BAOBAB SECONDARY SCHOOL
FORM TWO HOLIDAY PACKAGE
ELECTRICAL INSTALLATION

SECTION A: SAFETY GEAR, TOOLS AND EQUIPMENT

1. Why are safety gear vital in any working environment?
2. Why is preventive maintenance of safety gear essential?
3. Mention four safety gear used when performing preventive maintenance on an electric machine.
4. Differentiate hand tools from power tools.
5. Why are tools of the same type normally kept together?
6. Why is it necessary to clean tools after use?
7. Why are measuring tools needed in electrical installation works?
8. What are the typical applications of the following measuring tools?

(a) Voltmeter (b) Ammeter (c) Ohmmeter (d) Multimeter

9. How do you maintain electrical measuring tools?
10. Why is passive equipment required in an electrical system?
11. Why is preventive maintenance of passive electrical equipment essential?
12. Differentiate electrical equipment from electrical machines.
13. Why is active equipment required in electrical systems?
14. Differentiate active equipment from passive equipment.
15. Differentiate power machines from manual machines.
16. What are the two significant parts of a power machine?
17. What are the functions of a motor?
18. Why is lubrication essential in any power machine?
19. What are the two significant parts of a manual machine?
20. What is the function of the following manual machines?
    - (a) Rotary switch
    - (b) Changeover switch

SECTION B: REVISION EXERCISE 1

1. Why is safety gear used in the workplace?
2. Mention at least four types of hand tools and their uses.
3. Why is high-visibility clothing needed?
4. What are the safety procedures for maintaining hand tools?
5. What safety precautions should be taken when using electrical hand tools?
6. Mention the role of cable plug crimping tools in electrical engineering.
7. Why is calibrating an electrical measuring tool important?
8. Differentiate between analogue and digital multimeters.
9. Why are active and passive equipment required in electrical engineering systems?
10. Why is lubrication necessary in rotating parts of a power machine?
11. Mention the advantages and disadvantages of using power machines.
12. Mention the advantages and disadvantages of manual machines.

SECTION C: ELECTRICAL JOINTS AND SOLDERING

Exercise 2.1: Eyelet and Crimp Joints

1. Why is an eyelet joint essential in electrical engineering?
2. What might happen if an electrical joint is:
    - (i) Loose?
    - (ii) Not insulated?
3. Differentiate a crimp joint from an eyelet joint.

4. Where is the crimp joint applied?
5. Why is a crimping tool essential when making a crimp joint?

Parallel Groove Clamp Joints

1. Why is a parallel groove clamp joint essential in electrical installation?
2. Give one application area for each of the four types of parallel connectors.
3. Is it possible to use an eyelet joint to replace a parallel joint? Give a reason for your answer.
4. What is the difference between parallel joints and gluing?

Bolted Joints

1. Differentiate a bolted joint from a parallel joint.
2. Why is a bolted joint needed for electrical installation?
3. In which application areas can a bolted joint be seen or encountered?

Twisted Joints

1. Explain why the rat-tail twisted joint must be in the junction box.
2. Name one application area for the twisted cable joint in an electrical field.
3. Can a twisted joint extend wire length in an electrical distribution line? Give a reason.

Tee Joints

1. Differentiate a Tee joint from a rat-tail joint.
2. Is insulating a Tee joint in an overhead power transmission line necessary? Give a reason.
3. Name one area of application for a Tee joint in the electrical field.
4. Enumerate the process of making a Tee joint for an electrical application.

Competence-Based Question

A technician uses a rat-tail twisted joint to connect wires in a lighting circuit but leaves the joint exposed outside the junction box. Explain why this installation is unsafe and suggest the correct practice.

Soft Soldering

1. Why is a combination plier essential for soft soldering?
2. What is the maximum temperature in soft soldering?
3. Can aluminium and stainless steel be soldered using soft soldering? Justify your YES or NO answer.
4. Why is it essential to heat the part to be soldered before applying solder when performing soldering work?

Hard Soldering and Brazing

1. What is the difference between soft soldering and hard soldering?
2. State one typical application for each type of hard soldering.
3. Why is it critical to clean the parts to be joined when brazing?
4. Why is it recommended to remove flux residue after joining metal parts using brazing?

SECTION D: DOMESTIC ELECTRICAL INSTALLATION

Switches and Circuit Breakers

1. Why is a one-way switch needed in electrical circuits?
2. What is the function of a circuit breaker in any electrical wiring?
3. Where can you apply the following types of switches?
    - (a) One-way two-gang switch
    - (b) One-way three-gang switch
4. What are the physical features of a two-way switch?
5. Why are two-way switches essential in electrical installation?
6. Why must two-way switches operate in pairs?
7. Can a two-way switch perform the function of a one-way one-gang switch? Justify your answer.
8. Why are intermediate switches essential in domestic electrical installation?

9. In what condition would you need to install the intermediate switching circuit in domestic wiring?
10. Can an intermediate switch perform the function of a two-way switch and a one-way gang switch? Justify your answer.

Radial and Ring Circuits

1. State the IEE regulations concerning A2 and A3 radial power circuits.
2. Why do we need a power socket outlet in domestic wiring?
3. Differentiate between radial and ring circuits.
4. Specify the size of conductors to be used in ring circuits.
5. Why is a ring power circuit essential in domestic wiring?
6. Why is a spur connection needed in a ring circuit?

Electrical Cooker

1. State the function of a thermostat in the oven circuit.
2. What happens if a bulb is connected to the same circuit as a cooker?
3. Why do we need a cooker control unit?
4. Why are large cables and fuses recommended in an electric cooker circuit?

Water Heater

1. Why do we need a double-pole switch in a water heater circuit?
2. Why is it not recommended to switch on a newly installed heater without filling water?
3. Specify the size of conductors to be used in a water heater circuit.

SECTION E: ELECTRIC BELLS, BUZZERS AND INDICATOR BOARDS

Single-Stroke Bell

1. Why do we need a single-stroke bell?
2. Where can you apply a single-stroke bell?
3. Can you use a single-stroke bell in a burglar alarm circuit? Justify your answer.
4. How does a single-stroke bell operate?

Trembler Bell

1. What is the function of a coil in a trembler bell?
2. What is the application of a trembler bell?
3. Differentiate the trembler bell from the single-stroke bell.

Bells and Buzzers

1. What is the difference between a bell and a buzzer?
2. Why do we need a buzzer?
3. Can a buzzer play music?
4. Can a buzzer be used as a doorbell?

Continuous Ringing Bell

1. Differentiate between a continuous ringing bell and a single-stroke bell.
2. Mention the application of a continuous ringing bell.
3. Can you use a continuous ringing bell in a fire alarm circuit? Justify your answer.
4. How can you reset a continuously ringing bell?
5. How does a continuous ringing bell operate?
6. How does a buzzer operate?

Indicator Boards

1. Why are indicator boards needed?
2. In which typical application areas do indicator boards have significant use?
3. Mention the IET regulations that are followed when installing an indicator board.
4. Mention the application of an indicator board.
5. List three types of bell indicators.

SECTION F: FUSES AND PROTECTIVE DEVICES

1. Why is a fuse needed in an electrical system?
2. Differentiate a fuse from a miniature circuit breaker (MCB).
3. Can a miniature circuit breaker replace an earth-leakage circuit breaker? Justify your answer.
4. Differentiate a rewireable fuse from a cartridge fuse.

SECTION G: THREE-PHASE SYSTEMS AND EARTHING

Three-Phase Systems

1. Why is it necessary to be careful when working on a three-phase system?
2. Why are protective devices necessary in three-phase systems?

TT Earthing System

1. Why is the TT earthing method essential in the areas of its application?
2. Which typical application areas would you need to install a TT earthing method?
3. Can the TT earthing method be used in domestic wiring? Justify your answer.

IT Earthing System

1. Why is the IT earthing method essential in the areas of its application?
2. Which typical application areas would you need to install an IT earthing method?
3. Differentiate the IT earthing method from the TT earthing method.
4. Can the IT earthing method be used in domestic wiring? Justify your answer.

TN-S Earthing System

1. Differentiate the TN-S earthing method from the TT earthing method.
2. Why is the TN-S earthing method essential in its application?
3. Which typical application areas would you need to install a TN-S earthing method?
4. What is the function of PE in the TN-S earthing method?
5. Can the TN-S earthing method be used in domestic wiring? Justify your answer.

Electrical Bonding

1. What does a bonding system mean?
2. What are the types of bonding?
3. Why is electrical bonding essential in electrical engineering?

SECTION H: ELECTRICAL TESTING AND MEASUREMENTS

Polarity Verification Test

1. Why is a polarity verification test essential in electrical circuit installation?
2. How do you set the measuring instruments before verifying polarity?
3. Which areas should you apply polarity verification?
4. Explain why polarity testing is necessary in electrical engineering.

Insulation Resistance Test

1. Why is an insulation resistance test needed in electric cable production?
2. What can be the outcome if the insulation resistance test is ignored?
3. The insulation resistance is recommended to be 20 MΩ and above. Give a reason for this condition.
4. Why do we conduct insulation tests?

Ring Continuity Test

1. Why is a ring continuity test needed in domestic electrical installations?
2. What might happen if ring continuity testing is ignored?
3. How do you justify that the ring circuit is working perfectly?
4. Explain the ring circuit test.

Earth Resistance Test

1. Why is measurement of earth resistance essential?

2. Why does a power station have a smaller earth resistance value than a house's service connection?
3. State the measures for minimizing earth resistance values.

Continuity Test

1. Why is it essential to carry out a continuity test?
2. Why is it necessary to test the functionality of an Ohm meter before performing a continuity test?
3. How do you test the functionality of an analogue multimeter?
4. While conducting a continuity test, you observed OL on a digital multimeter. What does that mean?
5. When testing a fuse using a digital multimeter, you observed that the pointer is at the ∞ (infinity) symbol. What does that mean?
6. What are the common tools used when conducting continuity tests?

Open-Circuit Voltage Test

1. Why is it essential to carry out open-circuit voltage tests in new domestic electrical installations?
2. What is the reason for performing an open-circuit voltage test in an existing electrical system?
3. What is an open circuit?

SECTION I: REVISION EXERCISE 2

Electrical Joints

1. Elaborate the use of eyelet joints in electrical engineering.
2. What is a parallel groove clamp joint?
3. What is the purpose of parallel groove clamp joints?
4. What are the uses of bolted joints?
5. Why are bolted joints used in electrical engineering?
6. Mention the uses of twist joints.
7. Why are twist joints used in electrical engineering?
8. What is the use of tee joints in electrical engineering?
9. What is the meaning of a tee joint?
10. Why are married joints essential in electrical engineering?
11. What are the advantages of using married joints?

Soldering

12. What safety precautions should be taken when using soft soldering?
13. What is the meaning of soft soldering?
14. What is the meaning of hard soldering?
15. Differentiate soft from hard soldering.
16. Why is silver soldering used at a temperature above 450°C?
17. What is brazing soldering?
18. Differentiate silver from brazing soldering methods.

Domestic Electrical Installation

19. What is the function of a circuit breaker in domestic electrical installations?
20. Explain the features of a one-way one-gang switch.
21. Explain the function of an intermediate switch.
22. What are the differences between an intermediate switch and a 2-way switch?
23. Mention places where the intermediate switch is used.
24. What is the meaning of spur connection?

Electrical Cooker

25. What is a thermostat?
26. Why is a thermostat a vital part of an electrical cooker?

27. State the role played by a heating element in an electrical cooker.

Earthing

28. What is earthing?
29. Explain the importance of earthing electrodes in the earthing process.

Electric Bells and Buzzers

30. How does a single-stroke bell operate?
31. How does a buzzer operate?
32. How does a continuous ringing bell operate?
33. Differentiate a single-stroke bell from a trembler bell.

Fuses

34. Differentiate a rewireable fuse from a cartridge fuse.

Earthing Systems

35. What do you understand by the IT earthing method?
36. Briefly explain what the TT earthing method means.
37. TN-S is one of the types of TN earthing methods. What do you understand by it?
38. Differentiate TT from TN-S earthing methods.
39. Differentiate IT from TT earthing systems.

Electrical Bonding and Testing

40. Why is electrical bonding essential in electrical engineering?
41. Explain why polarity testing is necessary in electrical engineering.
42. Why do we conduct insulation tests?
43. Why do we conduct continuity tests?
44. Explain the ring circuit test.

End of Form Two Questions

BAOBAB SECONDARY SCHOOL
FORM TWO HOLIDAY PACKAGE
LIFE SKILLS

Module: Public Speaking, Interview & Writing Application Letters

INSTRUCTIONS:

1. Answer all questions clearly and concisely in your subject notebook.
2. Ensure your work is neat, well-organized, and legible.
3. This package is mandatory and must be submitted on the exact day of school opening at my office.

QUESTION 1: Public Speaking Skills

(a) Define the term public speaking in the context of life skills and effective communication.

(b) Explain four (4) essential elements a speaker must prepare before addressing an audience (such as body language, eye contact, tone of voice, and audience analysis).

QUESTION 2: Application Letter Writing (Structure)

Identify and explain five (5) key structural components of a formal job application letter, detailing what information should be included in each part.

QUESTION 3: Interview Preparation & Etiquette

Discuss four (4) professional interview etiquette rules that a candidate should observe before, during, and after an oral interview to create a positive impression.

QUESTION 4: Public Speaking & Interview Strategies

Define and briefly explain the following six (6) concepts used in effective public speaking and interview performance:

(a) Non-verbal Communication

(b) Stage Fright / Speech Anxiety

(c) STAR Method (Situation, Task, Action, Result)

(d) Assertive Tone

(e) Professional Resume / CV Attachment

(f) Active Listening

QUESTION 5: Practical Application Letter & Interview Dilemma

Suppose you are applying for a prefectship position or a student council role at school:

(a) Write a short outline of an application letter requesting an interview for the role.

(b) Outline four (4) steps you would follow to handle a difficult or unexpected question during the interview.

BAOBAB SECONDARY SCHOOL
FORM TWO HOLIDAY PACKAGE
MOTOR VEHICLE MECHANIC

1. In MVM workshop Personal safety is priority as trained student examine purposes of safety gear in motor vehicle mechanic's workshop.
2. What does 5S stand for? Explain each.
3. List 4 types of fire extinguishers and which fire they extinguish.
4. What are 3 causes of accidents in workshop?
5. Differentiate between spanner and socket wrench.
6. Mention 5 measuring tools and their use
7. What is the use of a torque wrench? Why should we not use it as a hammer?
8. Identify 20 hand tools by name
9. Explain 4-stroke cycle of petrol engine.
10. What is the function of Engine oil? Mention 2 oil grades.
11. List 5 parts of cylinder head.
12. Why do we need cooling system?
13. A customer brings his vehicle for general Check up and ask for engine oil service level? As an expert analyze what you are going to do?
14. Engine is a machine that generates the vehicle power as skilled technician Identify at least five engine components and state their application
15. What is the correct tire pressure for small car? What happens if pressure is low?
16. Mention 3 types of brakes.
17. What is the function of suspension?
18. Explain in short tire pressure and list at least four tools and equipment used in tire pressure refilling
19. With aid of diagram distinguish between electric drill machine and grinder machine.
20. Identify at least five suspension parts and state their application in a vehicle.
21. Define Motor Vehicle Mechanics.
22. List 5 workshop safety rules.
23. Draw and label simple brake system.
24. Explain procedures for replacing spare tires and analyse tools and equipment you may use to perform a task.
25. What is the use of jack stands? Why not use jack only?
26. Name 4 instruments on dashboard and their meaning.
27. Explain difference between petrol and diesel fuel.
28. What do you understand about tire rotation, analyze steps for tire rotation.
29. What is PPE? Give five examples and state their uses.
30. What are the principles and practices for handling mechanical hazards effectively.

NOTE; THERE WILL BE TEST AFTER OPENING THE SCHOOL, SO KEEP ON STUDYING

BAOBAB SECONDARY SCHOOL
FORM TWO HOLIDAY PACKAGE
ENGINEERING SCIENCE

Revision and Competence-Based Application

GENERAL INSTRUCTIONS

1. Attempt all questions in Sections B and C.
2. Show all working clearly in calculation questions. Include formulae, substitutions and correct units.
3. Use labelled sketches wherever required. Draw neatly using a ruler where appropriate.
4. For application questions, relate your answers to practical situations in homes, workshops, industries or the community.
5. The additional competence-based questions are included to help you apply the concepts, not merely memorise definitions.

SECTION B – STRUCTURED QUESTIONS

Answer all questions. (70 marks in the original assessment)

1. With the aid of labelled sketches, describe the steps you would follow when measuring the density of an irregular object.
2. A Coca-Cola company experiences excessive consumption of electrical power due to friction in its mechanical drives.
   (a) State four laws or principles on which static friction and kinetic friction depend.
   (b) A box of mass 20 kg is pushed along a horizontal surface by a horizontal force of 118 N. Calculate the coefficient of friction between the two surfaces in contact. Take g = 10 m/s² and assume the box moves at constant speed.
3. A body moves in a straight line with an initial velocity u m/s and accelerates uniformly at a m/s² until its velocity becomes v m/s after time t, covering a distance s. Prove that $s = ut + \frac{1}{2}at^2$.
4. A uniform scaffold plank 6 m long and weighing 100 N rests on two supports, B and C. A man weighing 700 N stands 2 m from end A, and a 50 N load hangs at end A.
   (a) Draw a clear, labelled force diagram and calculate the reactions X and Y at the two supports.
   (b) Calculate the additional weight that must be placed at A to make the plank just tilt about support B. Explain why this condition may endanger the man's safety.

Note: Use the support positions shown in your teacher's original scaffold-plank diagram. If the diagram is not available, state clearly any distances you assume.

5. A group of students needs to load a 5,000 N machine into a vehicle 2 m above the ground using an inclined plane. The effort required is 50 N. Two ramps are available: one is 5 m long and the other is 7 m long. Determine which ramp the students should choose by calculating and comparing the mechanical advantage and velocity ratio (and hence efficiency) for each ramp. State your recommendation.

6. Answer the following questions on thermal expansion.
   (a) A laboratory technician heats a wire and a small rectangular metal sheet through the same temperature rise of 1°C. Explain the difference between the type of expansion observed in the wire and that observed in the sheet.
   (b) An iron tyre has a diameter of 50 cm at 15°C. It is to be fitted over a wheel of diameter 50.35 cm, with a radial clearance of 0.5 mm. To what temperature must the tyre be heated? Take the linear expansivity of iron as 0.000012 K□¹. Show your working.
7. Two cells, each having an e.m.f. of 1.5 V and an internal resistance of 2 Ω, are connected first in series and then in parallel.
   (a) Calculate the current in each arrangement when connected to a 1 Ω external resistor.
   (b) Repeat the calculations when the 1 Ω resistor is replaced by an 11 Ω resistor.
   (c) For each external resistor, advise whether the cells should be connected in series or in parallel. Support your advice with your calculated results.

SECTION C – APPLICATION QUESTION

Answer the question. (15 marks in the original assessment)

8. A projectile of mass 15 g moves at a speed of 50 m/s and comes to rest after travelling 5 cm into a soft wooden block. Assuming uniform deceleration, calculate:
   (a) the initial kinetic energy of the projectile;
   (b) the average retarding force exerted by the block;
   (c) the time taken to come to rest; and
   (d) the average power transferred during the stopping process.

ADDITIONAL COMPETENCE-BASED QUESTIONS

These questions extend the original assessment and test your ability to apply Engineering Science in everyday and workplace situations.

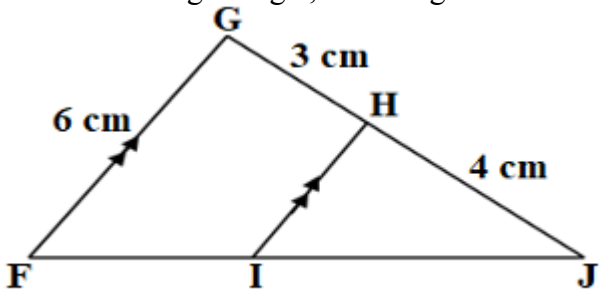
9. A technician is checking whether a small metal component supplied to a workshop is made of the correct material. Describe how the technician can determine its density using a balance and a measuring cylinder. Explain how the result can help identify the material.
10. A water tank is installed on a raised platform at a community facility. Explain how gravitational potential energy is stored in the water and how this energy can be converted into useful energy as water flows through a pipe. Give one practical example.
11. A worker pushes a heavy trolley across a rough workshop floor. Identify two factors that may affect the frictional force and describe two practical ways of reducing unwanted friction without compromising safety.
12. A steel pipe is installed outdoors and is exposed to large changes in temperature. Explain why allowance for thermal expansion is important and suggest two ways an engineer or plumber can reduce problems caused by expansion.
13. A small workshop uses two identical cells to power a portable electrical device. Explain the difference between connecting the cells in series and in parallel. State one situation in which each arrangement may be suitable.
14. A school wants to move a heavy piece of equipment into a store raised above ground level. Explain how an inclined plane makes the task easier. Identify two factors that should be considered when selecting a suitable ramp.

STUDENT'S REFLECTION

Choose one question you found challenging. State the topic involved, explain what you found difficult, and describe what you will do to improve your understanding.

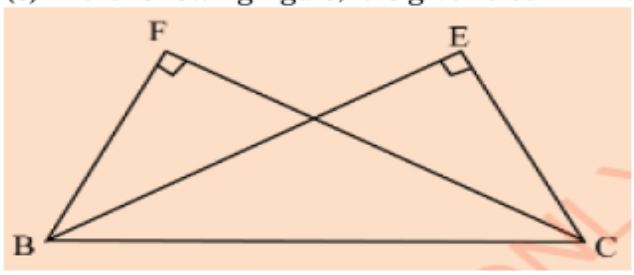
BAOBAB SECONDARY SCHOOL
FORM TWO HOLIDAY PACKAGE
MATHEMATICS

1. There a 1000 students at Baobab secondary school. Out of these, 680 students like football, 350 students like volleyball, and 100 students like neither game. Let F and V be sets of those who like football and volleyball, respectively. Use a Venn diagram to find the number of students who like;
   i. Both games.
   ii. Either football or volleyball.
   iii. Football only.
   iv. Volleyball but not football.
2. a) A plane flies 7 km due north and then 24 km due east. (i) Sketch the journey. (ii) How far is the plane from its starting point when it reaches the end of its journey?
   b) A flagstaff is secured by a straight rope which is 20 metre long. The angle between the rope and the flagstaff is 45°. Evaluate the height of the flagstaff. Leave the answer in surd form.
3. (a) In the following triangle, a line segment HI is drawn parallel to GF.



   (i) Prove that triangle HIJ is similar to triangle GFJ.
   (ii) (ii) What is the length of a line segment HI?

(b) In the following figure, it is given that $\overline{BF} = \overline{CE}$, prove that $\overline{CF} = \overline{BE}$



4. (a) Find the value of x if $5\log 4(x\ 10)=125$.

   (b) Simplify $(\sqrt{3}+\sqrt{2}\ )\div(2\sqrt{3}-\sqrt{2}\ )$ by rationalizing the denominator.

5. a) A man and a woman share a bingo prize of Tsh. 2,000,000 between them in the ratio 1:4. The woman shares her part between herself, her mother, and her daughter in the ratio 2:1:1. How much does her daughter receive?

   b) If a shirt is sold for Tsh. 27,000, the shopkeeper incurs a loss of 10%. What should his selling price be to gain a profit of 10%?

6. (a) Use the elimination method to solve the following system of linear equations:

$24x+5y=1{,}000$

$18x+10y=950$

(b) The area of a larger square garden exceeds twice that of a smaller square garden by 56. If the difference between their perimeters is 24 metres, find the length of one side of each garden.

7. (a) The distance from Asteria's home to school is 2 km 52 m. She goes to school in the morning and returns in the evening every day. What distance does she cover from Monday to Friday?

(b) Given the number 0.004040. Write the number:

(i) Correct to three (3) significant figures

(ii) Correct to three (3) decimal places

(iii)In standard form

8. Express each of the following in exponential form.

(a) $\log_2 8 = 3$
(b) $\log_2 64 = 6$
(c) $\log_4 1024 = 5$
(d) $\log_{10} 0.001 = -3$

9.

. Find the values of each of the following:

(a) $\log_{2\sqrt{3}} 1728$
(b) $\log_{2.25} 0.\overline{4}$
(c) $\log_{(\sqrt{2}+\sqrt{3})}\left(5+2\sqrt{6}\right)$
(d) $\log_{(5+2\sqrt{6})}\left(5-2\sqrt{6}\right)$

10. Solve the following simultaneous logarithmic equations.

$$\begin{cases} \log_2(x-1) = 1+\log_2 y \\ 2\log_3 x = 2+\log_3 y \end{cases}$$