Myfuture CBC Revision

electricity - Grade 10

Question Paper

1. 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 increases because more paths are available

B. Total current remains unchanged

C. Total current becomes infinite

D. Total current decreases because total resistance increases

2. How is the equivalent resistance of two resistors connected in parallel calculated (R1 and R2)?

A. R_eq = R1 × R2

B. 1 / R_eq = 1 / R1 + 1 / R2

C. R_eq = R1 + R2

D. R_eq = R1 - R2

3. What is an electric circuit?

A. A closed path that allows electric current to flow

B. A metal object that blocks current completely

C. A single battery without any connections

D. A measure of how hot a wire becomes

4. Which rule helps determine the direction of the magnetic field around a straight current-carrying conductor?

A. Archimedes' rule

B. Ohm's rule

C. Pythagoras rule

D. Right-hand rule (curling fingers around the wire)

5. Which unit is used to measure electrical charge?

A. Watt

B. Ohm

C. Coulomb

D. Meter

6. What is the correct unit for electrical resistance?

A. Volt

B. Joule

C. Ampere

D. Ohm

7. What is the typical voltage of a new single dry cell (AA) used in many Kenyan household torches?

A. 0.5 volts

B. 12 volts

C. 1.5 volts

D. 6 volts

8. Which of the following statements about renewable generation sources is true?

A. Renewable sources are always available and never vary

B. Renewable generation increases I^2R losses in transmission lines

C. Renewable sources always produce DC current only

D. Renewable sources like wind and solar can be variable and need storage or backup to

9. Which statement about rechargeable lithium-ion cells used in phones is correct?

A. They are identical to alkaline cells and cannot be recharged

B. They are always safer than all other cell types and require no protection circuitry

C. They have high energy density and are lightweight, but require proper charging to

D. They produce electricity by burning fuel inside the cell

10. Which of these is a direct consequence of poor power factor in an electrical installation?

A. Higher currents for the same real power leading to increased losses and possible penalty

B. Reduced cable aging due to lower current

C. Increased voltage stability

D. Lower electricity bills automatically

11. Which colour combination is used for the protective earth (ground) wire in modern wiring standards?

A. Blue with white stripe

B. Red with black stripe

C. Green and yellow striped

D. Plain brown

12. How does light affect the conductivity of a photoconductive semiconductor?

A. Light turns the semiconductor into a permanent magnet

B. Light increases conductivity by creating extra electron-hole pairs

C. Light decreases conductivity by removing electrons

D. Light has no effect on any semiconductor

13. What is the usual purpose of a step-up transformer at a power station?

A. To lower voltage for household use

B. To convert AC to DC for transmission

C. To increase voltage for efficient long-distance transmission

D. To reduce the frequency of the electricity

14. 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. Hydroelectric generation

B. Wind generation

C. Geothermal generation

D. Solar photovoltaic generation

15. What is the standard single-phase mains voltage supplied to most homes in Kenya?

A. 110 volts

B. 480 volts

C. 230 volts

D. 12 volts

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

A. Kipevu diesel plant

B. Masinga hydroelectric dam

C. Olkaria geothermal plant

D. Lake Turkana Wind Power

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

A. 3 A

B. 27 A

C. 0.03 A

D. 0.33 A

18. Why is earthing important in homes and appliances?

A. It provides a safe route for fault current to reduce the risk of electric shock

B. It stores extra electricity for later use

C. It converts AC into DC for safety

D. It increases the voltage available to the appliance

19. Why does increasing doping concentration increase conductivity in a semiconductor?

A. Because dopants make the material physically larger

B. Because more dopants introduce more free charge carriers

C. Because dopants turn the semiconductor into an insulator

D. Because dopants cool the semiconductor making electrons move faster

20. Which of the following best describes internal resistance of a cell?

A. The resistance that causes chemical reactions to stop

B. A resistance that increases terminal voltage when current flows

C. The resistance inside the cell that reduces its terminal voltage under load

D. The resistance of the external circuit only

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

A. Current is equal to voltage times resistance at a junction

B. The sum of currents entering a junction equals the sum of currents leaving the junction

C. Charge is not conserved at a junction

D. The sum of voltages around a loop is always zero

22. If identical 1.5 V cells are placed in series, what happens to the total voltage?

A. Total voltage decreases compared to one cell

B. Total voltage stays the same as one cell

C. Total voltage increases by the sum of the cell voltages

D. Total voltage becomes zero

23. Which is a good practice when storing spare loose batteries at home?

A. Keep them in a cool, dry place and avoid contact between terminals

B. Keep them in pockets with coins and keys

C. Mix old and new batteries together in the same device

D. Store them in direct sunlight to keep them warm

24. Which element is commonly used as the base material for making semiconductor devices in Kenya?

A. Wood

B. Silicon

C. Copper

D. Iron

25. In applying Kirchhoff's loop rule to a simple D.C. closed loop, what is the loop rule?

A. The total current in the loop is conserved and equal to zero

B. The battery voltage must be larger than any single resistor drop

C. Resistances around the loop multiply to give the total resistance

D. The algebraic sum of all potential changes around a closed loop is zero

26. Which of the following best describes a permanent magnet?

A. A material that retains magnetism without an external current

B. A temporary magnet made from soft iron

C. A wire coil with current flowing

D. A material that becomes magnetic only when cooled

27. What is the typical nominal voltage of a fresh alkaline AA cell used in a torch?

A. 12 volts

B. 3.7 volts

C. 1.5 volts

D. 9 volts

28. What is the unit of battery capacity commonly used to indicate how long a battery will last?

A. Ampere-hour (Ah)

B. Ohm

C. Joule per second

D. Watt per meter

29. What is a capacitor?

A. A device that stores electrical charge between two conductors separated by an

B. A component that converts electrical energy directly into mechanical motion

C. A device that produces electricity from chemical reactions

D. A conductor that allows unlimited current to pass

30. Which measurement describes the total amount of electrical energy used over time?

A. Hertz (Hz)

B. Ampere (A)

C. Kilovolt (kV)

D. Kilowatt-hour (kWh)

31. What is the relationship between voltage (V), current (I) and resistance (R) expressed by Ohm's law?

A. V = I × R

B. V = R ÷ I

C. R = V × I

D. I = V × R

32. How should you use an ohmmeter to measure the resistance of a resistor in a circuit?

A. Switch off the power and remove or isolate the resistor from the circuit before measuring

B. Measure only by touching the ohmmeter leads together

C. Measure while the circuit is powered to get a real operating resistance

D. Connect the ohmmeter across the battery terminals while circuit is on

33. What is the direction of the built-in electric field in a p-n junction depletion region?

A. From the p-side toward the n-side

B. There is no electric field in the depletion region

C. Always clockwise around the junction

D. From the n-side toward the p-side

34. Which of these is the correct unit for electrical resistance?

A. Ampere (A)

B. Ohm ()

C. Watt (W)

D. Volt (V)

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

A. Transformer

B. Voltage regulator

C. Circuit breaker

D. Step-up transformer

36. What creates the depletion region in a p-n junction?

A. Doping both sides with the same impurity

B. Heating the device to high temperature for a long time

C. Diffusion of electrons and holes across the junction leaving fixed ion charges

D. Putting a battery across the junction with correct polarity

37. Why are transmission lines operated at very high voltages for long-distance power transfer?

A. To make the lines lighter

B. To make the electricity safer for homes

C. To increase the frequency of the electricity

D. To reduce current and therefore reduce I^2R (power) losses

38. Kirchhoff's junction rule (node rule) in D.C. circuits states which of the following?

A. The sum of voltages around any closed loop is zero

B. Current is the same through every element in any circuit

C. Total resistance in a loop equals the sum of resistances in that loop

D. The sum of currents entering a junction equals the sum leaving it

39. What is a conductor that is used to protect people from electric shock by providing a low-resistance path to earth called?

A. Live wire

B. Insulator

C. Neutral wire

D. Earth (or ground) wire

40. Why should used batteries not be thrown into household rubbish and be recycled instead?

A. They immediately stop producing electricity and are useless

B. They turn into useful fertilizers when buried

C. They contain toxic metals that can pollute soil and water

D. They will explode if mixed with paper

41. 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

42. Which statement about insulators is correct?

A. Insulators are always metals

B. Insulators increase current in a circuit

C. Insulators produce electricity when heated

D. Insulators do not allow electric charges to flow freely

43. What is the conventional direction of current flow in circuit diagrams?

A. Randomly in any direction in the wire

B. Only inside the battery, not in the external circuit

C. From the negative terminal to the positive terminal of the battery

D. From the positive terminal to the negative terminal of the battery

44. Which factor does NOT increase the strength of an electromagnet?

A. Using plastic as the core

B. Adding more turns of wire on the coil

C. Increasing the current through the coil

D. Using a soft iron core instead of air

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

A. Ignore frayed wires if the appliance still works

B. Keep appliances dry and unplug them before cleaning

C. Overload sockets by connecting many high-power devices with a single thin extension

D. Use metal objects to probe sockets to test them

46. In Kenya the standard mains supply voltage in a household is approximately:

A. 12 volts DC

B. 48 volts DC

C. 110 volts AC

D. 240 volts AC

47. Which statement about the behaviour of a capacitor at very high frequency is correct?

A. It behaves like an open circuit and blocks AC

B. It always explodes at high frequency

C. It behaves almost like a short circuit, allowing AC to pass easily

D. Its capacitance becomes zero

48. In a simple series circuit with three resistors, what is true about the current through each resistor?

A. The current is highest in the smallest resistor only

B. Each resistor has a different current depending on its resistance

C. The current is the same through each resistor

D. Current flows only through the first resistor

49. Which unit is most practical for everyday capacitors used in school experiments?

A. Megafarad (MF)

B. Terafarad (TF)

C. Microfarad (μF)

D. Gigafarad (GF)

50. What is a semiconductor?

A. A material that only works at very high temperatures

B. A material that always conducts electricity better than copper

C. A material that cannot conduct electricity under any condition

D. A material whose electrical conductivity is between that of a conductor and an insulator