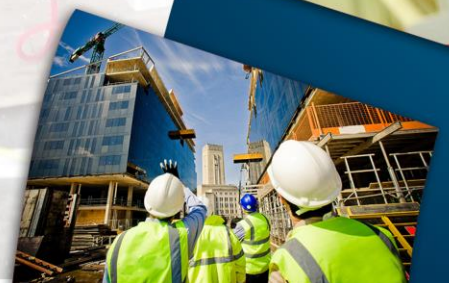
National Vocational Certificate
Level 1 in
Electrical Technology
(Building Electricity)



CBT Curriculum

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Contents

1. Introduction

Todays 'World of Work' has undergone radical changes. The emergence of new technologies, global markets for products and services, and international competition require economies to upgrade and enhance the skill level of their human resources. Technical and Vocational Education and Training (TVET) systems all over the world are constantly challenged by this question of how to respond to the demand of a knowledge-based economy. As TVET systems and their training programmes directly relate to the world of work in terms of quantity and quality output, the approach of TVET programmes need to focus on the acquisition of technical and non-technical skills, also referred to employability skills.

With the release of the National Skills Strategy 2009-2013 the Pakistan government has made skills development a political priority. The framework for skills development aims to:

- Change TVET education from time-bound, curriculum-based training to flexible, competency-based training;
- Bring about a shift from supply-led training to demand-driven (outcome-based) skills development by promoting the role of industry in designing and delivering TVET.

The curriculum for ***Building Electrician (Helper) – Level 1***aims to respond to this demand. Ithas beendeveloped asan outcome-based course designed to teach the employability skills needed to succeed in a high-performance work environment, as defined by labour market requirements. Although occupation specific, this course seamlessly articulates with advanced training programmes on NVQF level 2, such as *Electrical &Electronic Assembler (Assistant), Electro Machine Installer& Repairer (Assistant), Electrical Equipment Installer& Repairer (Assistant),* and*Industrial Electrician(Assistant)*.

1.1 Overall course objective

The overall objective of this introductory courseis to teach trainees transferable skills necessary to succeed in the ever-changing workplace through teamwork, problem-solving, communication, self-management, and career readiness. Trainees will enhance soft skills, basic workplace skills, interpersonal skills, communication skills, and leadership skills while becoming career-ready.

1.2 Course competencies

Curriculum modules (training input) are clusters of competenciesexpressed inlearning units, learning outcomes, and learning elements.After successful completion of the two curriculum modules of this course, the traineehas gained a range of competenciesrequired to proceed in the world of work. The competencies stated in table 1 reflect industry requirements expressed in competency standards (training output).

Table 1: Relationship of curriculum modules withcompetency standards

Curriculum Modules (training input)	Competency Standards (training output)
Module 1: Workshop introduction LU-1: Maintain health and safety LU-2: Carry out basic maintenance LU-3: Demonstrate positive workplace attitude and behaviours	- Maintain health, safety and cleanliness - Carry out maintenance procedures as Building Electrician (Helper) - Demonstrate positive workplace attitude and behaviours
Module 2: Workshop communication LU-1: Communicate in the workplace LU-2: Complete work documents LU-3: Apply basic numeracy LU-4: Develop personal career portfolio	- Communicate in different work contexts - Apply basic reading, writing and speaking skills in different life contexts - Apply basic numeracy skills in different life contexts - Produce a plan for career options related to a Building Electrician (Helper)

1.3 Job opportunities

The level 1 training course related to***Building Electrician (Helper)***transfers work-readiness skills (employability skills) and articulates with a number of level 2 training programmes in Electrical Engineering.Based onthe design and flexible approach qualifiedtrainees will find opportunitiesin a number of specialised areas to workas a 'Helper', such as*Electrical &Electronic Assembler (Helper), Electro Machine Installer & Repairer (Helper), Electrical Equipment Installer& Repairer (Helper),* and*Industrial Electrician (Helper)*.

After completion of the level 2 training programme qualifiedtrainees can further progress and embark on a career in the field of Electrical Engineering, providing job opportunities as Technician, Foreman, Manager, Owner or Electrical Engineer in government, semi-government or private enterprises. Experienced Electricians may advance through promotions with the same employer or by moving to more advanced positions with other employers.

1.4 Trainee entry level

Individualswho wish to enter this course of study have to comply against the following criteria:

- Grade 8 (Middle) or equivalent;
- Comfort level of English language and mathematics;
- Satisfactory completion of appropriate admission assessment test.

1.5 Trainer requirements

Trainers who wish to offer this programme should meet one of the following requirements:

- B.Sc. Eng. and 2 years of relevant work experience; or
- B-Tech and 3 years of relevant work experience; or
- Diploma Associate Engineer (DAE) and 5 years relevant work experience; or
- Certificate as Building Electrician with 8 years relevant work experience

Trainers offering this programme must be computer literate and be conversant with the delivery of competency-based education and training (CBET). All legislative requirements applicable to carry out training and assessment, if any, must be complied with.

1.6 Teaching strategies in a competency-based environment

Training in a competency-based environment differs from the traditional method of training delivery.It is based on defined competency standards, which are industry oriented.

The traditional role of a trainer changes and shifts towards the facilitation of training.A facilitator in CBETencourages and assists trainees to learn for themselves. Trainees are likely to work in groups (pairs)and all doing something different. Some are doing practical tasks in the workshop, some writing, some not even in the classroom or workshop but in another part of the building using specialist equipment, working on computers doing research on the Internet or the library. As trainees learn at different pace they might well be at different stages in their learning,thus learning must betailored to suit individual needs.

The following facilitation methods (teaching strategies) are generally employed inCBETprogrammes:

- **Direct Instruction Method:** This might beeffective when introducing a new topic to a larger group of trainees in a relative short amount of time. In most cases this method relies on one-way communication, hence there are limited opportunities to get feedback on the trainee's understanding.

- **Discussion Method:** This allows trainees to actively participate in sharing knowledge and ideas. It will help the trainer to determine whether trainees understand the content of the topic. On the other hand, there is a possibility ofstraying offtopic under discussion and some trainees dominating otherson their views.

- **Small Group Method:** Pairing trainees to help and learn from each other often results in faster knowledge/skill transfer than with the whole class. The physical arrangement of the classroom/workshop and individual assessment may be challenging also use analogy method.

- **Problem Solving Method:** This is avery popular teaching strategy for CBET. Trainees are challenged and are usually highly motivated when they gain new knowledge and skills by solvingproblems (Contingency skills). Trainees develop critical thinking skills and the ability to adapt to new learning situations (Transfer skills). It might be time consuming and because trainees sometimes work individually, they may not learn all the things that they are expected to learn.

- **Research Method:** This is used for workshops and laboratory tasks, field experiments, and case studies. It encourages trainees to investigate and find answers for themselves and to critically evaluate information. It however requires a lot of time and careful planning of research projects for the trainee.

1.7 Medium of instruction

Instructions will be provided in Urdu, local languages and/or English.

1.8 Sequence and delivery of the modules

The curriculum for ***Building Electrician (Helper) – NVQF level 1***, consists of two (2) modules and should be delivered in the following sequence:

Module 1: Workplace introduction

Learning units within this module can be delivered interchangeably as stand-alone modules or in a holistic approach

Module 2: Workplace communication

Learning units within this module can be delivered interchangeably as stand-alone modules or in a holistic approach

All theoretical content related to the modules should be delivered, where possible,in an applied settingrelated to the ***Building Electrician (Helper)*** work environment.

2. Overview about the programme: Curriculum for Building Electrician (Helper)–NVQF Level 1

Module Title and Aim	Learning Units	Theory[1] hours	Workplace[2] hours	Timeframe of modules
Module 1: Workplace introduction ***Aim:*** To provide trainees with the knowledge and skills to carry out safely basic maintenance work asBuilding Electrician (Helper)	**LU-1:** Maintain health and safety **LU-2:** Carry out basic maintenance **LU-3:** Demonstrate positive workplace attitude and behaviours	**65**	**95**	**160**
Module 2: Workplace communication ***Aim:*** To provide trainees with the knowledge and skills to effectively communicate verbally and non-verbally in aBuilding Electrician (Helper) work environment	**LU-1:** Communicate in the workplace **LU-2:** Complete work documents **LU-3:** Apply basic numeracy **LU-4:** Develop personal career portfolio	**115**	**55**	**170**

[1]Learning hours in training provider premises
[2]Training workshop, laboratory and on-the-job workplace

3. Building Electrician (Helper)Curriculum Contents

Module 1:	**Workplace introduction**				
Objective of the Module:	On completion of this module the trainee will be able to demonstrate the following competencies according to industry standards and/or requirements: • Maintain health and safety • Carry out maintenance procedures as part of Building Electrician (Helper) • Apply a problem solving method • Demonstrate positive workplace attitude and behaviours				
Duration:	**Total: 160 hours**	**Theory: 65hours**		**Practice: 95hours**	
Learning Unit	**Learning Outcomes**	**Learning Elements**	**Duration(Hours)**	**Materials Required**	**Learning Place**
LU-1: **Maintain health and safety** *This learning unit addresses competency standard(s):* *FL-001 – A1/2/3/4** *FL-012 – A3** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	1.1 Define the term 'hazard'	Definition • Hazard	**Total** 60 **Theory** 20 **Practical** 40	• Fire extinguisher • Fire blanket • Fire bucket • Safety signage • Personal protective equipment and clothing • Teaching aids • Flip charts • Computer *(Preferably with internet access)*	• Classroom • Workplace
	1.2 Identify the different types of hazards	• Acute hazards • Chronic hazards			
	1.3 Describe the different ways of controlling hazards	• Elimination • Substitution • Enclosure or isolation • Work practices • Training and education • Administrative controls			
	1.4 Describe the procedures for reporting hazards	Procedures for reporting hazards			
	1.5 Define the term 'personal protective equipment and clothing'	Definition • Personal protective equipment and clothing			

	1.6 Identify different types of personal protective clothing and equipment, their use and storage	Clothing • Overall • Steel cap boots • High visibility vest • Jacket • Rubber insulated gloves Equipment • Safety goggles • Safety hat • Ear muffs/plugs Use and storage			
	1.7 Define the term ‘emergency’ and ‘evacuation’	Definition • Emergency Definition • Evacuation			
	1.8 Identify emergency situations	• Accidents • Fire • Electric shock • Flood • Chemical spill			
	1.9 Demonstrate procedures for dealing with emergency and evacuation situations	Roles and responsibilities • Safety officer • Supervisor • Worker Procedures			

	1.10 List fire prevention methods	• House keeping • Training			
	1.11 Describe the different classes of fire	• Class A – wood, paper or cloth • Class B – liquids • Class C – gas • Class E – electrical			
	1.12 Identify different types of fire fighting equipment	• Fire blanket • Fire extinguisher			
	1.13 Demonstrate use of fire fighting equipment	• Procedures for using fire fighting equipment			
	1.14 Describe the key features of safety signs and symbols	• Shape • Colour • Graphics			
	1.15 Explain the meaning of safety signs and symbols	• Hazard identification • Facility or location signs • Site safety • Directional • Traffic • Warning signs and symbols			
	1.16 Describe the importance of cleanliness	• Personal hygiene • Workplace cleanliness			
	1.17 Demonstrate procedures for handling and storing items and materials	• Procedures for handling and storing			

LU-2: **Carry out basic maintenance** *This learning unit addresses competency standard(s):* *FL-003 – A1/2/3** *FL-012 – A1/2** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	2.1 Define the terms 'preventive' and 'corrective maintenance'	Definition • Preventive maintenance • Corrective maintenance	**Total** 60 **Theory** 15 **Practical** 45	• Hand tools • Tools and materials for cleaning, lubricating, sharpening, oiling, and insulating • Labels • Storage facilities • Examples of workplace documentation • Safety signage • Personal protective equipment and clothing • Teaching aids • Flip charts • Computer *(Preferably with internet access)*	• Classroom • Workplace
	2.2 Describe benefits of preventive maintenance	Benefits may include: • Safety • Efficiency • Time- and cost saving			
	2.3 Identify hazards associated with preventive maintenance	Hazards may include but are not limited to: • Cuts • Burns • Electric shocks • Fire • Explosion			
	2.4 Demonstrate procedures for conducting basic checks on tools and equipment	• Labeling of functional and non-functional tools and equipment			
	2.5 Perform basic maintenance procedures as part of Building Electrician (Helper)	Maintenance programme • Cleaning and lubricating • Sharpening • Oiling • Insulating			

	2.6 Demonstrate procedures for storing tools and equipment	• Inventory of tools and equipment • Proper storage of tools and equipment • Documentation of maintenance procedures			
	2.7 Demonstrate problem solving procedures as Building Electrician (Helper) related to preventive maintenance	Apply the Bransford IDEAL model (problem solving) • Identify the problem • Define the problem through thinking about it and sorting out the relevant information • Explore solutions through looking at alternatives, brainstorming, and checking out different points of view • Act on strategies • Look back and evaluate the effects of your capacity			

LU-3: **Demonstrate positive workplace attitude and behaviours** *This learning unit addresses competency standard(s):* *FL-007 – A1/2/3** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	3.1 Define the term 'work ethic'	Definition • Work ethic	**Total** 40 **Theory** 30 **Practical** 10	• Teaching aids • Flip charts • Computer *(Preferably with internet access)*	• Classroom
	3.2 Describe factors that demonstrate strong work ethic	Work ethic factors • Integrity - Confidentiality • Sense of responsibility - Time management • Emphasis on quality - Commitment to work • Discipline - Patience and tolerance • Sense of teamwork - Meeting goals as a team Customer service Communication Attire Influencing factors,such as: • Anger • Stress • Depression Ways to assess own professional behaviour			

Module 2:	**Workplace communication**				
Objective of the Module:	On completion of this module the trainee will be able to demonstrate the following competencies according to industry standards and/or requirements: • Communicate in different work contexts • Apply basic reading, writing and speaking skills in English in different life contexts • Apply basic numeracy skills in different life contexts • Produce a plan for career options related to Building Electrician (Helper)				
Duration:	**Total: 170 hours**	**Theory: 115hours**		**Practice: 55hours**	
Learning Unit	**Learning Outcomes**	**Learning Elements**	**Duration**	**Materials Required**	**Learning Place**
LU-1: **Communicate in the workplace** *This learning unit addresses competency standard(s):* *FL-002 – A1/2/3** *FL-005 – A3** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	1.1 Define technical terms related to succeeding on the job	Terms pertaining to basic work skillsin Building Electrician (Helper)	**Total** 30 **Theory** 15 **Practical** 15	• Examples of workplace documentation • Workplace forms • Safety signage • Teaching aids • Flip charts • Computer *(Preferably with internet access)*	• Classroom • Workplace
	1.2 List different types of communication	Face to face • Verbal and non verbal Written • Work instructions • Specifications • Safety sheets • Notice boards Visual • Safety signs • Hand signals Electronic • Purpose and function of electronic communication devices, such as: - Two way radio - Telephone, Facsimile - E-mail			

	1.3 Demonstrate receiving and responding to information using different communication types	• Effective face to face communication - Appropriate communication etiquette • Effective written communication - Appropriate communication etiquette • Effective visual communication - Appropriate communication etiquette • Effective electronic communication - Appropriate communication etiquette			

LU-2: Complete work-related documents *This learning unit addresses competency standard(s):* *FL-002 – A4** *FL-005 – A1/2** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	2.1 Assess the need for accurate written directions to complete a task	Interpretation of texts, key words and phrases, in work related documents, such as • Workplace forms • Job cards • Installation guides • Manufacturers' specifications Completion of work related documents • Workplace forms • Job cards	**Total** 60 **Theory** 40 **Practical** 20	• Examples of workplace documentation • Workplace forms • Job cards • Installation guides • Manufacturers' specifications • Technical literature • Safety signage • Teaching aids • Flip charts • Computer *(Preferably with internet access)*	• Classroom • Workplace
	2.2Write a short reportin simple English for practical purposesrelated to theBuilding Electrician (Helper) work environment	Planning • Introduction • Conclusion • Summary Drafting Editing • Spelling • Grammar • Punctuation			
	2.3 Demonstrate understanding from reading a simple text related tothe work of a Building Electrician (Helper)	Purpose of text Main idea(s) of text Key words and phrases Opinion on text			

LU-3: **Apply basic numeracy** *This learning unit addresses competency standard(s):* *FL-006 – A1/2/3/4/5** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	3.1 Identify two- and three dimensional shapes	Two or three dimensional shapes may include: • Rectangle • Triangle • Sphere • Cube • Cylinder • Pyramid • Square • Polygons • Circle • Cuboids Use correct terminology, such as: • Horizontal • Vertical • Parallel • Sides • Corners • Edges • Arc • Angles • Degrees • Length • Width • Breadth • Height • Straight • Points • Diameter • Radius	**Total** 50 **Theory** 40 **Practical** 10	• Two- and three dimensional shapes / objects • Measuring instruments, such as rulers, watches / clocks, scales, thermometers, AVO meter, gravity meter • Teaching aids • Flip charts • Computer *(Preferably with internet access)*	• Classroom • Workplace

	3.2 Sketch in diagrammatic form simple two and three-dimensional shapes and objects	Two or three dimensional objects may include: • Rectangle • Triangle • Sphere • Cube • Cylinder • Pyramid • Square • Polygons • Circle • Cuboids			
	3.3 Assemble simple three-dimensional objects by following construction instructions, plans or diagrams	Simple three dimensional objects may include: • Cube • Cylinder • Pyramid • Cuboids			
	3.4 Identify measuring instruments used asBuilding Electrician (Helper)	Measuring instruments for Building Electrician (Helper) may include: Rulers, including use • Watches / clocks • Scales • Thermometers • AVO meter • Gravity meter • Micro meter • Vernir caliplier • Micro meter			

	3.5 Calculate area and volume of regular shapes and objects	Simple formulae for calculating area and volume			
	3.6 Demonstrate basic calculation procedures related to money and time, including whole numbers, simple fractions and decimals	Money • Addition • Subtraction • Division • Percentage • Rounding Time • Calculate time lapsed • Summation of time • Appending additional time			
	3.7 Demonstrate knowledge of graphs and tables	Graphs may include: • Simple line and bar graphs Tables may include: • Simple two and three column tables • Tables used in everyday life such as timetables Collect, sort and record data • Preparation of basic data, tables and graphs Construct and label graphs • Increasing • Decreasing • Constant value			

	3.8 Demonstrate use of simple formulae and algebraic expressions	Simple formulae and algebraic expressions may relate to: • Area • Perimeter • Dimensions of regular and irregular shapes Verification may include: • Estimation • Backtracking • Improve			
LU-4: **Develop a personal career portfolio** *This learning unit addresses competency standard(s):* *FL-017 – A1/2** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	4.1 Describe the purpose of developing a personal career profile	• Personal development • Compatible career options • Sources for career information	**Total** 30 **Theory** 20 **Practical** 10	• Teaching aids • Flip charts • Computer *(Preferably with internet access)*	• Classroom
	4.2 Assess personal values, knowledge, aptitudes, skills, interest, experience, and accomplishments	• Analysis of own knowledge, skills, and abilities • Compatible career options • Sources for career information			
	4.3 Identify realistic and measurable personal and professional goals	• Short-term goals • Long-term goals • Milestones • Completion date • Criteria for review • Time period			

4. Assessment guidance

Competency-based assessment is the process of gathering evidence to confirm the candidate's ability to perform according to specified outcomes articulated in the competency standard(s).

4.1 Types of assessment

a) Sessional assessment

The goal ofsessional assessment is to monitor student progress in order to provide constant feedback. This feedback can be used by the trainers to improve their teaching and by learners to improve their learning.

More specifically, sessional assessments Help learners to identify their strengths and weaknesses and Help trainers to recognize where learners are struggling and address problems immediately

Examples of sessional assessments include:

- Observations
- Presentations
- Activity sheets
- Project work
- Oral questions

b) Summative (final) assessment

The goal of summative (final) assessment is to evaluate learning progress at the end of a training programme by comparing it against, e.g. set of competency standards.

Examples of summative assessments include:

- Direct observation of work activities
- Final project
- Written questions

4.2 Principles of assessment

When conducting assessment or developing assessment tools, trainers/assessors need to ensure that the following principles of assessment are met:

Validity

- Indicates if the assessment outcome is supported by evidence. The assessment outcome is valid if the assessment methods and materials reflect the critical aspects of evidence required by the competency standards (Competency units, performance criteria, knowledge and understanding).

Reliability

- Indicates the level of consistency and accuracy of the assessment outcomes. The assessment is reliable if the assessment outcome will produce the same result for learners with equal competence at different times or places, regardless of the trainer or assessor conducting the assessment.

Flexibility

- Indicates the opportunity for learners to discuss certain aspects of their assessment with their trainer or assessor, such as scheduling the assessment. All learners should be made aware of the purpose of assessment, the assessment criteria, the methods and tools used, and the context and proposed timing of the assessment well in advance. This can be achieved by drawing up a plan for assessment.

Fair assessment

- Fair assessment does not advantage or disadvantage particular learners because of status, race, beliefs, culture and/or gender. This also means that assessment methods may need to be adjusted for learners with disabilities or cultural differences. An assessment should not place unnecessary demands on learners that may prevent them from demonstrating competence.

4.3 Assessment template – Sessional and Summative assessment

Module 1: Workplace introduction

Learning Units	Recommended form of assessment	
	Sessional	**Summative**
Maintain health and safety *This learning unit addresses competency standard(s):* *FL-001 – A1/2/3/4** *FL-012 – A3** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	• Observation • Activity sheets • Simulation • Oral and written questions • Demonstration	Integrated assessment: • Project • Demonstration • Role play • Oral and written questions
Carry out basic maintenance *This learning unit addresses competency standard(s):* *FL-003 – A1/2/3** *FL-012 – A1/2** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	• Observation • Activity sheets • Simulation • Oral and written questions • Demonstration	
Demonstrate positive workplace attitude and behaviours *This learning unit addresses competency standard(s):* *FL-007 – A1/2/3** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	• Observation • Activity sheets • Simulation • Oral and written questions • Demonstration	

Module 2: Workplace communication

Learning Units	Recommended form of assessment	
	Sessional	**Summative**
Communicate in the workplace *This learning unit addresses competency standard(s):* *FL-002 – A1/2/3** *FL-005 – A3** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	• Observation • Activity sheets • Role play • Oral and written questions	Integrated assessment: • Project • Demonstration • Role play • Oral and written questions
Complete work-related documents *This learning unit addresses competency standard(s):* *FL-002 – A4** *FL-005 – A1/2** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	• Observation • Activity sheets • Role play • Oral and written questions	
Apply basic numeracy *This learning unit addresses competency standard(s):* *FL-006 – A1/2/3/4/5** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	• Observation • Activity sheets • Role play Oral and written questions	
Develop a personal career portfolio *This learning unit addresses competency standard(s):* *FL-017 – A1/2** ** In absence of a national coding system for competency standards, internal training provider codes are being used*	• Oral and written questions	

5. List of Tools, Machinery & Equipment

Occupational title	Building Electrician (Helper) – Level 1	
Duration	3 months	
Sr. No.	**Name of Item/ Equipment / Tools**	**Quantity**
1.	Fire extinguisher	5
2.	Fire blanket	5
3.	Fire bucket	5
4.	Personal protective equipment and clothing	25
5.	Teaching aids (Learning material, visual material)	As per dimand
6.	Flip charts	As per dimond
7.	Computer	02
8.	Hand tools	25
9.	Tools and materials for cleaning, lubricating, sharpening, oiling, and insulating	5
10.	Tags/Labels	25
11.	Storage facilities	5
12.	Examples of workplace documentation, Workplace forms, Job cards, Installation guides, Manufacturers' specifications, Technical literature	5
13.	Safety signage	5

6. List of Consumable Supplies

Occupational title	Building Electrician (Helper) – Level 1
Duration	3 months

Sr. No.	Name of Consumable Supplies	Quantity
1.	Notepad	50
2.	Ball pens	50
3.	Pencils	50
4.	Erasers	50
5.	Sharpeners	50
6.	White board markers in different colours	20
7.	Stapler	15
8.	Paper punch	15
9.	Ruler	20
10.	Compass	10

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