



XINMIN SECONDARY SCHOOL
新民中學
SEKOLAH MENENGAH XINMIN

Preliminary Examination 2026

CANDIDATE NAME

--

CLASS

--	--	--

INDEX NUMBER

--	--

PHYSICS

6091/01

Paper 1 Multiple Choice

Secondary 4 Express

02 SEP 2026

Setter: Ms Cindy Oh

Vetter: Mr Zhuang Haoyang

1 hour

Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, glue or correction fluid.

Write your name, class and index number on the Question Paper and Answer Sheet in the spaces provided.

There are **forty** questions in this paper. Answer **all** questions. For each question, there are four possible answers, **A, B, C, D**.

Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

The use of an approved scientific calculator is expected, where appropriate.

For Examiner's Use	
Total	40
Parent's Signature	

- 1 Which is not a correct unit for electric charge?

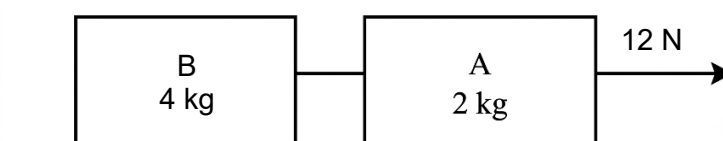
A A s B C C Cd D J V⁻¹

- 2 A simple pendulum is set into oscillation on Earth, Jupiter, Mars and Neptune in turn. The acceleration due to free fall of the planets are 9.8 m s^{-2} , 25 m s^{-2} , 3.7 m s^{-2} and 11 m s^{-2} respectively.

On which planet will the pendulum oscillate the fastest?

A Earth B Jupiter C Mars D Neptune

- 3 A force of 12 N acts on block A and block B of mass 2 kg and 4 kg respectively. The floor is smooth and the string connecting block A and block B is taut.



What is the tension in the string connecting block A and block B?

A 4 N B 6 N C 8 N D 12 N

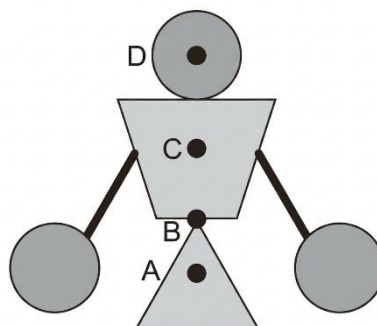
- 4 5000 kg of molten iron is mixed with 2.0 m^3 of molten copper. The densities of molten iron and molten copper are 7.5 g cm^{-3} and 9.0 g cm^{-3} respectively.

What is the density of the mixture?

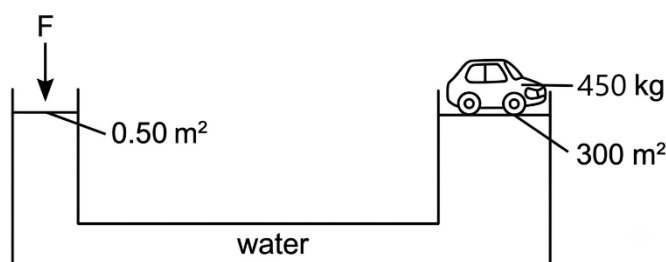
A 7.5 g cm^{-3} B 8.3 g cm^{-3} C 8300 kg m^{-3} D 8600 kg m^{-3}

- 5 A balancing toy is pivoted on a triangular stand. When the toy is tilted slightly, it stays at the new position.

Where is the centre of gravity of the toy?

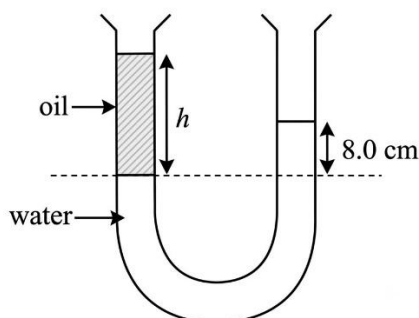


- 6 In a hydraulic system, a 450 kg car is loaded on one side of the system with an area of 300 m^2 . The other side of the system has an area of 0.50 m^2 .



What is the minimum magnitude of force F needed to lift the car?

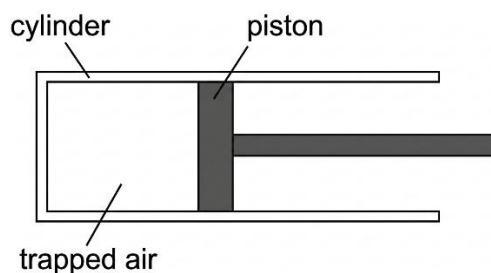
- A 0.75 N B 7.5 N C 270 000 Pa D 2 700 000 Pa
- 7 A diver of mass 60 kg is 20 m below water level. The atmospheric pressure is 100 000 Pa and the density of water is 1000 kg m^{-3} .
- What is the pressure experienced by the diver?
- A 12 000 Pa B 112 000 Pa C 200 000 Pa D 300 000 Pa
- 8 A manometer is filled with water and oil, and both ends are open to atmospheric pressure of 100 000 Pa. The densities of water and oil are 1000 kg m^{-3} and 800 kg m^{-3} respectively.



What is the height h of the column of oil?

- A 6.4 cm B 10 cm C 13 cm D 18 cm
- 9 Substances in gaseous state have no definite shape and size because
- A the inter-particulate forces are very weak.
- B the particles are in continuous random motion.
- C the particles have bigger size than particles in solid state and liquid state.
- D the particles have greater mass than particles in solid state and liquid state.

- 10** A smooth piston and cylinder combination has trapped some air and is lying horizontal. Energy in the internal store of the trapped air is transferred to the surroundings.



Which quantity/quantities has/have decreased after some time?

- 1 pressure of trapped air
- 2 temperature of trapped air
- 3 volume of trapped air

A 2 only **B** 1 and 2 only **C** 2 and 3 only **D** 1, 2 and 3

- 11** Air in a closed container contains smoke, illuminated by bright light. When viewed through a microscope, bright specks of light are seen moving at random.

Which statement is correct?

- A** The random motion of the specks is faster in a vacuum.
- B** The specks move faster when the air is at a higher temperature.
- C** The specks seen are molecules of air in continuous random motion.
- D** When the light is turned off, the specks slow down and stop moving.

- 12** Which statement is true?

- A** Land breeze happens during day time because the land is warmer than the sea.
- B** Land breeze happens during night time because the land is cooler than the sea.
- C** Sea breeze happens during day time because the sea is warmer than the land.
- D** Sea breeze happens during night time because the sea is cooler than the land.

- 13** Which statement is false?

- A** A black car is cooler than a white car during hot days as it emits more energy from its internal store.
- B** Heating elements and cooling fins are both painted black to emit energy from their internal stores.
- C** White clothes can keep us cool during hot days.
- D** White clothes can keep us warm during cold days.

- 14** The direction of energy transfer by heating from one internal store to the other internal store of two bodies in contact depends on the _____.

- 1 amount of energy in the internal stores of the two bodies
- 2 specific heat capacities of the two bodies
- 3 temperature of the two bodies

Which descriptor(s) is/are correct?

- A** 1 only **B** 1 and 3 only **C** 2 and 3 only **D** 3 only

- 15** Which statement is false?

- A** Boiling is fast but evaporation is slow.
B Boiling occurs throughout the liquid but evaporation occurs only at the surface.
C Bubbles are formed during boiling but not during evaporation.
D Temperature is constant during boiling, but increases during evaporation.

- 16** A 2.0 kg copper ball at 500 °C is put into 0.50 kg of water at 60 °C. No energy is transferred to the surroundings.

Given:

specific heat capacity of copper = 390 J/(kg °C)

specific heat capacity of water = 4200 J/(kg °C)

specific latent heat of vaporisation of water = 2 260 000 J/kg

How much water will vaporise to steam?

- A** 0.082 kg **B** 0.10 kg **C** 0.12 kg **D** 0.14 kg

- 17** Which option is the same as the speed of a transverse wave?

- A** Amplitude divided by time taken for one complete oscillation
B The speed of a crest on the wave
C The speed of a particle on the wave
D Wavelength divided by time taken for the wave to travel from the start to the end

- 18** When a sound wave travels from air into water, how would its frequency, speed and wavelength change?

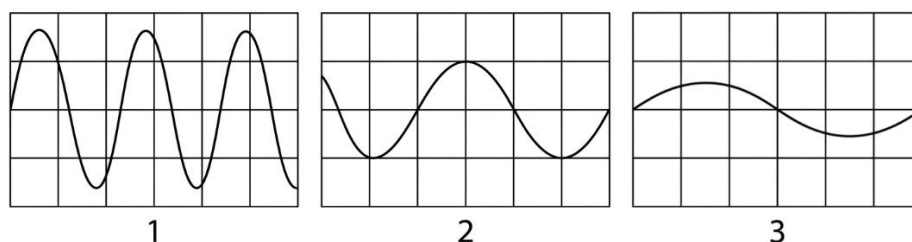
	frequency	speed	wavelength
A	increases	decreases	decreases
B	increases	increases	no change
C	no change	decreases	decreases
D	no change	increases	increases

19 Which is/are properties of electromagnetic (EM) waves?

- 1 All EM waves are transverse waves.
- 2 All EM waves can be reflected and refracted.
- 3 All EM waves carry energy.

A All of the above **B** 1 only **C** 3 only **D** 1 and 3 only

20 The graphs show three types of EM waves.



Which EM waves are shown in the graphs?

	graph 1	graph 2	graph 3
A	radio waves	infrared radiation	visible light
B	radio waves	visible light	infrared radiation
C	X-rays	ultraviolet radiation	visible light
D	X-rays	visible light	ultraviolet radiation

21 Which application uses infrared radiation?

- 1 Cooking food
- 2 Detecting fake notes
- 3 Sun-tanning

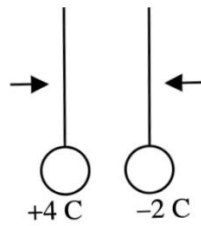
A 1 only **B** 3 only **C** 2 and 3 only **D** 1, 2 and 3

22 Which is the correct sequence to induce a positive charge in a neutral conducting sphere?

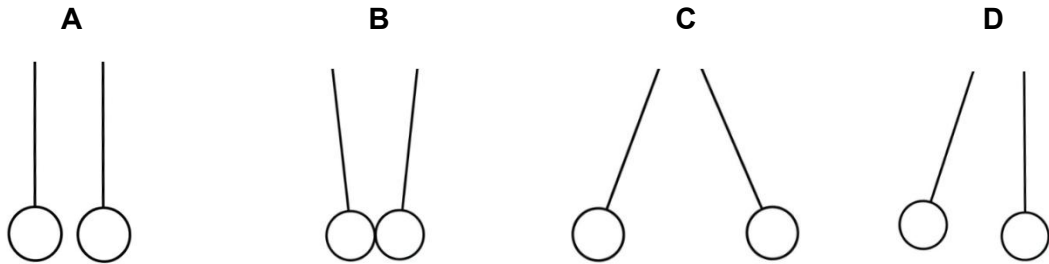
- 1 Earth the sphere momentarily.
- 2 Remove the charged rod.
- 3 Place a negatively-charged rod near the conducting sphere.
- 4 Place a positively-charged rod near the conducting sphere.

A 3 → 1 → 2 **B** 4 → 2 → 1 **C** 4 → 1 → 2 **D** 3 → 4 → 1 → 2

- 23** Two identical light conducting spheres of different charge are suspended freely and pushed close to each other.



What will be the positions of the two spheres after they touch each other?

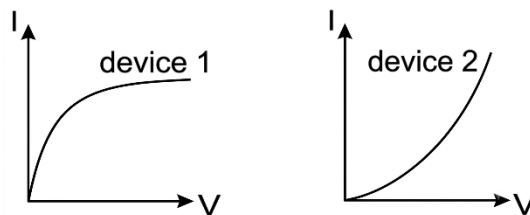


- 24** A 50 W lamp was turned on for five hours in the evening. The potential difference across the lamp was 240 V.

How much charges flowed through the lamp in the five hours?

- A** 1.0 C **B** 24 C **C** 2400 C **D** 3750 C
- 25** A 2 m long wire with a radius of 1 mm has a resistance of 16 Ω .
- What is the resistance of the same type of wire which is 4 m long with a radius of 2 mm?
- A** 8 Ω **B** 16 Ω **C** 64 Ω **D** 128 Ω

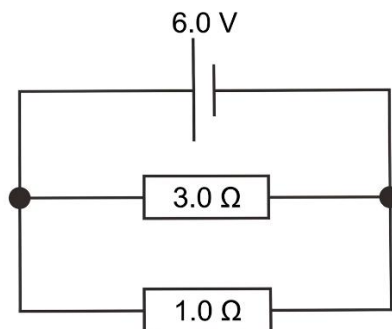
- 26** The current-potential difference graphs of two electronic devices are plotted.



What are the electronic devices?

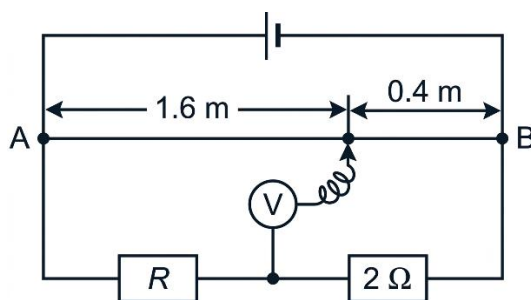
	device 1	device 2
A	filament lamp	thermistor
B	resistor	filament lamp
C	thermistor	filament lamp
D	thermistor	resistor

- 27 Two resistors are connected in parallel to a dry cell.



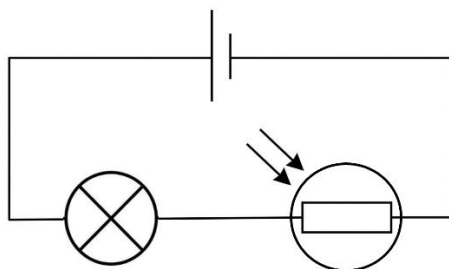
What is the effective resistance of the circuit?

- A 0.25 Ω B 0.75 Ω C 1.3 Ω D 4.0 Ω
- 28 A 12 Ω resistance wire AB and a combination of two fixed resistors are connected in parallel to a dry cell. When the jockey is at the position shown, the voltmeter reading is 0 V.



What is the resistance of resistor R?

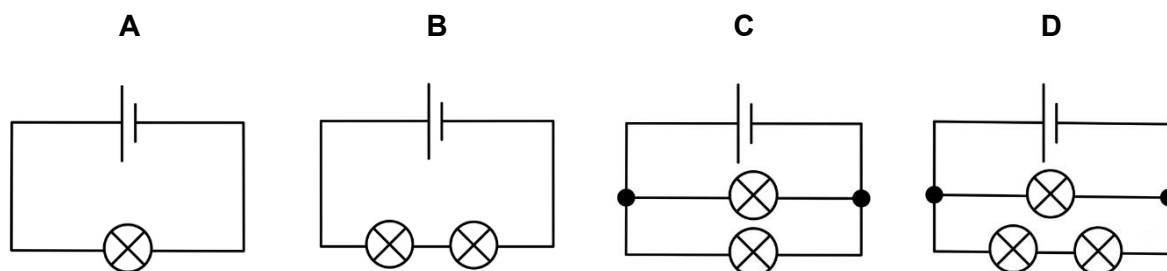
- A 2.4 Ω B 8.0 Ω C 9.6 Ω D 10 Ω
- 29 The lamp in the circuit below will light up



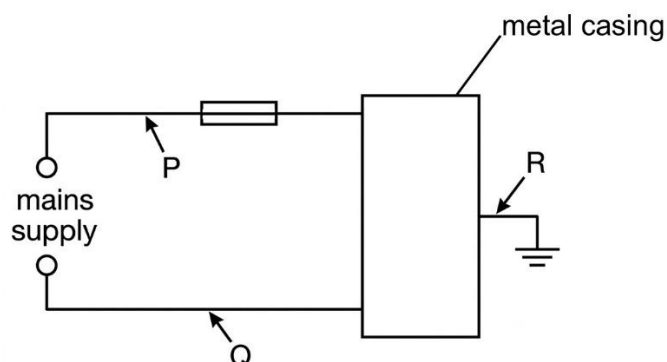
- A in a bright room. B in a dark room. C on a cold day. D on a hot day.

- 30 Four identical dry cells and eight identical lamps are connected into circuits.

Which circuit dissipates the greatest power?

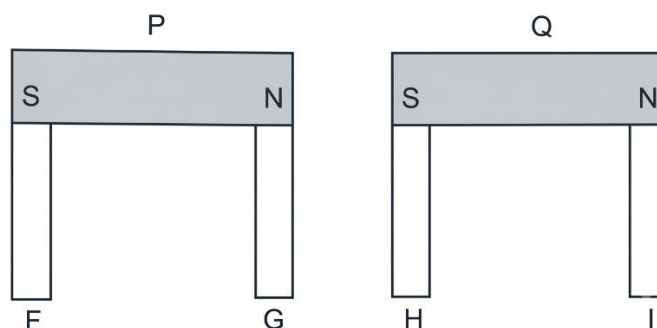


- 31 Which wires are the Earth, Live and Neutral wires?



	P	Q	R
A	Live	Earth	Neutral
B	Live	Neutral	Earth
C	Neutral	Earth	Live
D	Neutral	Live	Earth

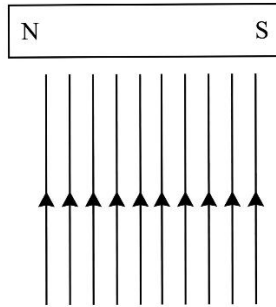
- 32 Two permanent magnets P and Q attract four soft iron bars F, G, H and I. The magnets are pushed close to each other and they attract and touch each other.



What will happen to the soft iron bars?

- A** F will attract G, and I will attract H. **B** G and H will drop off.
C G and H will repel each other. **D** There is no change.

- 33 A bar magnet is placed in a magnetic field.

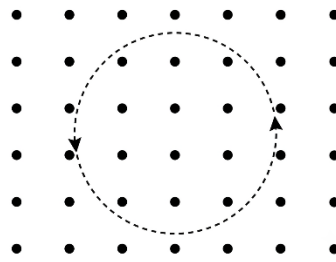


What will happen to the bar magnet?

- A** It moves into the paper. **B** It moves to the right.
C It moves upwards. **D** It rotates clockwise by 90° .
- 34 Which observation confirms that an object is a magnet?
- A** It causes a compass needle to move.
B It is attracted to both poles of a horseshoe magnet.
C It moves towards a current-carrying solenoid.
D It rotates before being attracted to a bar magnet.
- 35 What is the function of a split-ring commutator in a d.c. motor?
- A** It allows the coil to rotate continuously by preventing wires from being entangled.
B It allows the coil to rotate continuously by reversing the current through the coil every half turn.
C It ensures that the current in the external circuit is always in the same direction.
D It ensures that the coil is always connected to the external circuit as the coil turns.
- 36 Which combination will give the greatest turning effect of the coil in a d.c. motor?

	material of coil	number of turns	amount of current /A
A	aluminium	80	10
B	copper	80	8.0
C	copper	100	10
D	iron	100	8.0

- 37 A charged particle moves in a circular path in an uniform field.



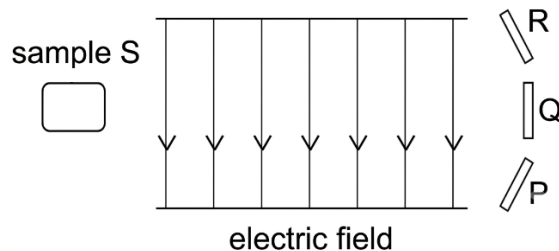
What is the correct type of charge and correct type of field?

	type of charge	type of field
A	negative charge	electric field
B	negative charge	magnetic field
C	positive charge	electric field
D	positive charge	magnetic field

- 38 An ideal transformer with turns ratio of 4:1 is used to operate a lamp from a 240 V d.c. supply.

What is the output voltage of the transformer after some time?

- A** 0 V **B** 60 V **C** 300 V **D** 960 V
- 39 A student investigates the type of nuclear emissions emitted by a radioactive isotope, S. Three detectors, P, Q and R, are positioned on one side of an electric field. The detectors will light up whenever charged particles or gamma rays strike them.



When sample S is placed near the other side electric field, only detectors P and Q light up.

Which nuclear emissions are emitted by radioactive isotope, S?

- A** alpha particles and beta particles
B alpha particles and gamma radiation
C beta particles and gamma radiation
D alpha particles, beta particles and gamma radiation

- 40** Radioactive substances are used as tracers in medical examinations.

A liquid tracer is injected into a patient. A detector 50 cm above the patient shows where the radioactive substance is in the body.

Which is the best radioactive substance to use?

- A** an alpha-particle emitter with a short half-life
- B** an alpha-particle emitter with a long half-life
- C** a gamma-ray emitter with a short half-life
- D** a gamma-ray emitter with a longer half-life

End of paper