Myfuture CBC Revision

electricity - Grade 10

Question Paper

1. What happens to a diode under reverse bias (n-side positive relative to p-side)?

A. Very little current flows until breakdown occurs

B. It changes into a resistor with fixed resistance

C. It becomes a light source without any special construction

D. It conducts the same as in forward bias

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

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

B. Light has no effect on any semiconductor

C. Light decreases conductivity by removing electrons

D. Light turns the semiconductor into a permanent magnet

3. Which instrument would you use to measure the resistance of a resistor in a school lab?

A. Ammeter set to high current

B. Voltmeter set to AC range

C. Ohmmeter (or multimeter set to resistance)

D. Thermometer

4. 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. Greater exposure to lightning strikes

D. They cause more visual pollution

5. Why are iron nails placed inside the coil of an electromagnet in devices like cranes for scrap yards?

A. To prevent the coil from heating up

B. To make the magnet permanently magnetic

C. To concentrate and strengthen the magnetic field so they can lift heavy metal

D. To store electric charge

6. Why do diodes have a depletion region at the PN junction?

A. Because of trapped neutral atoms at the surface

B. Because of external magnetic fields only

C. Because a metal layer is placed between P and N

D. Because electrons and holes recombine, leaving immobile ions

7. How does internal resistance of a cell affect its terminal voltage under load?

A. Internal resistance increases terminal voltage

B. Terminal voltage falls below the emf by the product of current and internal resistance

C. Terminal voltage becomes equal to zero regardless of load

D. Internal resistance has no effect on terminal voltage

8. Ohm's law states a relationship between which three quantities?

A. Power, energy and time

B. Charge, mass and distance

C. Frequency, wavelength and speed

D. Voltage, current and resistance

9. What is the unit of the current gain () of a transistor?

A. No unit (ratio)

B. Volts

C. Ohms

D. Amperes

10. Which cell type is commonly used in Kenyan cars and is rechargeable?

A. Zinc–carbon dry cell

B. Lead-acid battery

C. Alkaline AA cell

D. Lithium coin cell

11. Why does the terminal voltage of a battery drop when a heavy current is drawn?

A. Because the voltmeter gives false readings at high current

B. Because of the battery's internal resistance causing a voltage drop inside the cell

C. Because the battery changes colour under heavy load

D. Because the external wires gain resistance instantly

12. What is the first step when drawing a pictorial diagram for a classroom circuit activity?

A. Measure the current in each branch

B. Draw circuit symbols on paper first

C. Gather the actual components and arrange them as they will appear before drawing

D. Calculate the total resistance of the circuit

13. What is a photodiode used for?

A. Increasing the mass of a circuit board

B. Detecting light and converting it into electric current

C. Providing a fixed reference voltage like a Zener diode

D. Cooling electronic devices

14. What is the main advantage of transmitting electricity at high voltage?

A. Reduces current and therefore reduces power losses in the lines

B. Increases the frequency of the supply

C. Stops all lightning strikes on lines

D. Makes electricity safe for direct household use

15. 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

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

A. Voltmeter

B. Circuit breaker or fuse

C. Transformer

D. Resistor

17. If two wires cross in a pictorial drawing but are not connected, how is this usually shown?

A. They are shown with a dot where they cross

B. They are shown crossing without any dot or join at the crossing

C. They are drawn thicker where they cross to show a connection

D. They are always shown with different colours to show they are separate

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

A. Lake Turkana Wind Power

B. Kipevu diesel plant

C. Olkaria geothermal plant

D. Masinga hydroelectric dam

19. To check if two components are connected in a pictorial diagram, you should look for:

A. If they have the same shape

B. If they are the same colour in the picture

C. How far apart the components are on the page

D. A continuous drawn line or visible wire joining them

20. A compass needle points towards the Earth's magnetic north because the needle itself is a small magnet. Which pole of the needle points toward Earth's geographic north?

A. The needle's neutral point

B. Neither pole; it points randomly

C. The needle's north-seeking pole

D. The needle's south-seeking pole

21. In an NPN transistor, electrons primarily flow from which terminal to which terminal when forward biased?

A. Collector to Emitter

B. Collector to Base

C. Emitter to Collector

D. Base to Emitter

22. How many diodes are used in a standard bridge rectifier for full-wave rectification?

A. Three diodes

B. One diode

C. Four diodes

D. Two diodes

23. Which of the following is the main source of geothermal electricity generation in Kenya?

A. Lake Turkana wind farm

B. Kipevu thermal power station

C. Olkaria geothermal field

D. Turkwel hydroelectric dam

24. What is the main use of a photodiode?

A. To emit bright light when heated

B. To generate current when exposed to light

C. To provide a fixed voltage drop like a Zener diode

D. To allow current only when reverse-biased and dark

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

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

B. They produce electricity by burning fuel inside the cell

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

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

26. What is the purpose of bonding (equipotential bonding) at the consumer intake point?

A. To connect metal parts together to reduce touch voltage during a fault

B. To disconnect neutral from earth

C. To measure energy consumption

D. To increase the supply current capacity

27. How does a dielectric between capacitor plates affect capacitance?

A. It has no effect on capacitance

B. It increases capacitance by reducing the effective electric field and allowing more charge

C. It decreases capacitance by blocking charge entirely

D. It turns the capacitor into an inductor

28. Which label is important to place near the consumer intake to help emergency personnel?

A. Daily electricity usage

B. Appliance warranty dates

C. Location of the main switch and isolation instructions

D. Favourite radio station

29. What is a capacitor?

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

B. A device that produces electricity from chemical reactions

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

D. A conductor that allows unlimited current to pass

30. If a transistor has a current gain () of 100 and the base current is 20 microamperes, what is the collector current?

A. 200 microamperes

B. 0.2 microamperes

C. 20 milliamperes

D. 2 milliamperes

31. What is the purpose of the main switch at a consumer's intake point?

A. To isolate the whole supply to the premises

B. To act as the earthing electrode

C. To increase supply voltage

D. To measure energy consumption

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

A. A battery made from two identical carbon rods

B. A galvanic cell with zinc and copper electrodes and their sulfates as electrolytes

C. A device that produces electricity by heating metal

D. A cell that uses only distilled water and no electrodes

33. What is the most likely result if you connect the positive terminal of a cell directly to its negative terminal with a thick wire?

A. The cell will stop producing electrons permanently but remain cool

B. Nothing will happen because current needs a bulb

C. A large current flows and the cell may become hot or get damaged (short circuit)

D. The cell will produce more voltage than before

34. If identical 1.5 V cells are placed in parallel, what happens to the total voltage (neglecting internal resistance)?

A. Total voltage is multiplied by the number of cells

B. Total voltage remains the same as one cell

C. Total voltage doubles for two cells

D. Total voltage becomes zero

35. The base-emitter junction of a BJT behaves like which component when forward biased?

A. A perfect resistor

B. A forward-biased diode

C. An open circuit

D. A short circuit with zero voltage

36. Which property of a capacitor determines how quickly it can charge and discharge in combination with a resistor?

A. Its capacitance (C) together with the resistance (R) via the time constant $= R \times C$

B. The battery's internal resistance only

C. The conductor's melting point

D. Its physical colour

37. What is the primary function of an earth electrode (earth rod) at the intake point?

A. To increase power factor

B. To provide a path to ground for fault currents

C. To measure current flow

D. To switch off the supply

38. What is the unit of electric potential difference (voltage)?

A. Ohm

B. Volt

C. Ampere

D. Watt

39. When teaching a class about household wiring, a teacher uses pictorial drawings to:

A. Teach how to calculate power factor in alternating current circuits

B. Provide instrument calibration procedures

C. Help students visualise the appearance and layout of sockets, switches and lights

D. Show how to draw circuit symbols for advanced electronics only

40. What is the main function of a distribution transformer on a pole near houses?

A. To measure electricity consumption

B. To step-up voltage for long-distance transmission

C. To step-down high distribution voltage to usable household voltage

D. To convert AC to DC for household use

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

A. Touch the battery terminals to check voltage by feel

B. Switch off power before changing wiring or components

C. Use metal tools to bridge contacts while circuit is live

D. Work with wet hands to get a better grip on components

42. Which of the following is a renewable source of electricity used in Kenya?

A. Geothermal energy

B. Petrol generators

C. Coal imported for thermal plants

D. Diesel fuel

43. What device is used at a power station to increase voltage for transmission and later decrease it for distribution?

A. Circuit breaker

B. Isolator switch

C. Transformer

D. Generator

44. What are the three terminals of a bipolar junction transistor (BJT)?

A. Cathode, Anode, Gate

B. Positive, Negative, Ground

C. Base, Emitter, Collector

D. Source, Drain, Gate

45. What does a battery capacity rating in mAh (milliampere-hour) tell you?

A. How much current the battery can deliver over one hour before running flat

B. The internal resistance of the battery

C. How fast the battery will recharge

D. The voltage of the battery

46. Which of these best describes the I–V (current–voltage) characteristic of a diode?

A. Purely random with no relation between current and voltage

B. Linear: current is directly proportional to voltage over all ranges

C. Non-linear: little current in reverse, rapid rise in forward past threshold

D. Identical for all diodes regardless of type

47. Which chemical reaction type powers a galvanic cell used as a battery?

A. Purely physical separation of charge without reaction

B. Endothermic decomposition

C. Photosynthesis

D. Spontaneous redox (oxidation–reduction) reaction

48. Which is an advantage of pictorial drawings for Form 3/4 students learning basic wiring?

A. They are best for performing circuit calculations like finding current using formulas

B. They are easier for beginners to understand because components look familiar

C. They show current directions more precisely than schematics

D. They always show exact electrical values for components

49. 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. Distribution transformer with no protection

D. The consumer's appliance only

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

A. To increase the frequency of the electricity

B. To make the lines lighter

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

D. To make the electricity safer for homes