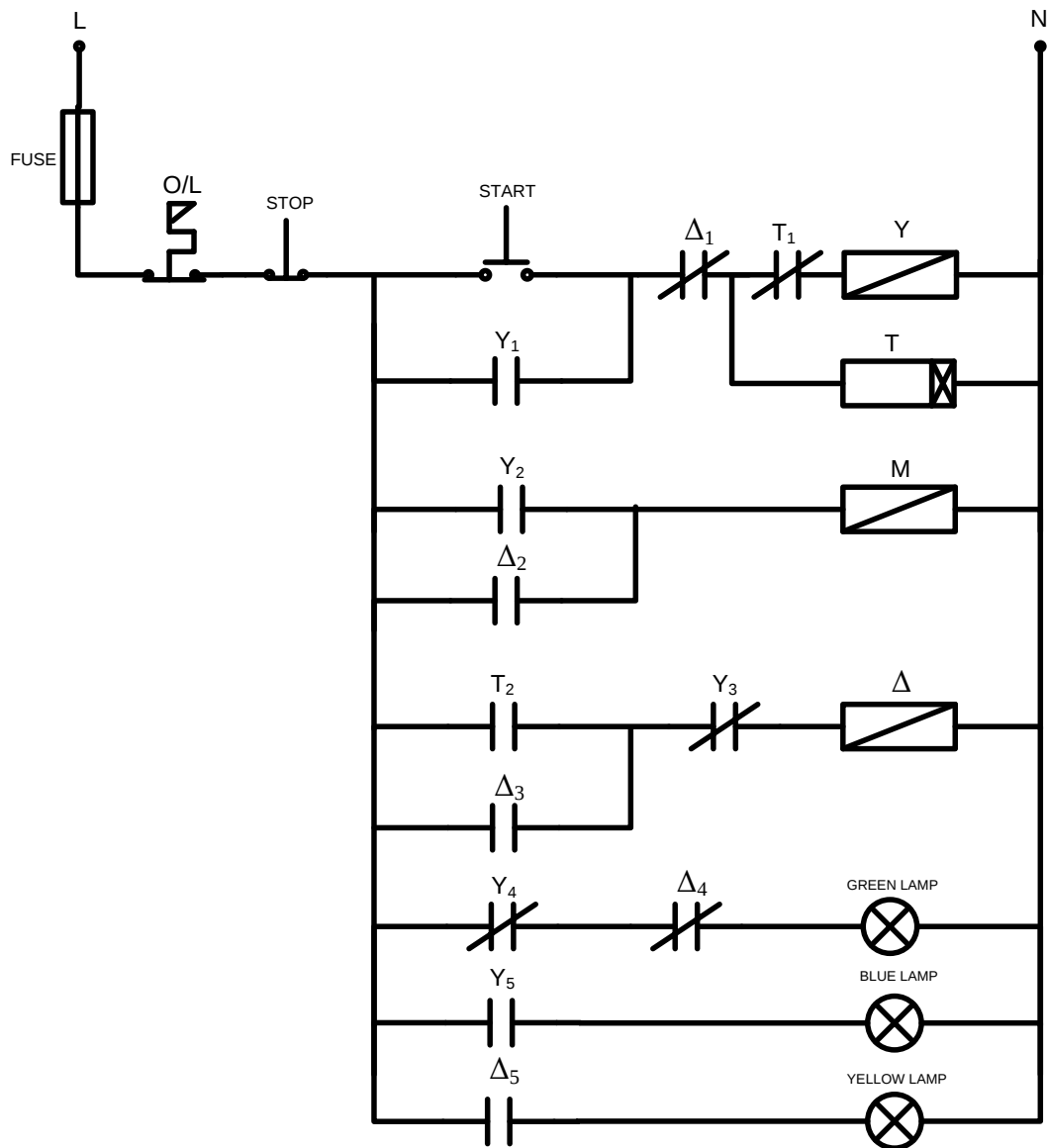
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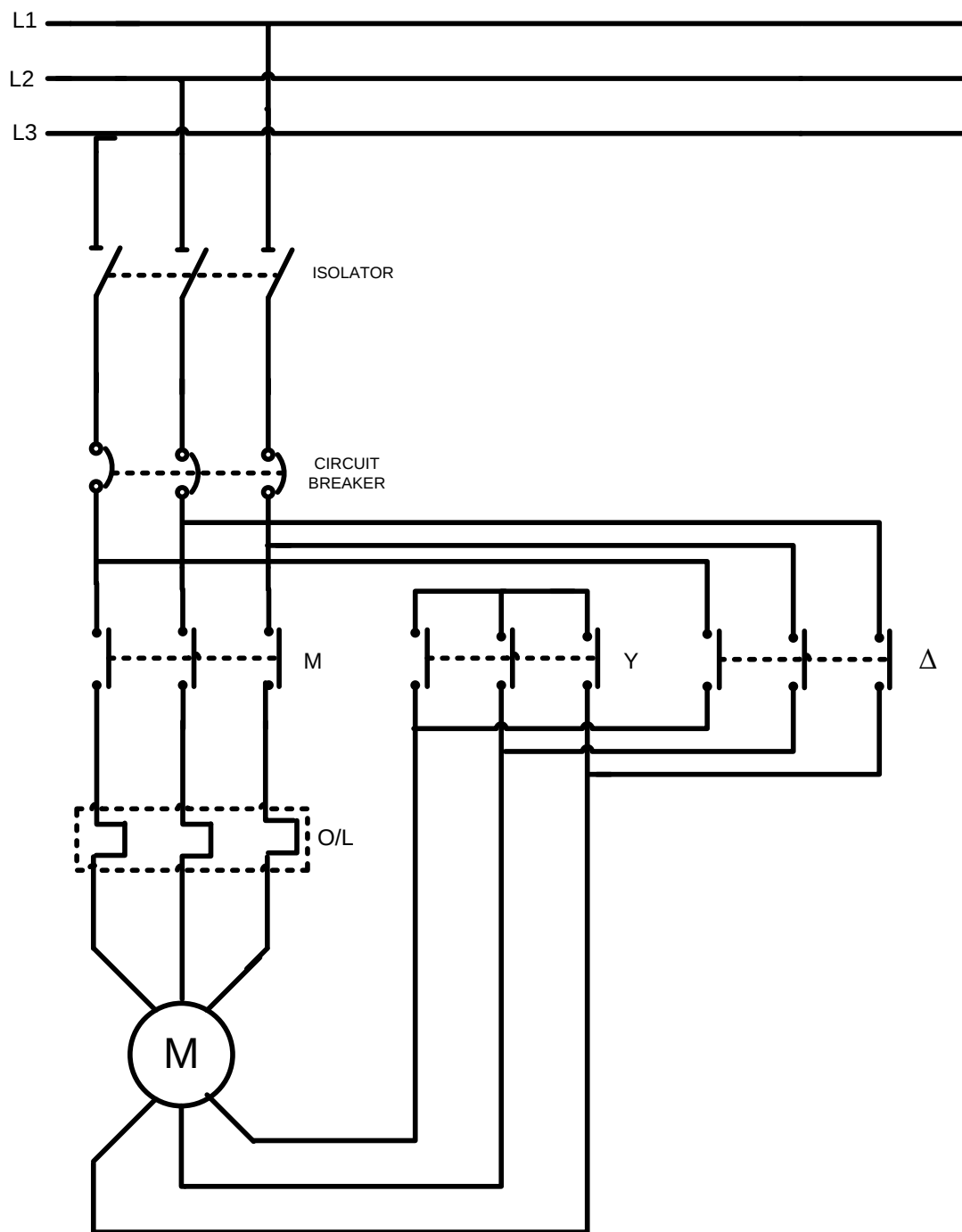
TASK 25: MATERIALS SPECIFICATIONS

1. 1 X 5A MCB
2. 1 X OVERLOAD RELAY
3. 1 X STOP PUSH BUTTON
4. 1 X START BUTTON
5. 1 X ON DELAY TIMER
6. 3 X CONTACTOR RELAY
7. 3 X LAMPS
8. 1 X 3PHASE MOTOR

TASK 25: CONTROL CIRCUIT



TASK 25: POWER CIRCUIT



TASK 26: MAINTAINING INDUCTION MOTORS

No	Activity	Satisfactory			Not Satisfactory		
		Attempts			Attempts		
	During observation of work activities, the candidate demonstrated that they can:	1 st	2 nd	3 rd	1 st	2 nd	3 rd
	Maintaining induction motor This should include: - Plan and schedule maintenance - Maintain Induction motor housing, bearing, stator and rotor - Clean and dry stator winding - Trouble shoot motor - failing to start - Overload - Single phasing - under voltage - Motor temperature - Motor speed - Motor vibration - Motor windings	☐	☐	☐	☐	☐	☐
	- Carryout the following tests - Continuity test - Insulation resistance test	☐	☐	☐	☐	☐	☐

Examiner`s comments:

Examiner Name:.....

Learner`s Name:.....

Signed:.....

Signed:.....

Date:.....

Date:.....

TASK 27: INSTALLING A STAR-DELTA LOCAL AND REMOTE CONTROL AND POWER CIRCUIT

No	Activity	Satisfactory			Not Satisfactory		
		Attempts			Attempts		
	During observation of work activities, the candidate demonstrated that they can:	1st	2nd	3rd	1st	2nd	3rd
	a) Install Star-Delta control circuit This should include: ▪ Mount contactor box ▪ Install conduit pipes using couplings and bushes ▪ Bend conduits to 90° ▪ Make Offsets ▪ Mount Saddles ▪ Mount 5A MCB ▪ Mount 220V, 50 Hz contactor ▪ On delay timer ▪ Mount overload relay ▪ Mount stop push button ▪ Mount start push button ▪ Mount indicator lamps ▪ Terminate and install cables	☐	☐	☐	☐	☐	☐
	b) Install Star-Delta Power circuit correctly ▪ Mount triple pole isolator ▪ Mount triple pole MCB ▪ Use 2.5 mm² cable ▪ Terminate flexible conduit ▪ Connect motor	☐	☐	☐	☐	☐	☐
	c) Carryout tests using the right test instrument ▪ Continuity test using an ohmmeter ▪ Polarity test using an ohmmeter ▪ Insulation resistance test using a megger	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

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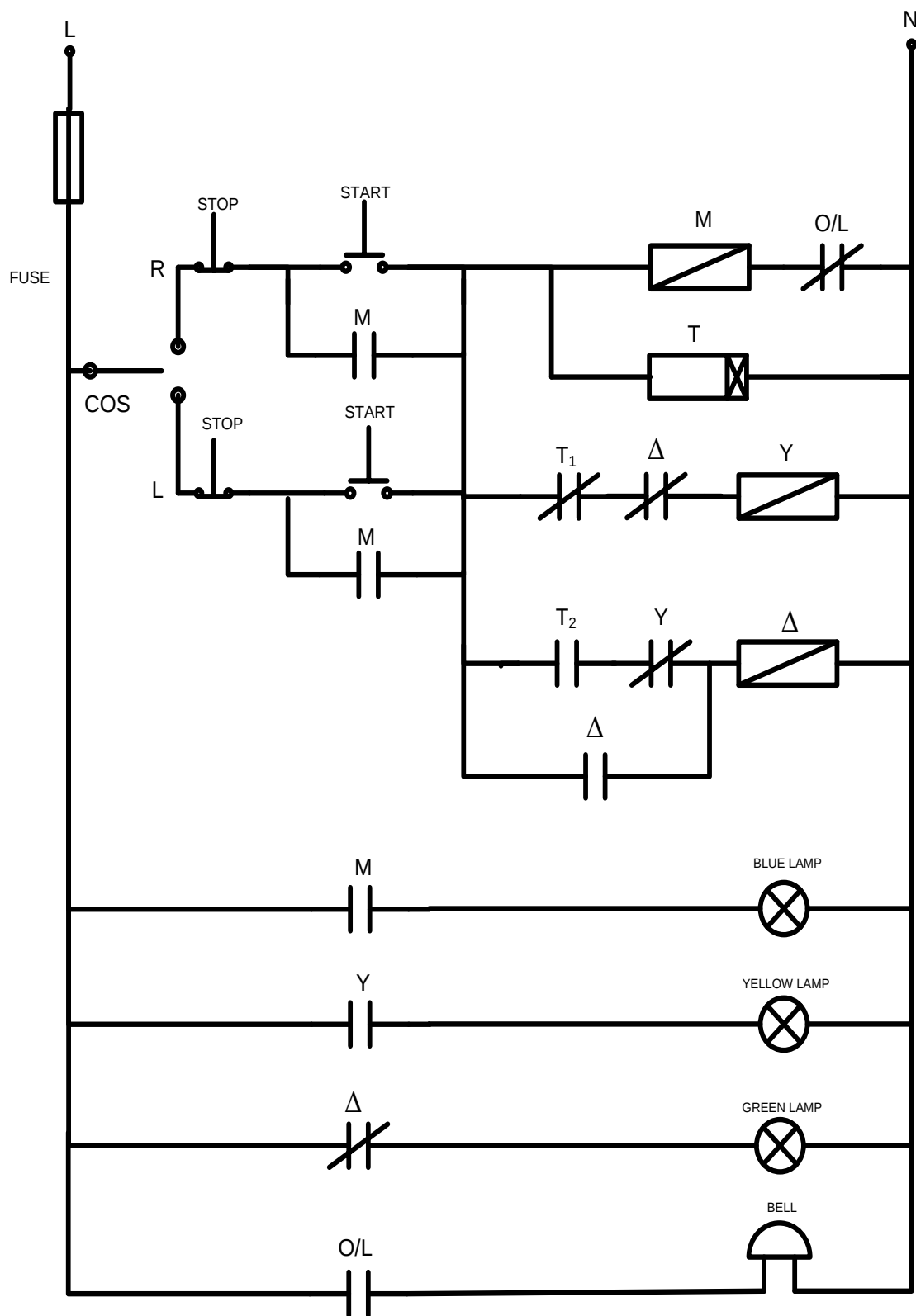
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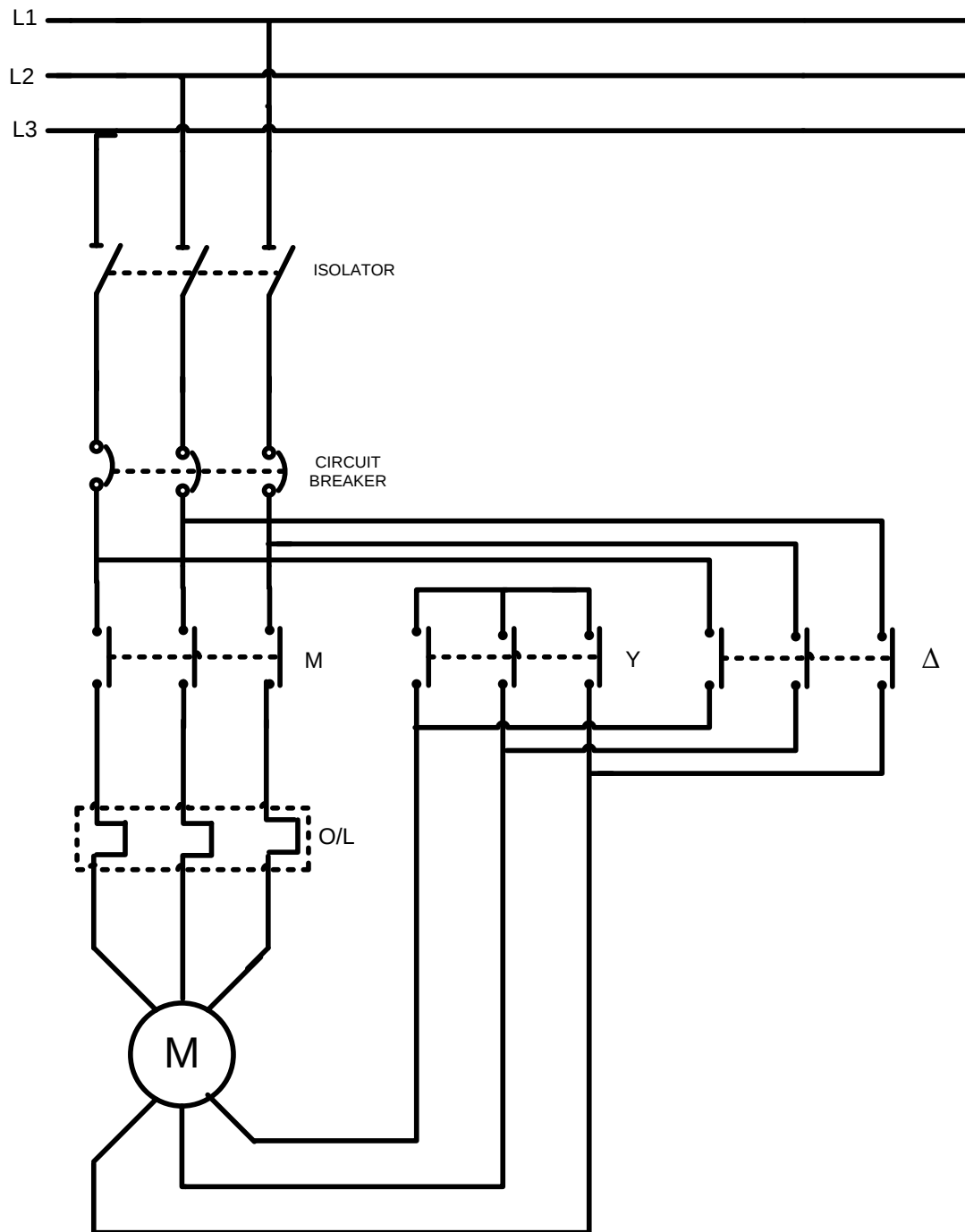
TASK 27: MATERIALS SPECIFICATIONS

- 23. 1 X 5A MCB
- 24. 1 X OVERLOAD RELAY
- 25. 1 X STOP PUSH BUTTON
- 26. 2 X START BUTTON
- 27. 1 X ON DELAY TIMER
- 28. 3 X CONTACTOR RELAY
- 29. 3 X LAMPS
- 30. 1 X BELL
- 31. 1 X 3PHASE MOTOR

TASK 27: CONTROL CIRCUIT



TASK 27: POWER CIRCUIT



TASK 28: INSTALLING A STAR-DELTA FORWARD AND REVERSE CONTROL AND POWER CIRCUIT

No	Activity	Satisfactory			Not Satisfactory		
		Attempts			Attempts		
	During observation of work activities, the candidate demonstrated that they can:	1 st	2 nd	3 rd	1 st	2 nd	3 rd
	a) Install Star-Delta control circuit correctly ▪ Mount contactor box ▪ Install conduit pipes using couplings and bushes ▪ Bend conduits to 90° ▪ Make Offsets ▪ Mount Saddles ▪ Mount 5A MCB ▪ Mount 220V,50 Hz contactor ▪ On delay timer ▪ Mount overload relay ▪ Mount stop push button ▪ Mount start push button ▪ Mount indicator lamps ▪ Terminate and install cables	☐	☐	☐	☐	☐	☐
	b) Install Star-Delta Power circuit correctly ▪ Mount triple pole isolator ▪ Mount triple pole MCB ▪ Use 2.5 mm² cable ▪ Terminate flexible conduit ▪ Connect motor	☐	☐	☐	☐	☐	☐
	c) Carryout tests using the right test instrument ▪ Continuity test using an ohmmeter ▪ Polarity test using an ohmmeter ▪ Insulation resistance test using a megger	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

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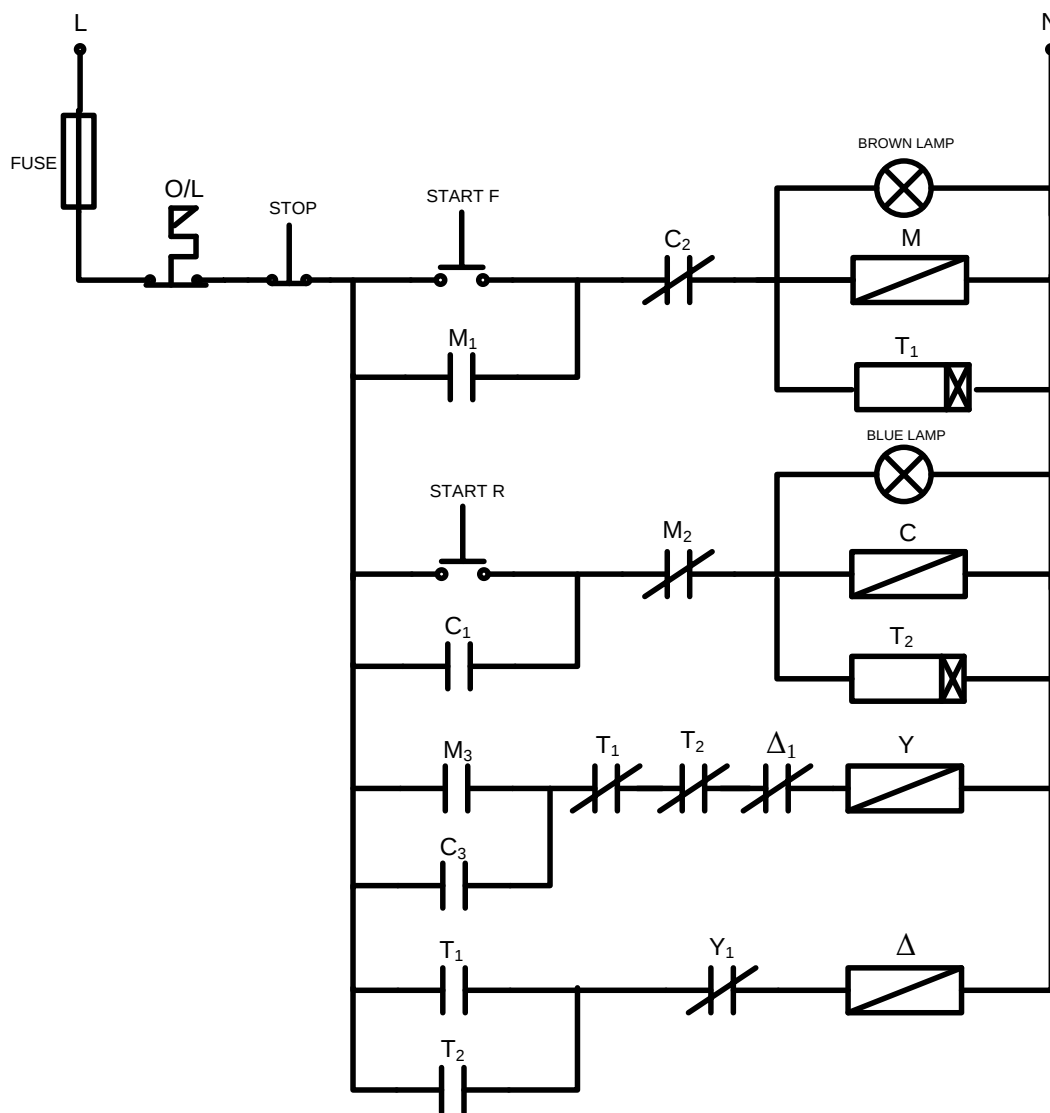
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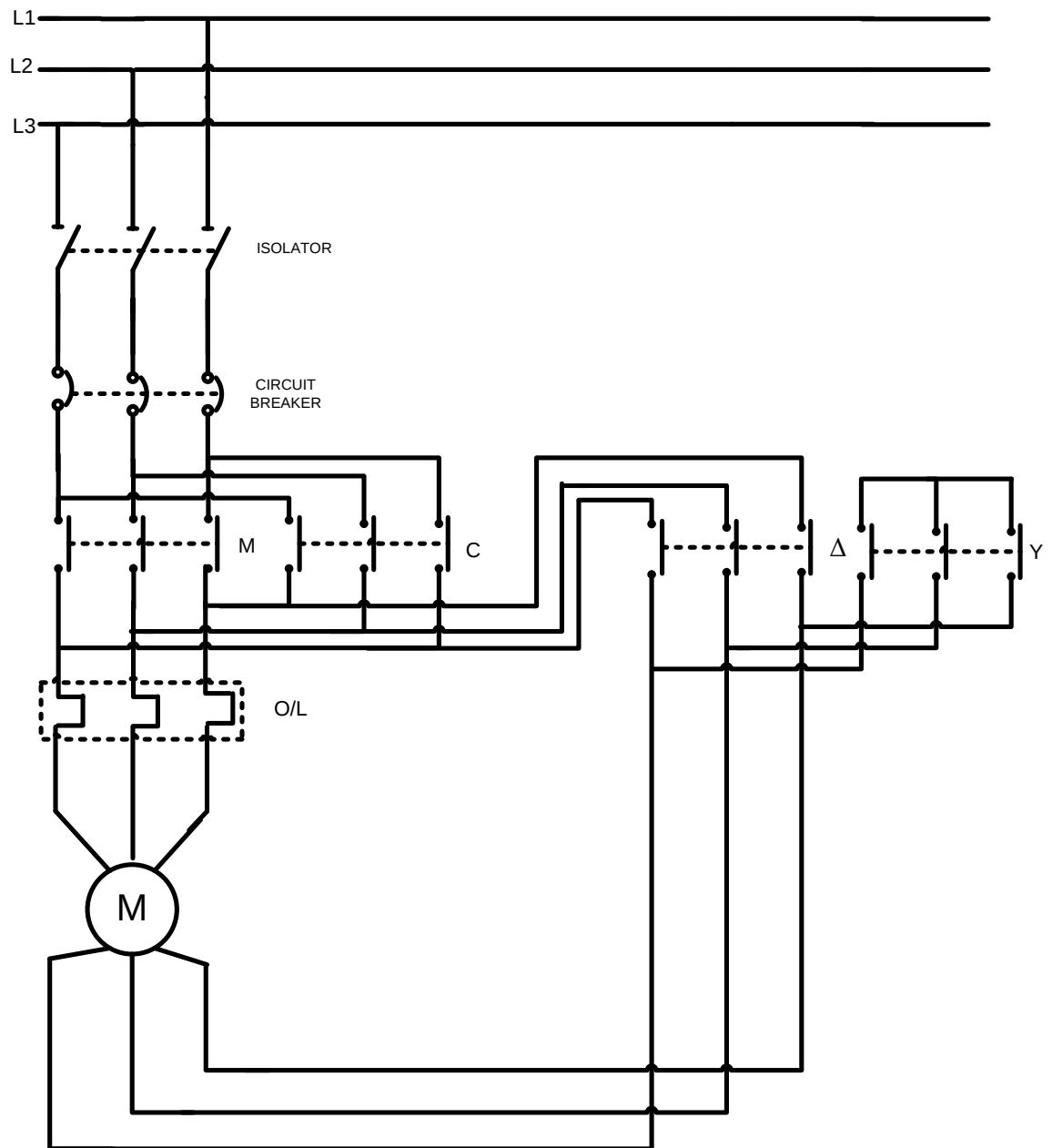
TASK 28: MATERIALS

1. 1 X 5A MCB
2. 1 X OVERLOAD RELAY
3. 1 X STOP PUSH BUTTON
4. 2 X START BUTTON
5. 2 X ON DELAY TIMER
6. 3 X CONTACTOR RELAY
7. 3 X LAMPS
8. 1 X BELL
9. 1 X 3PHASE MOTOR

TASK 28: CONTROL CIRCUIT



TASK 28: POWER CIRCUIT



TASK 29: INSTALLING A SEMI AUTOMATIC CONTROL AND POWER CIRCUIT

No	Activity	Satisfactory			Not Satisfactory		
		Attempts			Attempts		
	During observation of work activities, the candidate demonstrated that they can:	1 st	2 nd	3 rd	1 st	2 nd	3 rd
	(a) Install semi-automatic control circuit correctly ▪ Mount contactor box ▪ Install conduit pipes using couplings and bushes ▪ Bend conduits to 90° ▪ Make Offsets ▪ Mount Saddles ▪ Mount 5A MCB ▪ Mount 220V,50 Hz contactor ▪ On delay timer ▪ Mount overload relay ▪ Mount stop push button ▪ Mount start push button ▪ Mount indicator lamps ▪ Terminate and install cables	☐	☐	☐	☐	☐	☐
	(b) Install Power circuit correctly ▪ Mount triple pole isolator ▪ Mount triple pole MCB ▪ Use 2.5 mm² cable ▪ Terminate flexible conduit ▪ Connect motor	☐	☐	☐	☐	☐	☐
	(c) Carryout tests using the right test instrument ▪ Continuity test using an ohmmeter ▪ Polarity test using an ohmmeter ▪ Insulation resistance test using a megger	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

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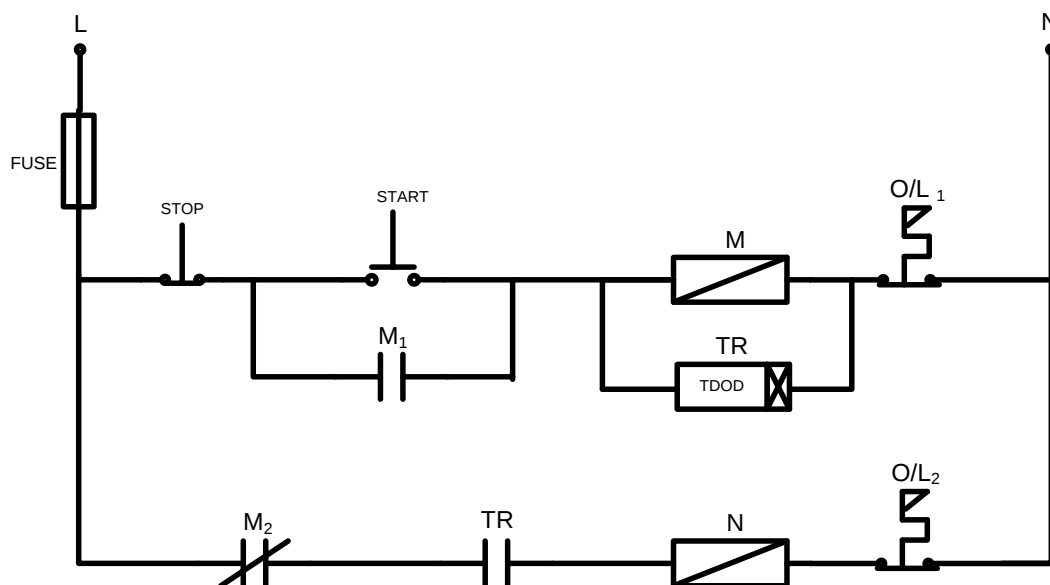
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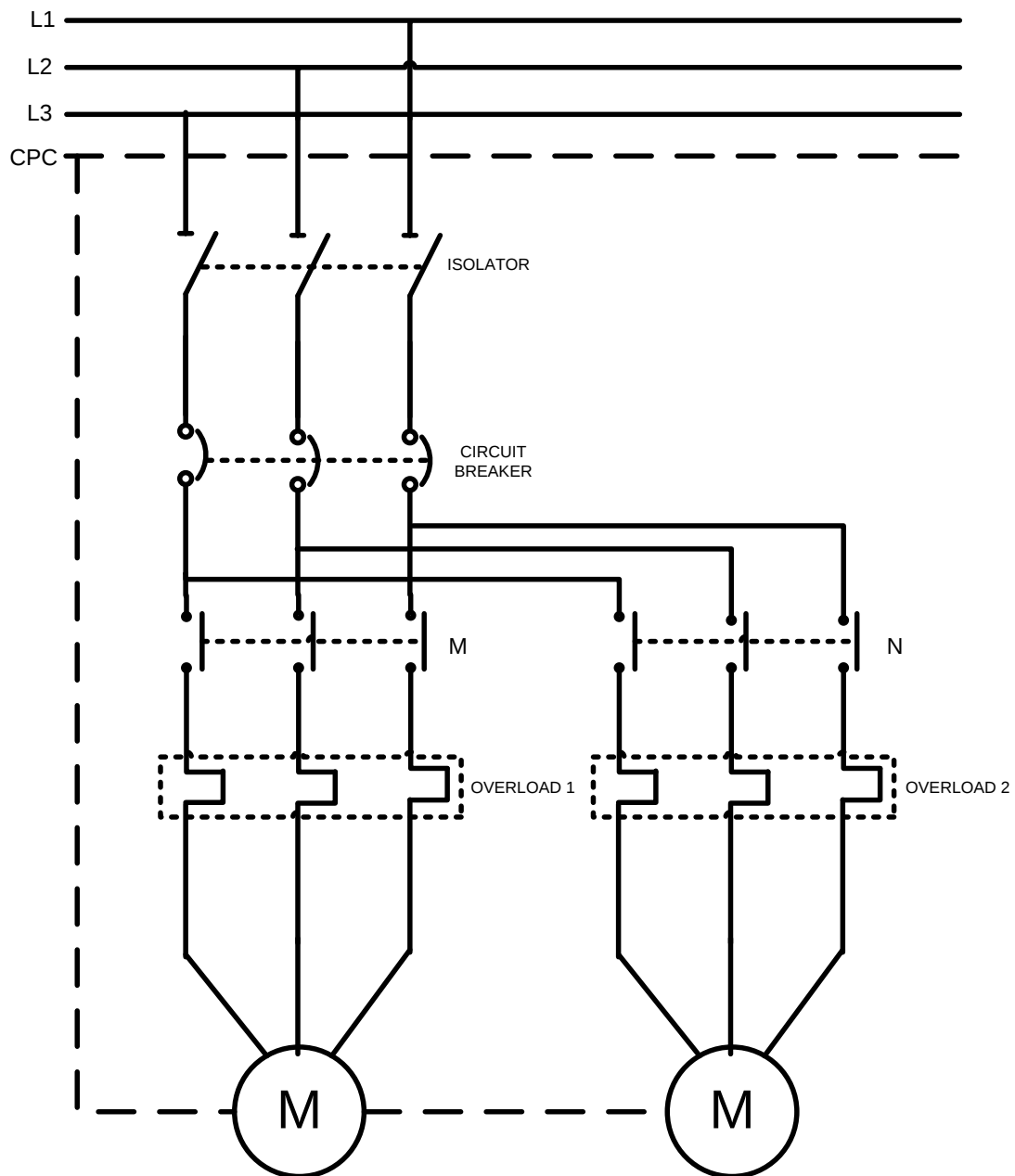
TASK 29: MATERIALS

1. 1 X 5A MCB
2. 2 X OVERLOAD RELAY
3. 1 X STOP PUSH BUTTON
4. 1 X START BUTTON
5. 1 X OFF DELAY TIMER
6. 1 X CONTACTOR RELAY
7. 3 X LAMPS
8. 1 X 3PHASE MOTOR

TASK 29: CONTROL CIRCUIT



TASK 29: POWER CIRCUIT



TASK 30: INSTALLING A SEQUENTIAL CONTROL AND POWER CIRCUIT

No	Activity	Satisfactory			Not Satisfactory		
		Attempts			Attempts		
	During observation of work activities, the candidate demonstrated that they can:	1 st	2 nd	3 rd	1 st	2 nd	3 rd
	(a) Install semi-automatic control circuit correctly ▪ Mount contactor box ▪ Install conduit pipes using couplings and bushes ▪ Bend conduits to 90° ▪ Make Offsets ▪ Mount Saddles ▪ Mount 5A MCB ▪ Mount 220V,50 Hz contactor ▪ On delay timer ▪ Mount overload relay ▪ Mount stop push button ▪ Mount start push button ▪ Mount indicator lamps ▪ Terminate and install cables	☐	☐	☐	☐	☐	☐
	(b) Install Power circuit correctly ▪ Mount triple pole isolator ▪ Mount triple pole MCB ▪ Use 2.5 mm² cable ▪ Terminate flexible conduit ▪ Connect motor	☐	☐	☐	☐	☐	☐
	(c) Carryout tests using the right test instrument ▪ Continuity test using an ohmmeter ▪ Polarity test using an ohmmeter ▪ Insulation resistance test using a megger	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

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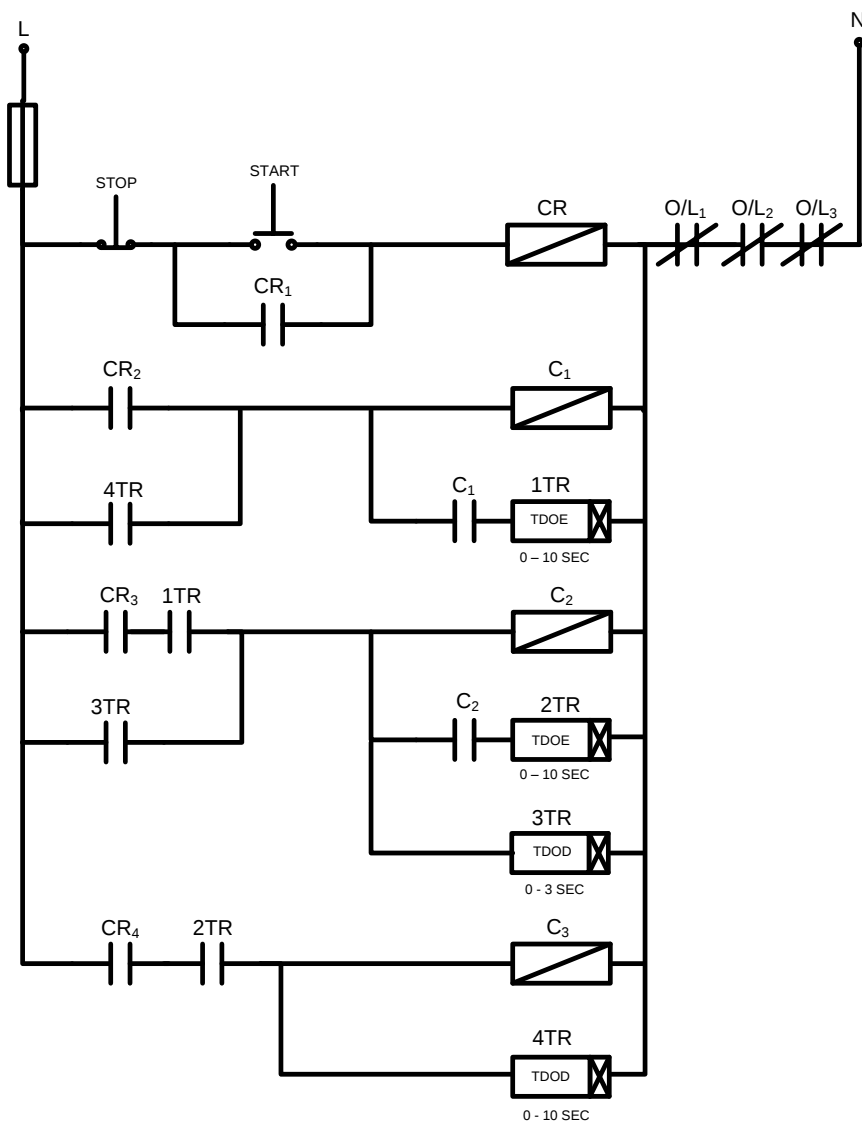
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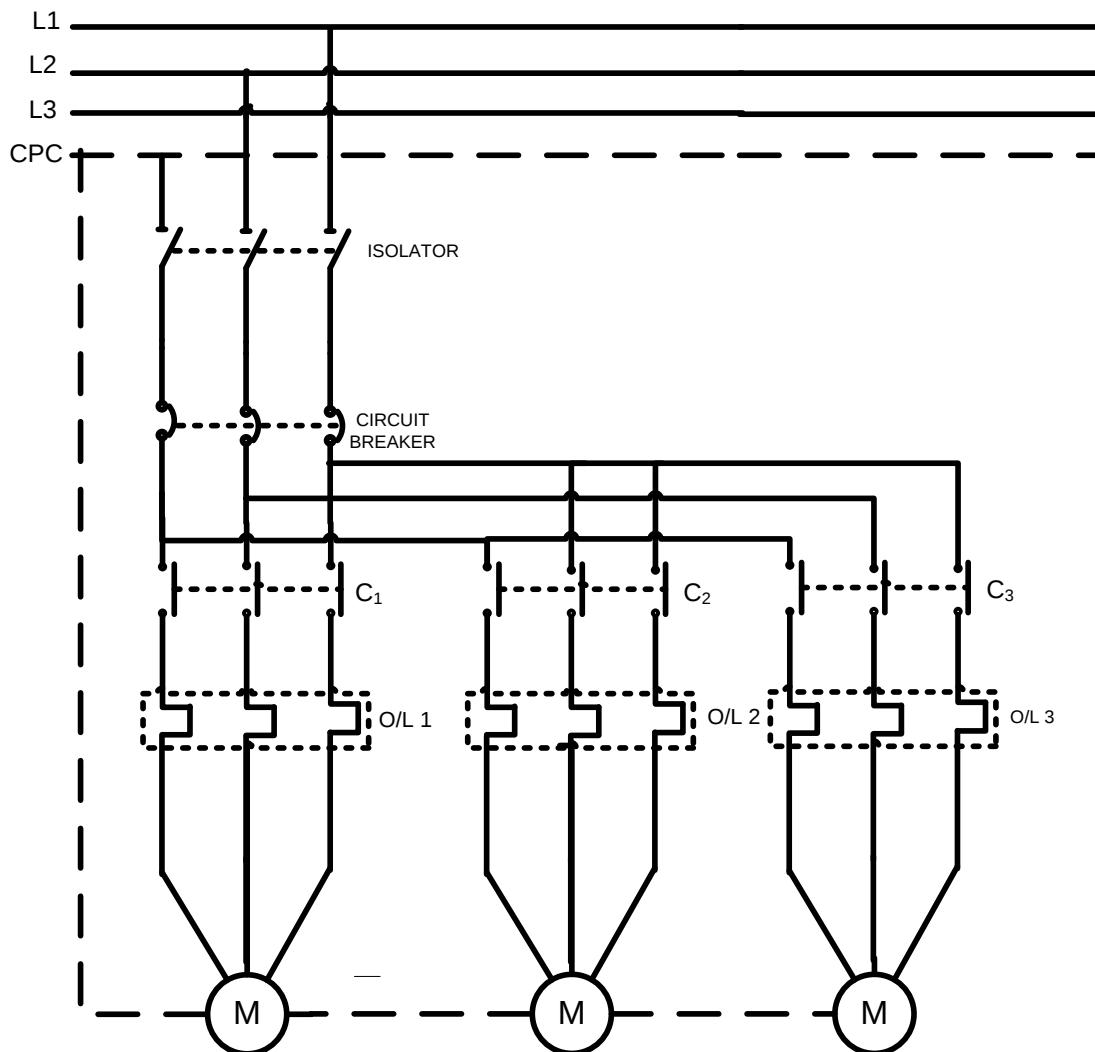
TASK 30: MATERIALS

1. 1 X 5A MCB
2. 3 X OVERLOAD RELAY
3. 1 X STOP PUSH BUTTON
4. 2 X START BUTTON
5. 3 X ON DELAY TIMER
6. 3 X CONTACTOR RELAY
7. 1 X 3PHASE MOTOR

TASK 30: CONTROL CIRCUIT



TASK 30: POWER CIRCUIT



TASK 31: INSTALLING A TRAFFIC LIGHT CONTROL CIRCUIT

No	Activity	Satisfactory			Not Satisfactory		
		Attempts			Attempts		
	During observation of work activities, the candidate demonstrated that they can:	1 st	2 nd	3 rd	1 st	2 nd	3 rd
	a) Install Traffic light control circuit correctly ▪ Mount contactor box ▪ Install conduit pipes using couplings and bushes ▪ Bend conduits to 90° ▪ Make Offsets ▪ Mount Saddles ▪ Terminate and install cables ▪ Use 1.5 mm² ▪ 3 timers ▪ 3 contactor relays	☐	☐	☐	☐	☐	☐
	b) Carryout tests using the right test instrument ▪ Continuity test using an ohmmeter ▪ Polarity test using an ohmmeter ▪ Insulation resistance test using a megger	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

Signed:.....

Signed:.....

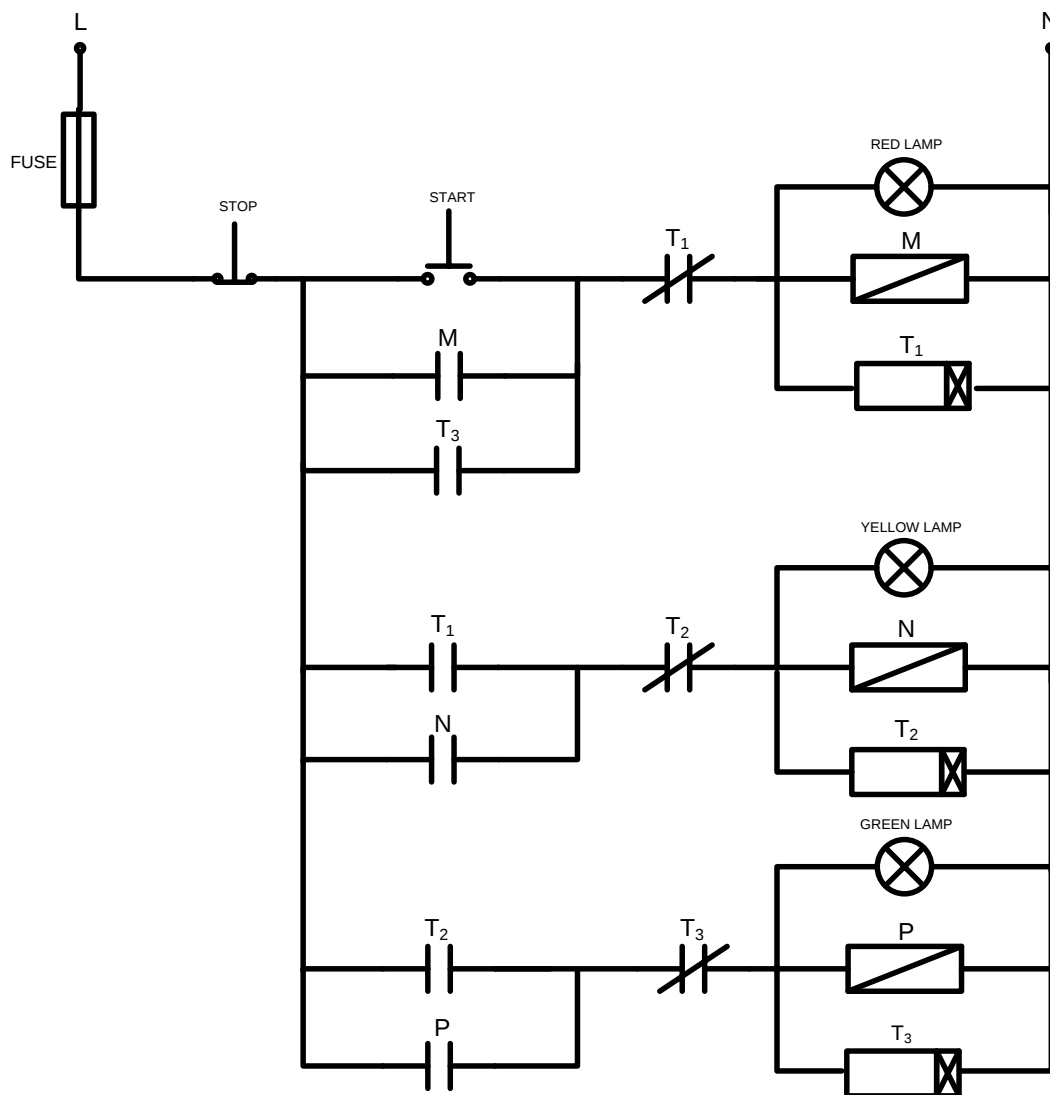
Date:.....

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TASK 31: MATERIALS

1. 1 X 5A MCB
2. 1 X STOP PUSH BUTTON
3. 1 X START BUTTON
4. 3 X ON DELAY TIMER
5. 3 X CONTACTOR RELAY
6. 3 X LAMPS

TASK 31: CONTROL CIRCUIT



TASK 32: MAINTAINING OF D.C MACHINES

No	Activity	Satisfactory			Not Satisfactory		
		Attempts			Attempts		
	During observation of work activities, the candidate demonstrated that they can:	1 st	2 nd	3 rd	1 st	2 nd	3 rd
	Maintain DC Machines correctly ▪ Plan and schedule maintenance ▪ Maintain motor housing, bearing, yoke and armature ▪ Clean and dry field winding ▪ Polish commutator bars ▪ Check condition of brushes and spring tension ▪ Trouble shoot motor • failing to start • Overload • Single phasing • under voltage • Motor temperature • Motor speed • Motor vibration • Motor windings ▪ Carryout the following tests: ▪ Continuity test ▪ Insulation resistance test	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

Signed:.....

Signed:.....

Date:.....

Date:.....

TASK 33: MAINTAINING OF SYNCHRONOUS MACHINES

No	Activity	Satisfactory			Not Satisfactory		
		Attempts			Attempts		
	During observation of work activities, the candidate demonstrated that they can:	1 st	2 nd	3 rd	1 st	2 nd	3 rd
	Maintain Synchronous Machines ▪ Plan and schedule maintenance ▪ Maintain Induction motor housing, bearing, stator and rotor ▪ Clean and dry stator winding ▪ Trouble shoot motor • failing to start • Overload • Single phasing • under voltage • Motor temperature • Motor speed • Motor vibration • Motor pulls out of synchronism • Motor fails to synchronise • Motor windings	☐	☐	☐	☐	☐	☐
	b) Carryout the following tests: ▪ Continuity test ▪ Insulation resistance test	☐	☐	☐	☐	☐	☐

Examiner's comments:

Examiner Name:.....

Learner's Name:.....

Signed:.....

Signed:.....

Date:.....

Date:.....

FINAL PRACTICAL ASSESSMENT SUMMARY

Practical assessment summary	Satisfactory	Not Satisfactory
APPLICATION OF SAFETY MEASURES	☐	☐
APPLICATION OF FASTENNING METHODS	☐	☐
IDENTIFICATION OF HAND TOOLS	☐	☐
IDENTIFICATION OF MEASURING INSTRUMENTS AND MARKING TOOLS	☐	☐
IDENTIFICATION OF DOMESTIC WIRING ACCESSORIES	☐	☐
INTERPRETING DOMESTIC ELECTRICAL SYMBOLS	☐	☐
CARRING OUT CONDUIT WORKS	☐	☐
MOUNTING OF THE ELECTRICAL METER BOX	☐	☐
MOUNTING OF THE DISTRIBUTION BOX	☐	☐
INSTALLATION OF LIGHTING CIRCUITS	☐	☐
INSTALLATION OF SOCKET OUTLET CIRCUITS	☐	☐
INSTALLATION OF GEYSER AND COOKER CONTROL UNIT	☐	☐
EARTHING OF INSTALLATION	☐	☐
INTERPRETING BASIC INDUSTRIAL CONTROL AND POWER CIRCUIT SYMBOLS	☐	☐
DESIGNING BASIC INDUSTRIAL POWER CIRCUITS	☐	☐

INSPECTION OF INDUSTRIAL CONTROL AND POWER CIRCUITS	☐	☐
TESTING OF INDUSTRIAL CONTROL AND POWER CIRCUITS	☐	☐
INSTALLATION OF DIRECT ON LINE CIRCUIT	☐	☐
INSTALLATION OF A DIRECT ON LINE LOCAL AND REMOTE CIRCUIT	☐	☐
INSTALLATION OF A DIRECT ONLINE JOGGING/INCHING CIRCUIT	☐	☐
INSTALLATION OF A DOOR BELL RING CIRCUIT	☐	☐
INSTALLATION OF A STAR-DELTA SEMI AUTOMATIC CONTROL AND POWER CIRCUIT	☐	☐
MAINTAINING INDUCTION MOTORS	☐	☐
INSTALLING A STAR-DELTA LOCAL AND REMOTE CIRCUIT	☐	☐
INSTALLING A STAR-DELTA FORWARD AND REVERSE CONTROL AND POWER CIRCUIT	☐	☐
INSTALLATION OF A SEMI AUTOMATIC CONTROL AND POWER CIRCUIT	☐	☐
INSTALLTION OF A SEQUENTIAL CONTROL AND POWER CIRCUIT	☐	☐
INSTALLATION OF A TRAFFIC LIGHT CONTROL CIRCUIT	☐	☐
MAINTAINING A DC MACHINE	☐	☐

MAINTAINING A SYNCHRONOUS MACHINE	☐	☐
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VALIDATION OF THE ASSESSMENT

NAME:.....

DATE:.....

POSITION: PRINCIPAL/HEAD OF INSTITUTION

SIGNATURE:.....

NAME INSTITUTION:.....

STAMP:

