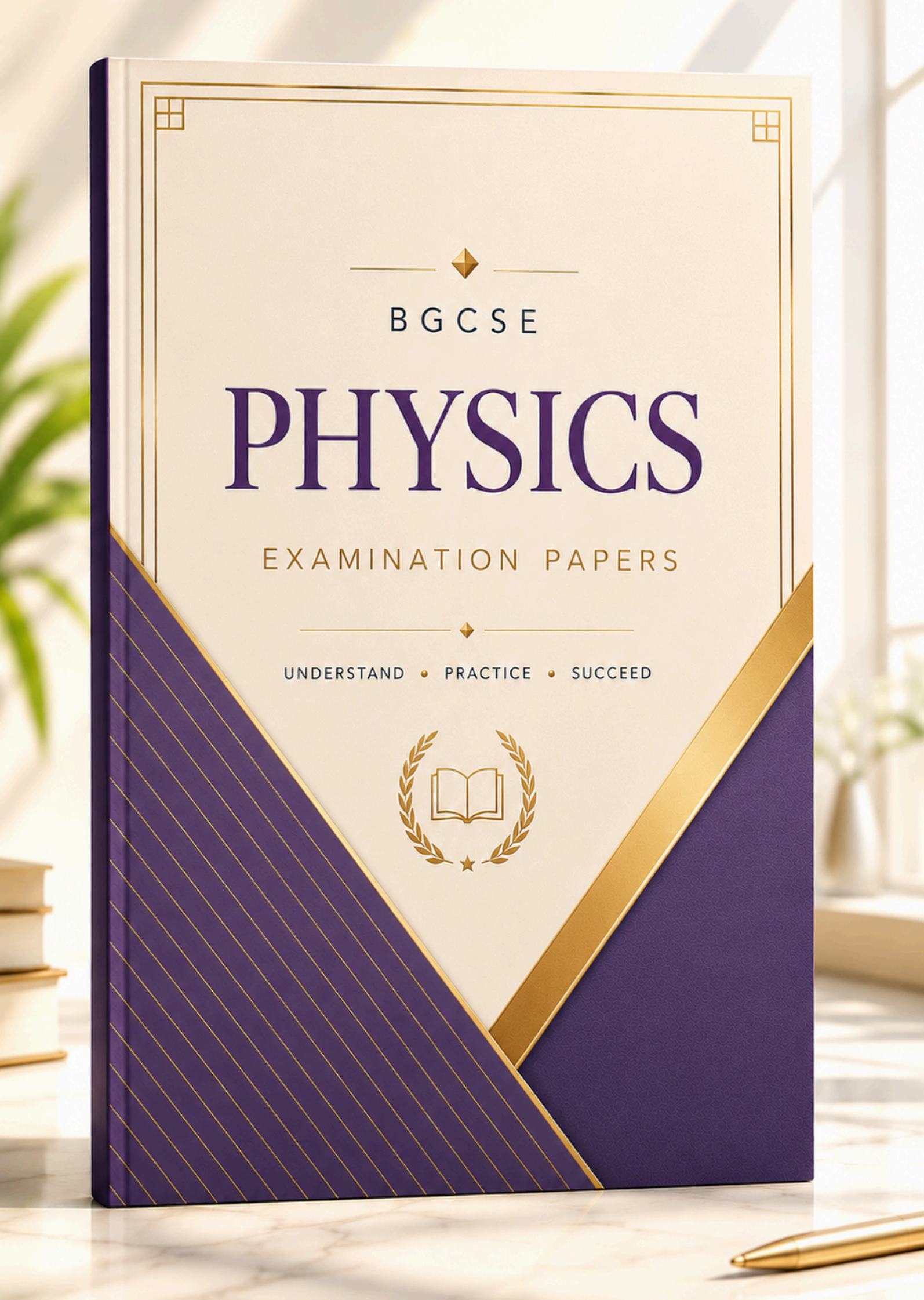
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3117/1 **BGCSE**

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PHYSICS

PAPER 1 3117/1

Thursday 29 MAY 2025 12:00 NOON–1:15 P.M.

Additional materials:
None

MINISTRY OF EDUCATION
NATIONAL EXAMINATIONS

BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION

INSTRUCTIONS AND INFORMATION TO CANDIDATES

Do not open this booklet until you are told to do so.

All answers are to be recorded in this booklet.

Write your school number, candidate number, surname and initials in the spaces provided above.

Answer **ALL** questions. For each question, four possible answers, **A**, **B**, **C**, and **D** are given.

Circle the letter of the response which you consider to be correct.

FOR EXAMINER'S USE ONLY	
Total marks	

This question paper consists of 19 printed pages and 1 blank page.

1. Given the acceleration due to gravity is 10 m/s^2, calculate the mass of an object with a weight of 30 N.

   A. 30 kg
   B. 3 000 g
   C. 300 g
   D. 0.3 kg

2. Given that a metal cube with dimensions 50 cm on each side has a mass of 50 kg, calculate the pressure each side exerts on a flat surface. ($g = 10\,m/s^2$)

   A. 20 000 Pa
   B. 2 000 Pa
   C. 200 Pa
   D. 20 Pa

3. Which of the following is not a simple machine?

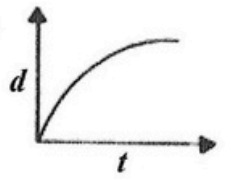
   A. pulley
   B. ramp
   C. screw
   D. sphere

4. Which statement best describes Boyle's law?

   A. For a fixed mass of gas at constant pressure the volume is inversely proportional to its temperature.
   B. For a fixed mass of gas at constant volume, the temperature is directly proportional to the pressure.
   C. For a fixed mass of gas at constant temperature the pressure is inversely proportional to the volume.
   D. For a fixed mass of gas at constant temperature the pressure is directly proportional to the volume.

5. Which distance (d) vs time (t) graph represents an object that is at rest?

A.



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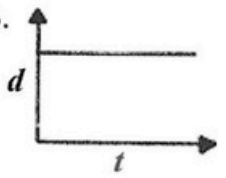

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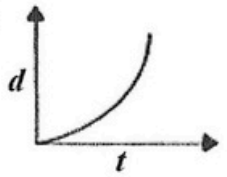

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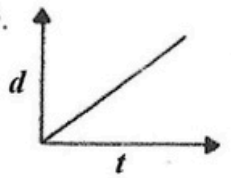


6. Which row of the table below, correctly classifies speed and velocity?

	Speed	**Velocity**
A.	scalar quantity	scalar quantity
B.	scalar quantity	vector quantity
C.	vector quantity	scalar quantity
D.	vector quantity	vector quantity

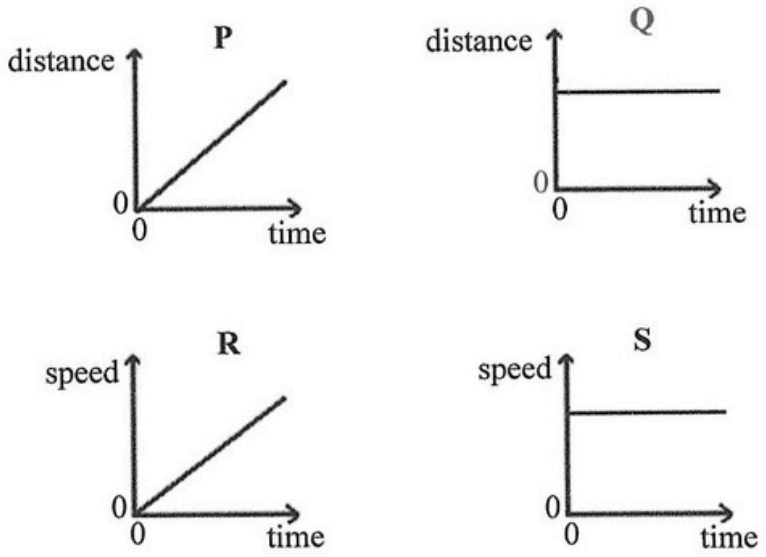
7. A car increases its velocity from 5.0 m/s to 28 m/s in 60 seconds.

What is the acceleration of the car?

A. $0.08\ m/s^2$
B. $0.38\ m/s^2$
C. $0.47\ m/s^2$
D. $0.55\ m/s^2$

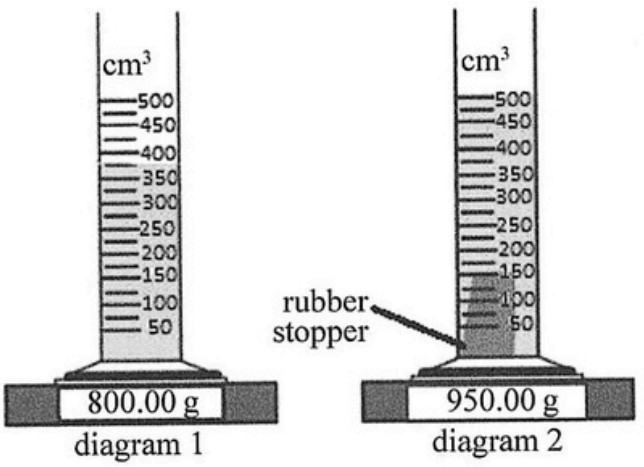
8. Four motion graphs **A**, **B**, **C** and **D** are shown.

Which two graphs represent an object moving at constant speed?



A. graphs **P** and **R**
B. graphs **P** and **S**
C. graphs **Q** and **R**
D. graphs **Q** and **S**

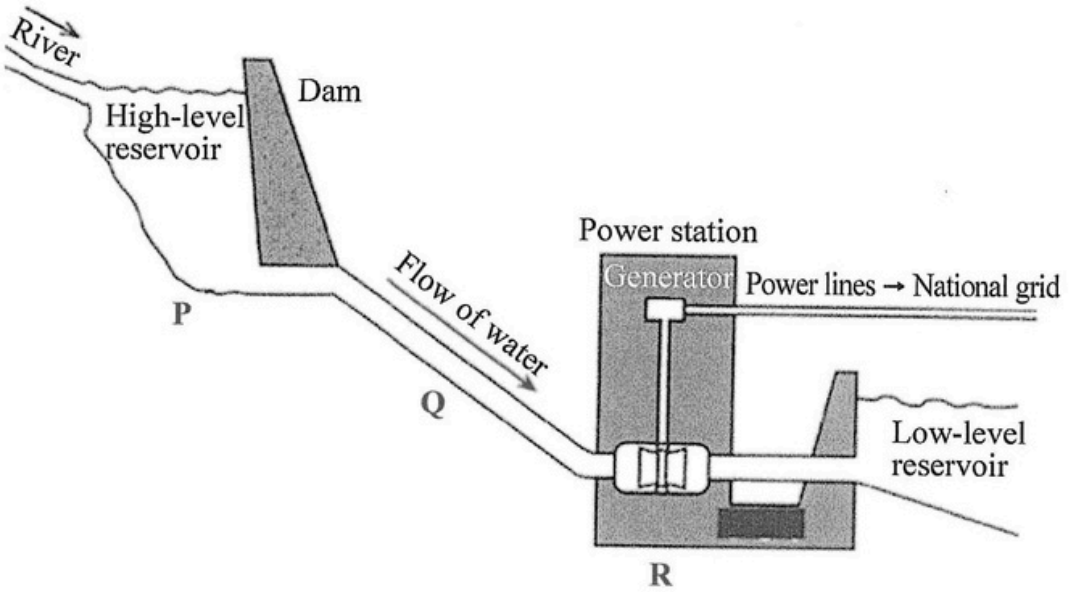
9. A measuring cylinder containing a liquid is placed on an electronic balance. A rubber stopper is gently immersed in the liquid in diagram 2.



Given that no liquid splashes out of the measuring cylinder, what is the density of the rubber stopper?

A. 0.30 g/cm³
B. 1.2 g/cm³
C. 1.6 g/cm³
D. 1.9 g/cm³

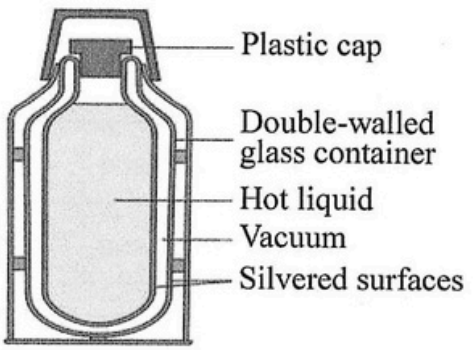
10. The diagram shows a simplified model of a hydroelectric power station.



Name the energy transformations, **P** → **Q** → **R**, that occurs in the hydroelectric power station.

A. chemical potential ⟶ kinetic ⟶ electrical
B. electrical ⟶ gravitational potential ⟶ kinetic
C. gravitational potential ⟶ kinetic ⟶ electrical
D. kinetic ⟶ electrical ⟶ gravitational potential

11. The diagram shows an insulated vacuum flask.

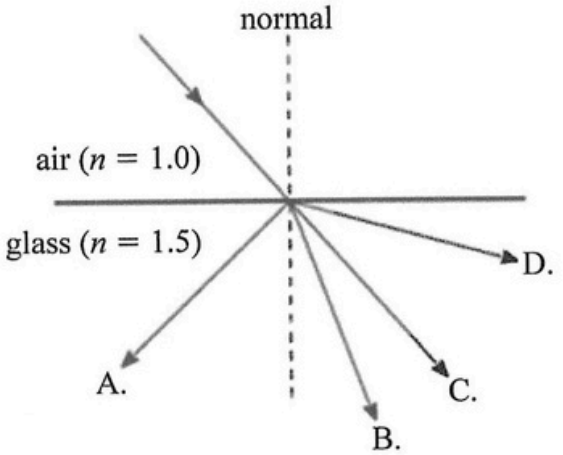


Which form(s) of radiation is reduced by the silvered surfaces?

A. conduction
B. convection
C. radiation
D. conduction, convection and radiation

12. The diagram below represents monochromatic light passing from air into glass. The refractive index of air is 1.0, while glass has a refractive index, n of 1.5.

What path will the monochromatic light take as it leaves air and enters glass?



13. The musical instrument below shows a guitar.

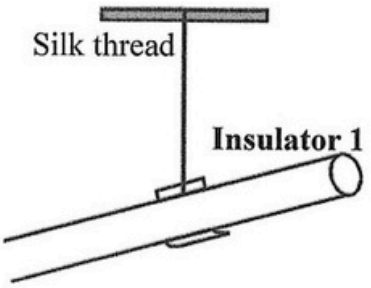
A sound is produced by plucking any of the strings with a finger.

A musician can increase the pitch of a given string by increasing its tension. This is done by tightening the tuning knob, which is located at the top.

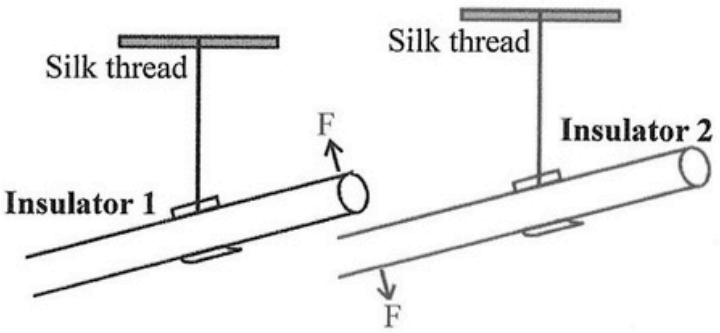
Which of the following is another method to increase the pitch of the guitar string?

A. increasing the length
B. striking the string harder
C. using a thicker string
D. using a thinner string

14. **Insulator 1** is suspended by a silk thread, as shown in the diagram.



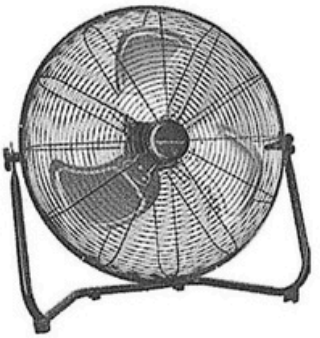
When **insulator 2** is brought near **insulator 1**, the insulators are observed to move away from each other.



What are possible charges on **insulator 1** and **2**?

	Insulator 1	**Insulator 2**
A.	negative	positive
B.	neutral	negative
C.	neutral	positive
D.	positive	positive

15. An 800 W rated industrial fan is connected to a 120 V mains supply.



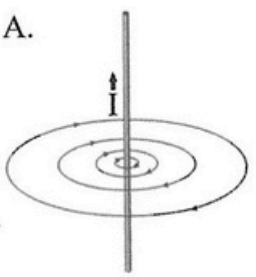
Which fuse is most suitable to be used, in a circuit, with the fan?

A. 1 A
B. 5 A
C. 7 A
D. 13 A

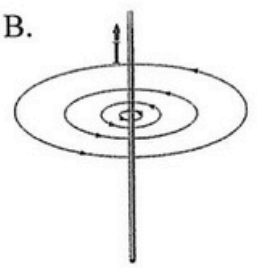
16. A straight wire carrying an electric current, I, whose direction is shown in the diagram below.

Which of the following diagram shows the direction and shape of the magnetic field lines, formed around the wire?

A.



B.



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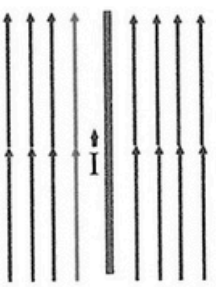
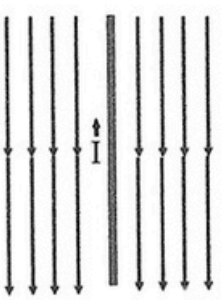


D.



17. Two nuclides have the symbols $^{60}_{28}Ni$ and $^{60}_{29}Cu$.

Which statement is correct about the nuclei of Ni-60 and Cu-60?

A. Ni-60 has one more proton than Cu-60.
B. Ni-60 has the same number of protons as Cu-60.
C. Ni-60 has the same number of neutrons as Cu-60.
D. Ni-60 has the same total number of neutrons and protons as Cu-60.

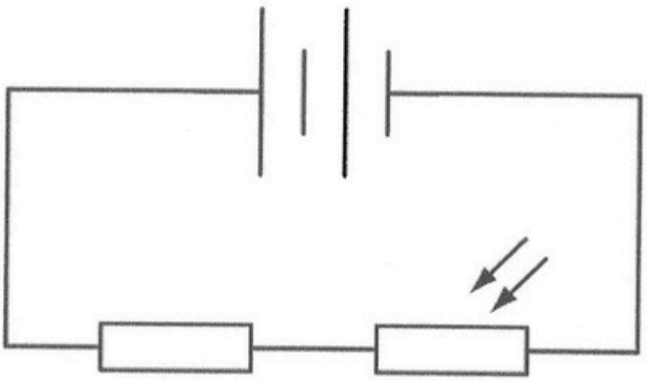
18. The ratio of ^{12}C:^{14}C in living organisms is 10 000 000:1. This ratio is found to be 40 000 000:1 in a fossil.

What is the age of the fossil?

(^{12}C is a stable isotope and ^{14}C is a radioactive isotope with a half-life of 6 000 years).

A. 1 500 years
B. 3 000 years
C. 12 000 years
D. 24 000 years

19. A fixed resistor and a light dependent resistor (LDR) are connected in series with a low voltage power supply as shown in the diagram.



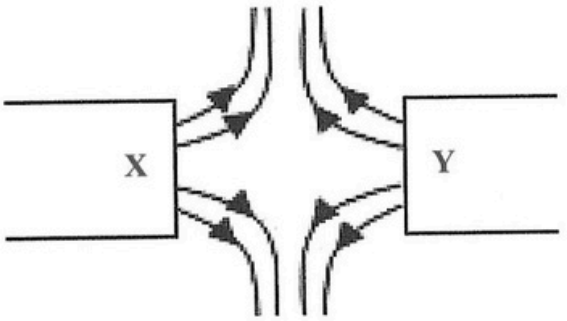
In dark conditions, the current in the circuit is 0.3 mA.

Light is then shone on the LDR.

What is a possible value of the new current in the circuit?

A. 0 mA
B. 0.2 mA
C. 0.3 mA
D. 0.4 mA

20. The diagram below shows the magnetic field lines between two poles, **X** and **Y** of a bar magnet.



Which are the correct names for poles **X** and **Y**?

	Pole **X**	Pole **Y**
A.	North	North
B.	North	South
C.	South	North
D.	South	South

21. You are provided with a steel bar, a coil of conducting copper wire called a solenoid, a direct current (d.c) supply and an alternating current (a.c) supply.

Which of the following could be used to magnetise the steel bar?

A. connect the coil to a direct current (d.c.) supply and place the steel bar inside the coil.
B. connect the coil to an alternating current (a.c.) supply and place the steel bar inside the coil.
C. pass a direct current through the steel bar.
D. pass an alternating current through the steel bar.

22. Which of the following is an electrical safety device?

A. a circuit breaker
B. an electric motor
C. a reed switch
D. a diode

23. Given that the speed of sound in air is 330 m/s, calculate the time taken for the echo of a ship's horn to be heard if the ship is 1000 m away from a cliff face.

A. 0.33 s
B. 0.66 s
C. 3.0 s
D. 6.1 s

24. Which of the following is **NOT** correct about electromagnetic waves?

A. They are longitudinal waves.
B. They can be refracted.
C. They can be diffracted.
D. They travel at a speed of 3.0×10^8 m/s in a vacuum.

25. The designers of marinas normally leave a narrow slot like entrance for boats to enter the protective basin. What occurs at the entrance?

A. reflection
B. refraction
C. diffraction
D. the wavelength increases

26. A spring with a natural length of 3 cm extends by 0.5 cm for every 2 N of force.

Which force is required to stretch the spring to a total length of 10.5 cm?

A. 30 N
B. 40 N
C. 45 N
D. 50 N

27. Which of the following physical properties decreases in magnitude when a 10 kg rock is taken from Earth to the Moon?

A. density
B. mass
C. volume
D. weight

28. Heat is continuously added to a liquid sample.

Which physical change takes place in the water?

A. burning
B. condensation
C. evaporation
D. fusion

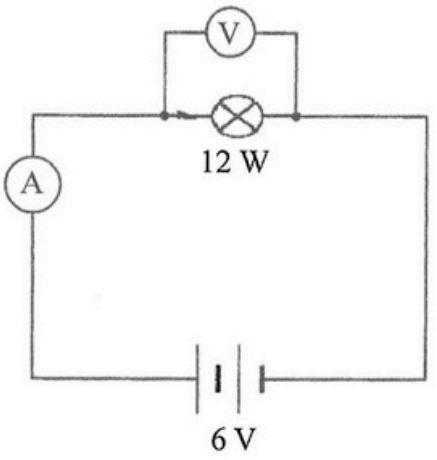
29. Given that the conversion of degrees Fahrenheit to degrees Celsius can be achieved using the formula $°C = (°F - 32) \times \frac{5}{9}$, what is the value of 120 °F in °C?

A. 48.9 °C
B. 84.4 °C
C. 120 °C
D. 158 °C

30. In cold countries the electrical power providers have to take into account the effect of weather on the hanging of electrical lines. Which answer best describes the effect of cold weather and hot weather on electrical wires.

	cold weather	**hot weather**
A.	expansion	contraction
B.	expansion	no change
C.	contraction	expansion
D.	no change	contraction

31. The diagram shows a 6.0 V, 12 W lamp connected to a 6 V battery, an ammeter and a voltmeter.



What is the reading on the ammeter?

A. 2.0 A
B. 12 A
C. 18 A
D. 72 A

32. Which of the following is an example of the occurrence of nuclear fusion?

A. radioactive decay
B. heat and light produced in the sun
C. heat produced in a nuclear power plant
D. the use of radioactive tracers

33. A doctor wants to investigate organ function in a patient, by injecting them with a radioactive isotope.

Which radioactive isotope has the best half-life and emits radiation of a suitable type?

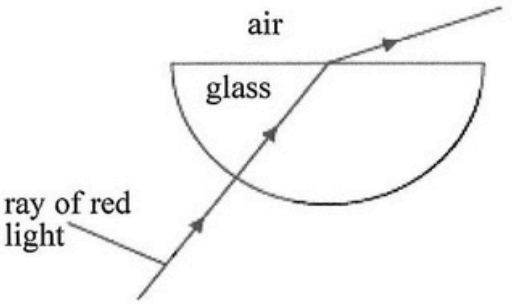
	Radioisotope	**Half Life**	**Emission Type**
A.	Carbon-14	6000 years	Beta
B.	Polonium-210	138 days	Alpha
C.	Strontium 90	28.8 years	Beta
D.	Technetium-99	6 hours	Gamma

34. Fiber optic cables allow high-speed communication by transmitting light over long distances.

Which property of light enables this capability?

A. partial internal reflection
B. partial internal refraction
C total internal reflection
D. total internal refraction

35. The diagram shows the path of a ray of red light, as it travels from glass into air.



Why does the ray of light change direction, as it travels from glass into air?

A. it changes to white light
B. its amplitude changes
C. its frequency changes
D. its speed changes

36. 1 kg of water is heated to 100 °C and changes from a liquid to a gas.

Which best describes the change in internal energy during this change of state?

A. it decreases
B. it fluctuates
C. it increases
D. it remains constant

37. A stone of mass 2 kg is taken to a height of 20 m. It is then dropped.

What is the kinetic energy of the stone, just before it hits the ground? Assume no energy is lost due to air resistance. ($g = 10\,m/s^2$)

A. 32 J
B. 200 J
C. 400 J
D. 800 J

38. Which of the following **decreases** the rate of diffusion of the particles of a gas?

A. raising the temperature
B. lowering the temperature
C. stirring or mixing
D. decreasing particle size

39. According to Charles' Law, the temperature of a gas is directly proportional to which property of the gas?

A. mass
B. pressure
C. average speed of the gas particles
D. volume of the gas particles

40. A rocket that is free to move, propels exhaust gases downwards.

According to Newton's Third Law, what is the direction of the force on the rocket caused by the exhaust gases?

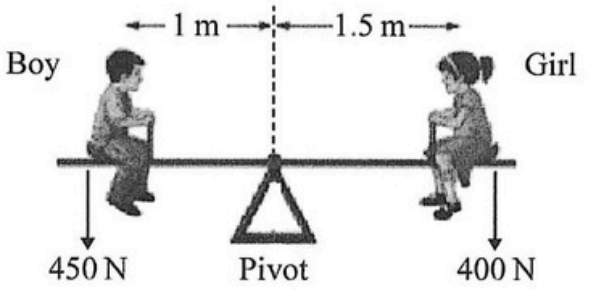
A. downwards
B. upwards
C. to the left
D. to the right

41. Which term describes the tendency of an object to resist changes in its motion?

A. inertia
B. pressure
C. speed
D. weight

42. The diagram shows a boy and a girl on a see-saw.

What is the moment of the girl about the pivot?

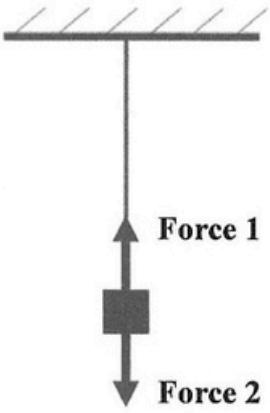


A. 450 Nm
B. 600 Nm
C. 1 000 Nm
D. 1 125 Nm

43. What is the density of an object that floats when placed in water that has a density of 1.09 g/cm^3?

A. 0.60 g/cm^3
B. 1.20 g/cm^3
C. 2.70 g/cm^3
D. 19.3 g/cm^3

44. A mass is hung from a rigid support by a rope and two equal forces act on the mass.



What are the names of **Force 1** and **Force 2**?

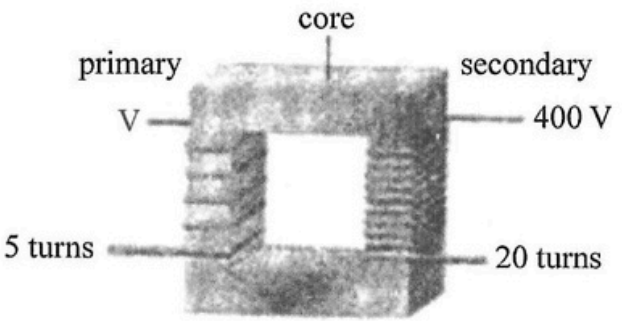
	Force 1	**Force 2**
A.	weight	tension
B.	weight	elastic force
C.	tension	weight
D.	tension	elastic force

45. A car of mass 1 000 kg is travelling at 20 m/s.

What is the kinetic energy of the car?

A. 10 000 J
B. 20 000 J
C. 200 000 J
D. 400 000 J

46. The diagram shows an ideal transformer with an output voltage of 400 V. The primary coil has 5 turns and the secondary coil has 20 turns.



What is the potential difference across the primary coil of the transformer?

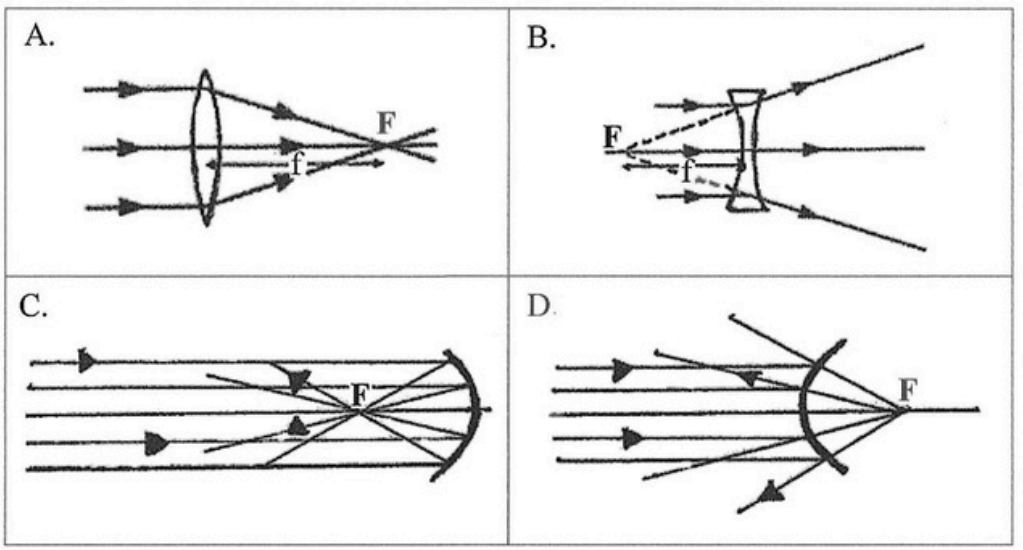
A. 4 V
B. 80 V
C. 100 V
D. 1600 V

47. A long solenoid carries an electric current.

What is the pattern of the magnetic field at the centre of the solenoid?

A. concentric circles
B. diverging lines
C. random and chaotic
D. uniform and parallel lines

48. Which diagram correctly labels the focal point **F** of a convex lens?

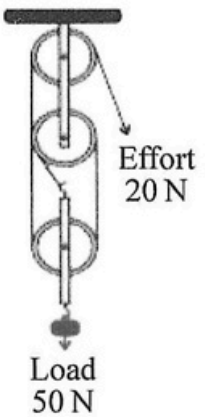


49. An athlete with a mass of 55 kg, is running at a speed of 4.0 m/s.

What is the momentum of the athlete?

A. 54 kg m/s
B. 220 kg m/s
C. 440 kg m/s
D. 880 kg m/s

50. Determine the mechanical advantage of the pulley system shown.



A. 0.40
B. 2.0
C. 2.5
D. 5.0

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