Sample Test Project

Regional Skill Competitions – Level 3

Skill 18 – Electrical Installations

Category: Construction and Building Technology

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Section - A

A. Preface

Skill Explained:
An electrician works on commercial, residential, agricultural, and industrial projects. There is a direct relationship between the nature and quality of the product required and the payment made by the customer. Therefore, the electrician has a continuing responsibility to work professionally in order to meet the requirements of the customer and thus maintain and grow the business.

Electrical installation is closely associated with other parts of the construction industry and with the many products that support it, normally for commercial purposes. The electrician works internally, including the homes of customers and on small and major projects. He or she will plan and design, select and install, commission, test, report, maintain, fault find, and repair systems to a high standard. Work organization and self-management, communication, and interpersonal skills, problem solving, flexibility and a deep body of knowledge are the universal attributes of the outstanding electrician. Whether the electrician is working alone or in a team the individual takes on a high level of personal responsibility and autonomy. From working to provide a safe and reliable electrical installation and maintenance service, in accordance with relevant standards, through to diagnosing malfunctions, programming, and commissioning home and building automation systems, concentration, precision, accuracy, and attention to detail every step in the process matters and mistakes are largely irreversible, costly, and potentially life threatening.

With the international mobility of people, the electrician faces rapidly expanding opportunities and challenges. For the talented electrician there are many commercial and international opportunities; however, these carry with them the need to understand and work with diverse cultures and trends. The diversity of skills associated with electrical installations is therefore likely to expand.

Eligibility Criteria (for IndiaSkills 2018 and WorldSkills 2019):
Competitors born on or after 01 Jan 1998 are eligible to attend the Competition.

Total Duration: **12 Hours**

Section - B

B. Test Project

You have 12 hrs to complete this project. Complete all tasks from A to F.

Task A – Record the mixer/grinder name plate value and dismantle it.

You have 2 hrs to complete this task.

Record the specifications from the name plate of the equipment. Place the equipment on a soft surface and dismantle it. Trace the circuit and record it. Remove the motor from the plastic cover assembly with care. Remove the armature out of the stator.

Task B – Prepare winding data.

You have 3 hrs 30 minutes to complete this task.

Make visual inspection and prepare a table of findings. Count the slots and segments. Develop winding diagram from the recorded data. Use centre punch for correct marking.

Task C – Take out the damaged armature winding and record data for rewinding.

You have 1 hrs to complete this task.

Remove the old damaged winding from the armature slots. Record the winding data with care.

Task D – Prepare the armature for rewinding.

You have 1 hr to complete this task.

Once the old winding is removed, clean the armature slot and commutator segment. Check for proper laminations.

Task E – Rewind the armature.

You have 2 hrs 30 minutes to complete this task.

Use pen and paper wherever required and make proper preparation before rewinding. Rewind the armature correctly.

Task F – Solder and test the armature after rewinding
You have 2 hrs to complete this task.

After rewinding, solder properly for commutation. Test (all three) the armature with an external growler/test lamp. Varnish the armature. Place the armature in the stator. Reassemble in the plastic assembly and carry out load test.

Section – C

C. Marking Scheme

The Assessment is done by awarding points by adopting two methods, Measurement and Judgments.

- Measurement - One which is measurable
- Judgments - Based on Industry expectations

Aspects are criterias which are judged for assessment.

In Electrical installation skill markings are done on both measurement and judgmental basis. For measurement marks awarded will be 0 or full marks and for judgmental marks will be awarded as:

0- Below industry standard or no attempt:
1- Meets industry standard
2- Industry standard with elements of good practice
3- Excellent in comparison to industry standard

Example: If maximum marks for Judgment criteria are 1 and if all 3 Experts (Juries) give 3 points to a candidate, the candidate will get 1 mark for that aspect. If 2 Experts give 3 and 1 Expert gives 2 points, then candidate will get (3+3+2)/9*1 = 0.89 marks for that aspect out of 1 mark.

Sl. No.	**Criteria**	**Max. Marks**
1	Safety (Health & Safety Regulations)	5
2	Removal of armature winding	20
3	Bill of quantities	10
4	Rewinding the armature	25
5	Tracing the circuit	5
6	Preparation of winding diagram	20
7	Reassemble the equipment	10
8	Calculations	5

Sub Criteria Name or Description	Aspect Type M = Meas J = Judg	Aspect – Description	Judge Score	Max Mark	Marks Obtained
1- Safety (Health & Safety Regulations)					
	M	No breaches and maintained a tidy workspace		2	
		Any breach must be confirmed by at least 2 Experts and recorded in a skill log book			
	M	Identify and use the PPE in the context		3	
		Any breach must be confirmed by at least 2 Experts and recorded in a skill log book			
2 – Removal of armature winding					
	M	By following standard steps, remove the armature winding from its slots		20	
3 - Bill of quantities					
	M	Identify the tools/equipment/materials with specifications (to be verified by experts)		5	
	M	Jot down the bill of quantities with correct number of components (to be verified by experts)		5	

4 – Rewinding the armature					
	M	Rewind the armature using the winding diagram developed		15	
	M	Selection of materials		4	
	J	Make optimal use of resources		2	
	M	Maintain neatness of the work area		2	
	M	Stack all the tools and components correctly and cleanly after use		2	
5 – Tracing the circuit					
	M	Recording of internal connection while dismantling		5	
6 – Preparation of winding diagram					
	M	Development of winding diagram		20	
7 – Reassemble the equipment					
	M	Reassemble the equipment in correct sequence		10	
8 – Calculations					
	M	Use calculations wherever required for estimation		5	
		Total		**100.00**	

Section - D

D. Infrastructure List

- Infrastructure List (Tool and equipment including raw material)

The quantity is given for each candidate

S. No.	Item	Requirement/specification
Tools		
1	Electrician Tool Kit	1 Per Competitor
2	Combination Plier Insulated 200mm	1 Per Competitor
3	Scissor 150mm	1 Per Competitor
4	Mallet hardwood 0.5kg	1 Per Competitor
5	Soldering iron 25W, 125W 240V	1 Per Competitor
6	Tray 200mm×200mm×50mm	1 Per Competitor
7	Scale with weights 1 to 450g	1 Per Competitor
8	Outside micrometer 0-25mm	1 Per Competitor
9	Tweezer 100mm	1 Per Competitor
10	Stand winder for armature	1 Per Competitor
11	Power hacksaw	1 Per Competitor
Equipment		
12	Growler external with hacksaw blade	1 Per Competitor

13	Mixer/grinder with burnt out armature	1 Per Competitor
14	Rotor balancing machine for small armature	1 Per Competitor
15	Multimeter 0 -1kohm, 2.5 to 5000V	1 Per Competitor
Materials		
16	7 milli milnex paper	As per requirement
17	30 SWG super enameled copper wire	300g
18	Empire sleeve 1mm, 2mm	1 meter each
19	Cotton tape 20mm	1 meter
20	Binding/Hemp thread	1 roll
21	Hylam/fibre wedge 2mm thick	As per requirement
22	10 milli triplex paper	As per requirement
23	V-32 insulation vaernish	½ litre
24	Resin core solder 50/40	20g
25	Resin flux (powder type)	10g

Section – E

E. Instructions for candidates

- The Health, Safety, and Environment Policy and Regulations are given below for the skill competition on electrical installation.
- During the competition, competitors:
    - MUST wear ear protection and eye protection at all times.
    - All marking points regarding health and safety marks will be made clear to all Competitors before competition begins.
- If the supervising expert, who are watching the competitors, witness any breach of the Health, Safety and Environment requirements during the Competition, he will:
- On the first occasion: Warn the Competitor and make a note of the breach;
- On the second occasion: Warn the Competitor and make a note of the breach;
- On the third occasion: A record of the breach will be made and result in a loss of the Health and Safety marks.

Section – F

F. Health, Safety, and Environment

1. All accredited participants and supporting volunteers will abide by rules and regulations with regards to Health, Safety, and Environment of the Competition venue.

2. All participants, technicians and supporting staff will wear the required protective Personnel clothing. The Competitors must wear proper dress suiting the task and wear goggles while performing wood work

3. All participants will assume liability for all risks of injury and damage to property, loss of property, which might be associated with or result from participation in the event. The organizers will not be liable for any damage, however in case of Injury the competitor will immediately inform the immediate organizer for medical attention.