



Myfuture CBC Revision

electricity - Grade 10

Question Paper

1. What is the effect of connecting identical batteries in series?

- A. Battery polarity is lost and they stop working
- B. Voltage decreases while current capacity increases
- C. Voltage increases while current capacity (same battery capacity in Ah) remains similar
- D. Voltage remains the same but internal resistance becomes zero

2. What is the main role of the electrolyte in a cell or battery?

- A. To act as the external wire connecting batteries in series
- B. To allow ions to move between electrodes and complete the internal circuit
- C. To cool the battery during use
- D. To block electron flow between electrodes

3. Which formula gives the terminal voltage V of a cell with emf E , internal resistance r , carrying current I ?

- A. $V = E + I r$
- B. $V = E / (I r)$
- C. $V = E - I r$
- D. $V = I r - E$

4. What is Kirchhoff's current law (KCL) at a circuit junction?

- A. The sum of currents entering a junction equals the sum of currents leaving the junction
- B. Current is equal to voltage times resistance at a junction
- C. The sum of voltages around a loop is always zero
- D. Charge is not conserved at a junction

5. How does high temperature affect most rechargeable batteries if left in hot conditions?

- A. It converts the battery from rechargeable to primary
- B. It always improves battery capacity permanently
- C. It reduces battery life and may cause swelling or damage
- D. It makes the battery colder over time

6. What is meant by an intrinsic semiconductor?

- A. A semiconductor with heavy impurity doping
- B. A pure semiconductor without intentional doping
- C. A semiconductor that only works when connected to the Internet
- D. A semiconductor that conducts like a metal

7. Where should a voltmeter be connected to measure the potential difference across a resistor?

- A. In series with the resistor
- B. Anywhere in the circuit because it measures current
- C. Across the power supply only, never across a resistor
- D. In parallel with the resistor

8. What is electricity in the simplest scientific sense?

- A. A type of magnet that attracts metal objects
- B. A flow of electric charge such as electrons
- C. The light produced by the sun
- D. Heat produced by burning fuel

9. What is an electric cell?

- A. A device that stores mechanical energy
- B. A device that converts chemical energy into electrical energy
- C. A device that blocks the flow of electricity
- D. A device that measures electrical current

10. Which effect demonstrates that a changing magnetic field can produce an electric current?

- A. Electromagnetic induction
- B. Photoelectric effect
- C. Thermoelectric effect
- D. Electrolysis

11. What happens to the total current drawn from a battery if you add another identical resistor in series to an existing series chain?

- A. Total current becomes infinite
- B. Total current increases because more paths are available
- C. Total current decreases because total resistance increases
- D. Total current remains unchanged

12. What happens in a short circuit?

- A. Voltage doubles across all components
- B. Current bypasses the intended path through a low-resistance route, causing very large
- C. The battery's chemical energy increases
- D. Resistance increases significantly and current stops

13. Which factor does NOT significantly affect the resistance of a uniform metal wire?

- A. Cross-sectional area (thickness) of the wire
- B. Colour of the insulating coating
- C. Material of the wire (its resistivity)
- D. Length of the wire

14. Which generation source is most affected by changes in sunlight and is often installed on rooftops for homes?

- A. Solar photovoltaic (PV)
- B. Thermal fossil fuel
- C. Hydroelectric
- D. Geothermal

15. Which method of electricity generation uses heat from the Earth's interior and is widely used in Kenya's Rift Valley (e.g., Olkaria)?

- A. Solar photovoltaic generation
- B. Hydroelectric generation
- C. Geothermal generation
- D. Wind generation

16. Which instrument measures the direction and relative strength of magnetic fields and is commonly used in schools?

- A. A barometer
- B. A thermometer
- C. An ammeter
- D. A compass

17. What is the nominal voltage of a typical lead-acid car battery used in most Kenyan vehicles?

- A. 6 volts
- B. 12 volts
- C. 1.5 volts
- D. 24 volts

18. Why is earthing (grounding) important in electrical distribution systems?

- A. It prevents any need for circuit breakers
- B. It increases the supply voltage to households
- C. It stores extra electricity for peak times
- D. It provides a safe path for fault currents to reduce shock risk

19. Which of the following is a safe practice when using electrical appliances at home?

- A. Overload sockets by connecting many high-power devices with a single thin extension
- B. Use metal objects to probe sockets to test them
- C. Ignore frayed wires if the appliance still works
- D. Keep appliances dry and unplug them before cleaning

20. Which renewable project in Kenya harnesses wind energy to generate electricity?

- A. Masinga hydroelectric dam
- B. Lake Turkana Wind Power
- C. Olkaria geothermal plant
- D. Kipevu diesel plant

21. How should an ammeter be connected in a circuit to measure current correctly?

- A. Connected to earth only
- B. Across the mains supply at all times
- C. In parallel across the component whose current is being measured
- D. In series with the component whose current is being measured

22. What device isolates a faulty section of a transmission line to prevent damage to the rest of the network?

- A. Transformer
- B. Step-up transformer
- C. Circuit breaker
- D. Voltage regulator

23. Which of the following is usually a primary (non-rechargeable) cell?

- A. Lithium-ion rechargeable cell
- B. Lead-acid cell
- C. Alkaline cell
- D. Nickel-metal hydride (NiMH) cell

24. Which of these is a common use of capacitors in everyday electronics?

- A. Turning AC into DC by itself
- B. Directly producing light
- C. Smoothing voltage in power supplies
- D. Increasing resistance in a circuit

25. What is the main function of a light-emitting diode (LED)?

- A. Store electrical energy like a battery
- B. Increase the current without any power input
- C. Convert electrical energy into light
- D. Act as a loudspeaker to make sound

26. Which of the following is a common alkaline battery advantage over a zinc-carbon cell?

- A. Cannot be used at all in cold climates
- B. Lower voltage by half
- C. Higher energy capacity and longer shelf life
- D. More likely to leak under normal use

27. Which of the following describes a Daniell cell commonly used in teaching experiments?

- A. A cell that uses only distilled water and no electrodes
- B. A device that produces electricity by heating metal
- C. A battery made from two identical carbon rods
- D. A galvanic cell with zinc and copper electrodes and their sulfates as electrolytes

28. Which element of the power system changes voltage from transmission levels to distribution levels near towns?

- A. Power factor capacitor
- B. Distribution substation (step-down transformer)
- C. Powerhouse turbine
- D. Transmission tower

29. What is a common reason for 'load shedding' in a national grid?

- A. Having too much electricity supply
- B. To increase transformer efficiency
- C. Insufficient generation capacity to meet demand
- D. To reduce electricity prices

30. What is the correct direction of conventional current in a circuit?

- A. From positive terminal to negative terminal of the supply
- B. Always clockwise in a circuit diagram
- C. From earth to the positive terminal
- D. From negative terminal to positive terminal of the supply

31. When performing experiments with D.C. circuits in a Kenyan school lab, which safety practice is most important?

- A. Switch off power before changing wiring or components
- B. Touch the battery terminals to check voltage by feel
- C. Work with wet hands to get a better grip on components
- D. Use metal tools to bridge contacts while circuit is live

32. Which formula relates capacitance (C), charge (Q) and voltage (V)?

- A. $V = I \times R$
- B. $C = I \times V$
- C. $C = Q / V$
- D. $Q = I \times t$

33. A voltmeter should be connected how when measuring the voltage across a resistor in a D.C. circuit?

- A. Across the power supply only when circuit is switched off
- B. In series with the resistor
- C. Between the resistor and earth only
- D. In parallel with the resistor

34. What is the effect of connecting capacitors with the same capacitance in series on the total capacitance?

- A. The total capacitance doubles automatically
- B. The total capacitance is less than any one capacitor
- C. The total capacitance equals the sum of the capacitances
- D. The total capacitance becomes infinite

35. Why are high-voltage transmission towers built tall and widely spaced?

- A. To make the towers look impressive
- B. To keep conductors clear of the ground and each other to avoid arcing and allow safe
- C. To reduce the number of conductors needed
- D. To increase the weight that the conductors can carry

36. What device automatically breaks a circuit when current becomes too large to protect wiring?

- A. Circuit breaker or fuse
- B. Resistor
- C. Voltmeter
- D. Transformer

37. What is meant by the term 'capacitance per unit area' for a parallel-plate capacitor?

- A. The capacitance divided by the plate area, showing how much capacitance each square
- B. The amount of charge on each plate regardless of voltage
- C. The voltage that develops per unit area
- D. The resistance of the dielectric per square metre

38. In the event of a short circuit, which part of the network clears the fault to protect equipment and safety?

- A. Protective devices such as fuses and circuit breakers at various points
- B. Smart meter only
- C. The consumer's appliance only
- D. Distribution transformer with no protection

39. Which device isolates a section of high-voltage line so maintenance can be done safely?

- A. Distribution transformer
- B. Isolator (disconnect) switch
- C. Energy meter
- D. Fuse

40. A 9 V battery is connected to a resistor of 3 . What is the current through the resistor?

- A. 3 A
- B. 0.33 A
- C. 27 A
- D. 0.03 A

41. What is the correct unit for electrical resistance?

- A. Volt
- B. Ohm
- C. Ampere
- D. Joule

42. Which of the following is a disadvantage of underground cables compared to overhead lines?

- A. Higher installation and repair costs
- B. They require taller towers
- C. They cause more visual pollution
- D. Greater exposure to lightning strikes

43. How does a diode behave when forward biased (p-side positive relative to n-side)?

- A. It allows current to flow easily after overcoming the barrier potential
- B. It becomes a perfect insulator and blocks all current
- C. It explodes because semiconductors cannot have forward voltage
- D. It converts current into sound

44. Which of the following losses is mainly caused by the resistance of transmission lines?

- A. Dielectric heating losses
- B. I^2R losses
- C. Battery discharge losses
- D. Corona losses due to wind

45. What does the time constant (τ) in an RC circuit represent?

- A. The frequency at which the circuit resonates
- B. The maximum charge the capacitor can store
- C. The time it takes for the resistor to cool down
- D. The time for the capacitor voltage to reach about 63% of its final value

46. What is the band gap of a semiconductor?

- A. The energy difference between the valence band and the conduction band
- B. The distance between two doping atoms
- C. The physical gap inside a silicon wafer
- D. The time it takes for an electron to travel across a wire

47. What is the purpose of a fuse in a DC circuit at home?

- A. To store electrical energy for later use
- B. To increase the voltage supplied to appliances
- C. To convert DC to AC
- D. To protect the circuit by melting and breaking the circuit when current is too high

48. A 12 V battery with internal resistance 1 Ω supplies current through an external resistor of 5 Ω . What is the terminal voltage across the external resistor?

- A. 10 V
- B. 12 V
- C. 2 V
- D. 7 V

49. Why are three-phase systems used for industrial power rather than single-phase?

- A. They always produce DC electricity
- B. They provide smoother and more efficient power for heavy loads and motors
- C. They eliminate the need for earthing
- D. They require fewer conductors than single-phase

50. In a typical galvanic (discharging) cell, which electrode is the anode and its polarity?

- A. The anode is positive because it gains electrons
- B. The zinc electrode is the anode and it is negative
- C. The cathode is the anode and is always positive
- D. The copper electrode is the anode and it is positive

