Myfuture CBC Revision

physics - Grade 10

Question Paper

1. How does a capacitor behave in a circuit once a steady DC voltage is applied and enough time has passed?

A. It continuously increases the circuit voltage

B. It allows steady DC current to flow freely

C. It turns into a resistor with fixed resistance

D. It behaves like an open circuit (no steady current passes through)

2. What is meant by 'space weather'?

A. The temperature of spacecraft surfaces only

B. Conditions in space driven by the Sun such as solar wind, flares and geomagnetic storms that

C. The style of clothing astronauts wear

D. Daily weather forecasts for astronauts inside the ISS

3. What can cause a satellite's orbit to decay faster than expected?

A. Increased atmospheric density from heating during solar activity (raising drag), and

B. Because satellites are attracted to clouds

C. Because the Sun steals orbital energy each day

D. Because satellites get tired and choose to come down

4. Which greenhouse gas has a stronger warming effect per molecule than CO2 but usually shorter atmospheric lifetime?

A. Nitrogen (N2)

B. Oxygen (O2)

C. Helium (He)

D. Methane (CH4)

5. A cube with top surface area 0.04 m^2 experiences a downward force of 80 N on its top face. What pressure acts on the top face?

A. 2,000 Pa

B. 20 Pa

C. 200 Pa

D. 0.5 Pa

6. Why is aluminium used for cooking pots in Kenya despite its relatively large thermal expansion coefficient?

A. Because it does not expand at all when heated

B. Because it becomes magnetic when heated

C. Because it has good thermal conductivity and light weight, making it heat quickly and be easy

D. Because it melts at low temperatures

7. What does the principle of superposition say about electrostatic forces?

A. Forces add algebraically without considering direction

B. The net force on a charge is the vector sum of forces from each other charge independently

C. Forces cancel out completely in all systems of more than two charges

D. Only the nearest charge affects the net force

8. When you squeeze a closed plastic bottle and release it quickly, air rushes back in. This happens because:

A. The pressure inside was lowered and outside atmospheric pressure pushes air back in

B. The bottle becomes heavier

C. The bottle creates its own vacuum that repels air

D. Temperature drops to absolute zero

9. Which factor does NOT directly affect Young's modulus of a material?

A. Temperature

B. Material's internal structure (bonding)

C. Impurities and defects

D. Applied force magnitude

10. How is artificial radioactivity commonly produced in the laboratory?

A. By placing samples in sunlight

B. By bombarding stable nuclei with neutrons or other particles

C. By cooling materials to very low temperatures

D. By mixing two chemicals at room temperature

11. Which of the following is the best electrical conductor commonly used in wiring?

A. Wood

B. Glass

C. Rubber

D. Copper

12. If you add another resistor in series to a simple circuit with the same battery, what happens to the current?

A. The current increases

B. The current becomes zero

C. The current remains the same

D. The current decreases

13. Why do sharp points on a charged conductor have higher charge density and stronger fields?

A. Because the material there becomes magnetic

B. Because electric charges concentrate at regions of high curvature, producing stronger

C. Because charges avoid curved surfaces and stay on flat areas

D. Because sharp points are cooler than flat surfaces

14. A hydraulic jack uses a small piston area of 0.01 m^2 and a large piston area of 0.5 m^2. If a force of 100 N is applied to the small piston, what ideal upward force appears on the large piston (neglecting losses)?

A. 500 N

B. 200 N

C. 50 N

D. 5,000 N

15. If an isolated conducting sphere carries a net positive charge, where does this charge reside?

A. Concentrated only at the centre

B. On the surface of the sphere

C. Uniformly throughout the interior

D. Only at points of contact with air molecules

16. What does Pascal's principle state about pressure in a confined fluid?

A. Pressure in a fluid decreases with temperature

B. A change in pressure applied to an enclosed fluid is transmitted undiminished to every part

C. Pressure in a fluid depends only on the container material

D. Pressure acts only downward in a fluid

17. Which of the following is evidence of climate change already observed in Kenya?

A. More frequent droughts and unpredictable rainfall patterns

B. A permanent drop in sea level along the Kenyan coast

C. Yearround heavy snow in Nairobi

D. No change in seasonal rainfall for decades

18. During beta-minus decay what happens to the atomic number of the nucleus?

A. It stays the same

B. It decreases by 1

C. It increases by 1

D. It increases by 2

19. What is the solar cycle?

A. A daily heating and cooling of the Sun

B. The time it takes for sunlight to reach Earth

C. An approximately 11-year cycle during which the Sun's magnetic activity, sunspot number

D. The yearly change in Earth’s orbit around the Sun

20. Carbon-14 dating is most useful for which type of material?

A. Pure metals such as iron or copper

B. Once-living organic remains such as wood or bones

C. Fresh water samples from rivers

D. Igneous rocks like lava flows

21. Which method of charging makes an object gain charge by rubbing it with another object?

A. Charging by heating

B. Charging by friction

C. Charging by induction

D. Charging by conduction from a connected wire

22. If a constant force of 10 N acts on an object and moves it 3 m in the direction of the force, how much work is done?

A. 7 J

B. 13 J

C. 30 J

D. 3.3 J

23. An ideal ammeter should have what kind of resistance to avoid changing the circuit current?

A. Very high resistance

B. Infinite resistance

C. Exactly equal to the load resistance

D. Very low resistance

24. What is the pressure due to a 2 m column of water (density 1000 kg/m³), neglecting atmospheric pressure? (Take g = 10 N/kg)

A. 200 Pa

B. 100 Pa

C. 20,000 Pa

D. 2,000 Pa

25. How do aerosols (small particles from burning) generally affect climate in the short term?

A. They permanently increase Earth's temperature without affecting air quality

B. They sink to the ocean floor and have no atmospheric effect

C. They can reflect sunlight and cause temporary cooling while harming air quality

D. They convert CO2 into oxygen directly

26. What does ppm stand for when measuring greenhouse gas concentration?

A. Parts per million

B. People per million

C. Pascals per minute

D. Percent per meter

27. Why must the perpendicular distance be used when calculating a moment?

A. Because only the component of force at right angles produces rotation

B. Because force magnitude alone determines rotation

C. Because distance along the force gives torque directly

D. Because parallel components produce the largest moment

28. Which of the following correctly describes absolute zero in Celsius?

A. 273.15 °C

B. 0 °C

C. -273.15 °C

D. 100 °C

29. Which of the following is an example of shear stress?

A. Heating a metal rod

B. Stretching a rope by pulling at both ends

C. Sliding one layer of material parallel to another (like scissors cutting paper)
D. Compressing a block by pushing on its faces

30. If a rod is fixed at both ends and heated, what kind of mechanical stress develops?

A. Magnetic stress caused by heat

B. No stress develops because temperature cannot create forces
C. Only shear stress develops regardless of constraints

D. Thermal stress due to constrained expansion

31. Which simple machine changes the direction of an applied force without ideal mechanical advantage greater than 1?

A. Wedge

B. Fixed pulley

C. Inclined plane

D. Screw

32. Why can alpha particles be stopped by a sheet of paper?

A. Because they are neutrinos that rarely interact

B. Because they are massless and pass through without interacting
C. Because they travel at the speed of light and are deflected

D. Because they are heavy and carry a positive charge so they lose energy quickly in matter

33. What is creep in materials science?

A. Sudden fracture due to a single overload

B. Vibration of a material at its natural frequency

C. Slow, time-dependent permanent deformation under a constant load at high
D. Instantaneous elastic extension when a force is first applied

34. Which material would be most suitable where a structure must flex repeatedly without breaking (high fatigue resistance)?

A. High-strength tempered glass

B. Brittle ceramics

C. Hard but brittle cast iron

D. Ductile steel with good toughness

35. Which component allows current to pass in only one direction?

A. Inductor

B. Diode

C. Transformer

D. Resistor

36. What is the standard mains voltage and frequency in Kenya?

A. 12 V at 60 Hz

B. 240 V at 50 Hz

C. 110 V at 50 Hz

D. 120 V at 60 Hz

37. Which of these affects the hydrostatic pressure at a point inside a liquid?

A. The colour of the liquid

B. The total mass of the liquid in the container only

C. The shape of the container only

D. Depth below the free surface and the liquid's density

38. How does charging by induction produce a net charge on an isolated conductor after grounding one side?

A. A nearby charged object polarises the conductor; grounding allows charges to flow so
B. Placing the conductor in a magnetic field creates electric charge
C. Rubbing the conductor with a cloth moves electrons directly from the cloth to the
D. Heating the conductor creates free charges that stay on the surface

39. Which unit is equivalent to 1 pascal?

A. 1 N/m²

B. 1 m/s²

C. 1 kg/m³

D. 1 J/s

40. Which best states Newton's first law of motion (the law of inertia)?

A. Energy cannot be created or destroyed

B. Force equals mass times acceleration

C. An object remains at rest or moves at constant velocity unless acted on by a resultant

D. For every action there is an equal and opposite reaction

41. Why is the actual efficiency of real machines always less than 100%?

A. Because input energy is always zero

B. Because machines create energy

C. Because some energy is lost to friction and heat

D. Because output energy is greater than input

42. What is the approximate numerical value of Coulomb's constant k used in Coulomb's law?

A. 3.0 × 10^8 m/s

B. 9.0 × 10^9 N·m^2/C^2

C. 1.6 × 10^-19 C

D. 6.6 × 10^-34 J·s

43. What is an isotope?

A. Particles that have identical numbers of protons and neutrons

B. Atoms of the same element with the same number of protons but different numbers of

C. Atoms with the same mass but different chemical properties

D. Atoms with the same number of neutrons but different numbers of protons

44. What does electric voltage (potential difference) represent?

A. The number of electrons in a conductor

B. The resistance to the flow of current

C. The electric pressure that pushes charges between two points

D. The amount of current flowing in a circuit

45. An object moves at constant velocity on a horizontal surface. What is the net work done on the object?

A. Negative and equal to kinetic energy

B. Zero

C. Equal to mg

D. Positive and increasing

46. A neutral metal sphere is touched by a negatively charged rod and then the rod is removed. What is the final charge of the sphere?

A. Still neutral because touching doesn't transfer charge

B. Positive because electrons left the sphere

C. Negative because electrons transferred from the rod to the sphere

D. Alternating positive and negative regions but net zero

47. A single movable pulley (one pulley attached to the load) ideally provides what mechanical advantage?

A. 1

B. 2

C. 4

D. 3

48. Why are space weather forecasts important for Kenya's communication and navigation systems?

A. Because they predict rainfall and help farmers

B. Because they decide satellite colours

C. Because they tell us when satellites will land in Nairobi

D. Because disturbances in the ionosphere and magnetosphere can disrupt HF radio, satellites

49. In beta-minus decay, what happens to a neutron in the nucleus?

A. It is ejected from the nucleus as a neutral particle

B. It turns into a photon

C. It splits into two protons

D. It changes into a proton and emits an electron

50. What does the amplitude of a wave represent?

A. Distance between two consecutive crests

B. Number of waves passing per second

C. Speed of the wave

D. Maximum displacement of particles from the equilibrium position