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南洋女子中學校
NANYANG GIRLS' HIGH SCHOOL
End-of-Year Examination 2014
Secondary Four

Physics

Paper 1 Multiple Choice

Friday

Additional materials: Multiple Choice Answer Sheet

45 minutes

08:00 – 08:45

03 October 2014

READ THESE INSTRUCTIONS FIRST

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

Write in soft pencil.

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

Write your name, class and register number on the Multiple Choice Answer Sheet provided.

There are **thirty** questions in this paper. Answer **all** questions. For each question there are four possible answers, **A, B, C** and **D**. Choose the **one** you consider correct and record your choice in **soft pencil** on the answer sheet.

INFORMATION FOR CANDIDATES

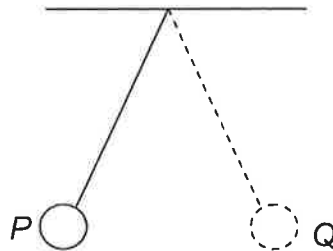
Each correct answer will score one mark. A mark will not be deducted for a wrong answer. Any rough working should be done in this booklet.

Take the gravitational field strength, g , to be 10 m s^{-2} or 10 N kg^{-1} .

1 Which pair of units both measure the same quantity?

- A Pa and N m^{-3}
- B W and J C^{-1}
- C V and J s^{-1}
- D N and kg m s^{-2}

2 A simple pendulum oscillates between P and Q with a frequency of 1.2 Hz.



How many complete oscillations does the pendulum make in one minute?

- A 12
- B 50
- C 72
- D 144

3 The diagram below shows a ticker tape that was attached to the back of a trolley moving along a straight track to the left.



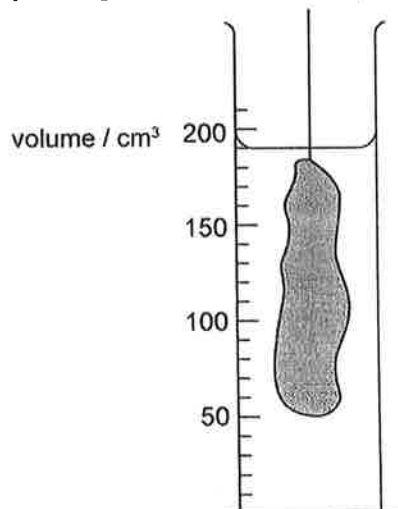
If the ticker timer makes 50 dots every second, what is the average acceleration of the trolley?

- A 10 m s^{-2}
- B 12 m s^{-2}
- C 20 m s^{-2}
- D 24 m s^{-2}

4 A cyclist moving at a speed of 5.0 m s^{-1} braked with uniform deceleration and stopped in 6.0 m. How long did she take to stop?

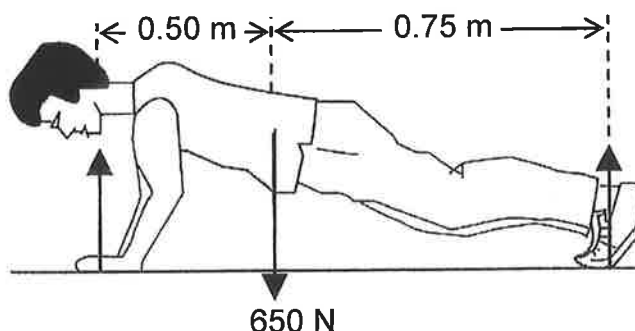
- A 0.60 s
- B 0.83 s
- C 1.2 s
- D 2.4 s

- 5 Which of the following statements concerning gravitational fields is **not** true?
- A A gravitational field is a region in which a mass experiences a force due to gravitational attraction.
 - B Gravitational field strength is numerically equal to the acceleration due to gravity.
 - C The gravitational field of the Earth acts outwards from the Earth's magnetic north pole.
 - D The strength of the Earth's gravitational field decreases as the distance from the surface of the Earth increases.
- 6 A measuring cylinder filled with 100 cm^3 of water has a mass of 105.0 g . The diagram below shows a body being suspended by a piece of thread in the cylinder with 100 cm^3 of water.



If the total mass of the measuring cylinder containing 100 cm^3 of water together with the body immersed is 385.0 g , what is the density of the body?

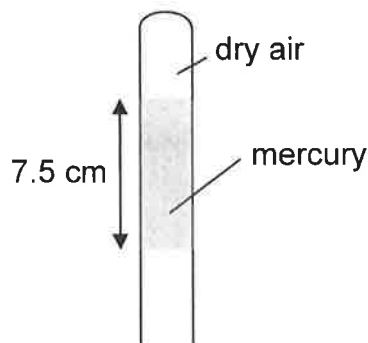
- A 1.47 g cm^{-3}
 - B 2.00 g cm^{-3}
 - C 2.80 g cm^{-3}
 - D 3.11 g cm^{-3}
- 7 The diagram below shows an athlete doing push-up, which involves raising his body by means of his arms.



If the athlete weighs 650 N , what is the minimum force exerted by his arms in lifting himself?

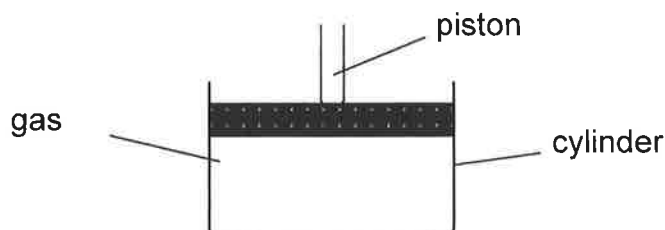
- A 260 N
- B 390 N
- C 1080 N
- D 1630 N

- 8 The diagram below shows a column of dry air enclosed in a narrow capillary tube by a thread of mercury 7.5 cm in length.



If the atmospheric pressure is 76.0 cm Hg, what is the pressure of the enclosed air?

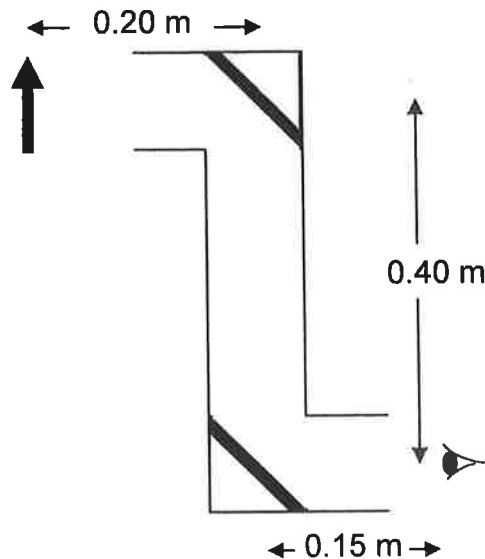
- A 7.5 cm Hg
B 68.5 cm Hg
C 76.0 cm Hg
D 83.5 cm Hg
- 9 A fixed mass of gas is enclosed in a cylinder fitted with a smooth movable piston as shown below.



The piston is pushed down slowly such that there is no change in the temperature of the gas. What effect does this have on the kinetic energy, pressure and volume of the gas?

- | | <u>kinetic energy</u> | <u>pressure</u> | <u>volume</u> |
|---|-----------------------|-----------------|---------------|
| A | increase | increase | decrease |
| B | increase | increase | no change |
| C | increase | no change | decrease |
| D | no change | increase | decrease |
- 10 A body of mass 5.0 kg is moving horizontally along a smooth, straight path at 6.0 m s^{-1} . What is the work done in order to change its speed to 10.0 m s^{-1} ?
- A 40 J
B 90 J
C 160 J
D 400 J

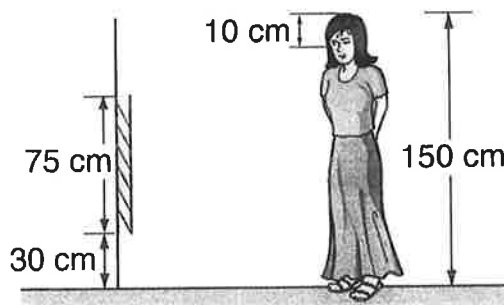
- 11 An object in the form of an arrow is placed in front of a periscope as shown in the diagram below.



Which of the following correctly describes the image seen by the observer and the distance between the final image and the observer?

	<u>description of image</u>	<u>distance between the final image and the observer</u>
A	inverted arrow	0.35 m
B	inverted arrow	0.75 m
C	upright arrow	0.35 m
D	upright arrow	0.75 m

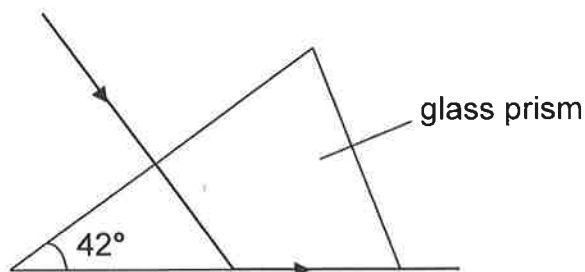
- 12 The diagram below shows a girl stands facing a long mirror.



The mirror is 75 cm long and its bottom edge is 30 cm above the floor. If the girl is 150 cm tall and her eyes are 10 cm below the top of her head, which of the following statements is **not** correct?

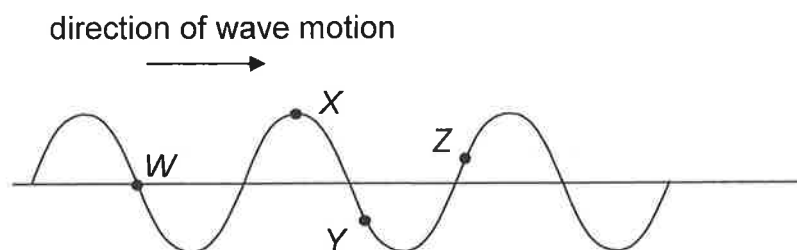
- A The girl's image can be photographed.
- B The girl cannot see her whole image no matter how far she is from the mirror.
- C The girl cannot see her whole image no matter how high she hangs the mirror.
- D The distance between the girl and the mirror is the same as the distance between the girl's image and the mirror.

- 13 Which of the following phenomena is **not** a result of refraction?
- A A stick appears bent when dipped in water
 - B Image in a mirror is laterally inverted
 - C When you see the Sun setting on the horizon, the Sun has in fact already set below the horizon
 - D Water in a swimming pool appears to be shallow
- 14 A ray of light strikes a glass prism normally and is refracted as shown in the diagram below.



What is the critical angle of the glass?

- A 42°
 - B 48°
 - C 60°
 - D Cannot be determined because the other angles of the prism are not given.
- 15 Which of the following statements about all types of electromagnetic waves is true?
- A They are all transverse waves.
 - B They are dangerous to living organisms.
 - C They require a medium to propagate.
 - D They travel at the same speed through water.
- 16 The diagram shows a wave travelling to the right. W, X, Y and Z are particles in the medium.



Which of the following statements about the particles at the moment shown above is correct?

- A Particle W is momentarily at rest.
- B Particle X is moving fastest.
- C Particle Y and Z are in phase.
- D All the particles W, X, Y and Z have the same amplitude.

- 17 The audible range of a girl's hearing is 30 Hz to 18 kHz. If the speed of sound in air is 340 m s^{-1} , what is the shortest wavelength of sound that the girl can hear?

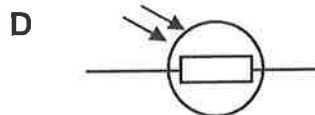
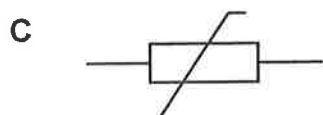
A 1.89 cm
B 11.3 cm
C 11.3 m
D 18.9 m

- 18 Three objects X, Y and Z are metal spheres, each supported on an insulating stand. X and Y experience a force of attraction when placed near to each other. X and Z also experience a force of attraction when placed near to each other.

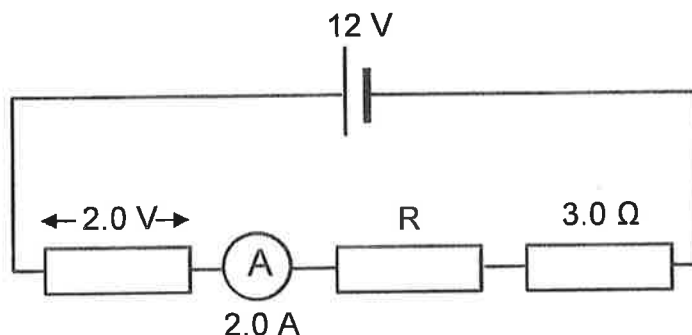
Which set of charges **cannot** be correct?

	<u>Charge on X</u>	<u>Charge on Y</u>	<u>Charge on Z</u>
A	positive	negative	negative
B	positive	negative	positive
C	uncharged	positive	negative
D	uncharged	positive	positive

- 19 Which of the following symbol does **not** represent a type of resistor?



- 20 A 12 V cell is connected to three resistors arranged in series. The potential difference across the first resistor is 2.0 V, and the reading on the ammeter is 2.0 A.



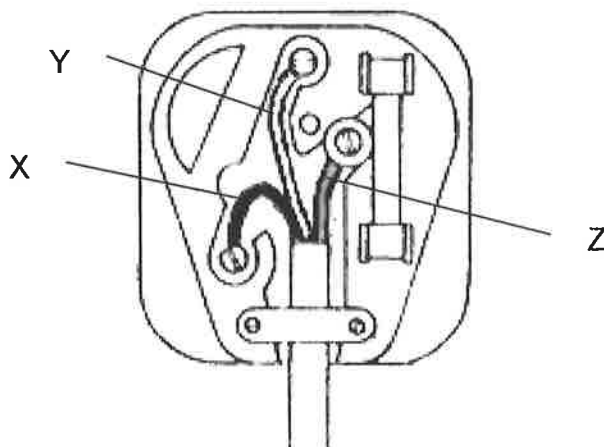
What is the potential difference across resistor R?

A 2.0 V
B 4.0 V
C 5.0 V
D 6.0 V

- 21 A metal wire of length l and diameter d has a resistance of $20\ \Omega$.
If another wire of the same metal is $2l$ in length and $0.5d$ in diameter, what is its resistance?

A $10\ \Omega$
B $20\ \Omega$
C $80\ \Omega$
D $160\ \Omega$

- 22 The following diagram shows a correctly wired three-pin mains plug.



Which of the following gives the correct colour code for the three wires?

	<u>X</u>	<u>Y</u>	<u>Z</u>
A	blue	brown	green-and-yellow
B	brown	blue	green-and-yellow
C	blue	green-and-yellow	brown
D	brown	green-and-yellow	blue

- 23 A computer is marked as '230 V, 150 W'. It is used on a ring main socket marked '30 A Max'.

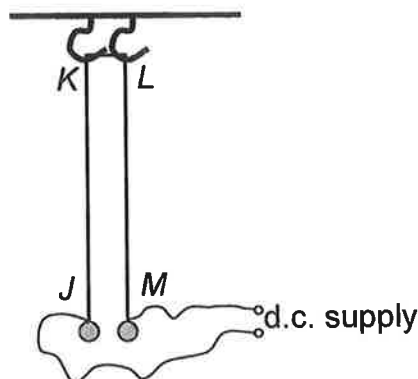
Which is the correct fuse to put in the plug of the computer power cable?

A 30 A
B 13 A
C 3 A
D 1 A

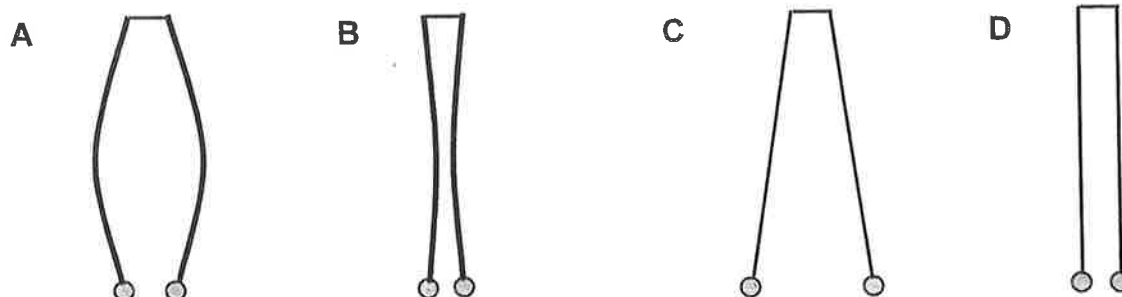
- 24 Which of the following ways to magnetise a steel rod will produce the strongest magnet?

A Place the rod in a solenoid carrying a large alternating current.
B Stroke the rod with a permanent magnet.
C Place the rod in a solenoid carrying a large direct current.
D Heat the rod in the presence of a magnetic field.

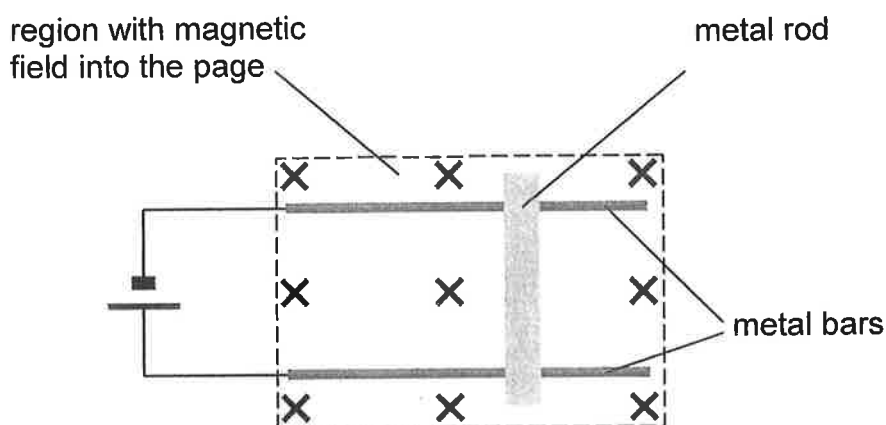
- 25 A light straight wire is bent into the shape $JKLM$ and suspended from two hooks from the ceiling making two long straight parallel sections JK and LM . Small weights are attached to the bottom J and M to keep them straight. A d.c. current is then passed through the wire as shown.



What is the appearance of the wires when the current is switched on?



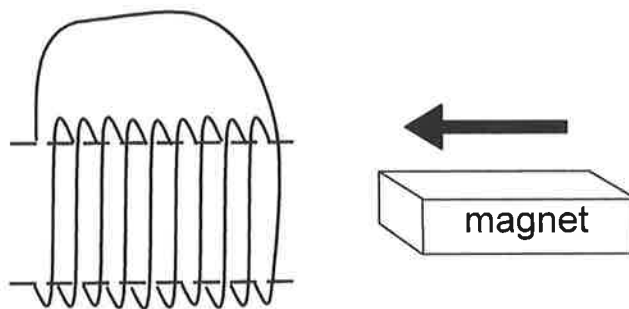
- 26 The diagram below shows a battery completing a circuit of a metal rod resting on two metal bars. The metal rod is located in a magnetic field that is directed perpendicularly into the page.



How will the metal rod move?

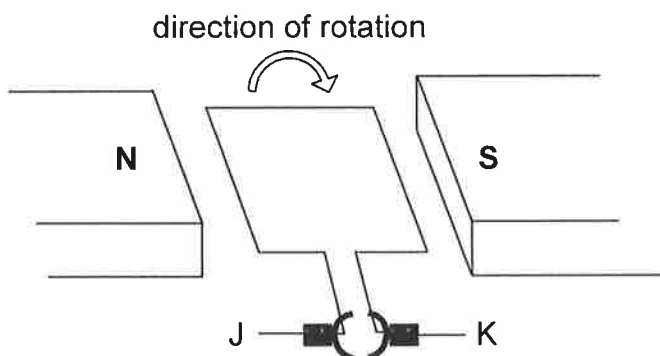
- A The rod will move to the left.
- B The rod will move to the right.
- C The rod will rotate clockwise.
- D The rod will rotate anticlockwise.

- 27 A magnet is pushed horizontally towards a coil of insulated wire, inducing an e.m.f. in the coil.



In which direction does the induced e.m.f. make the coil move?

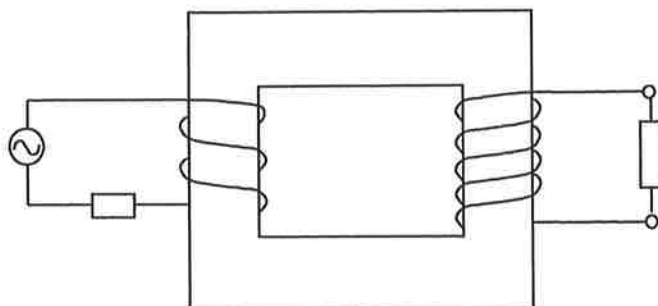
- A towards the magnet
 - B away from the magnet
 - C downwards
 - D upwards
- 28 The diagram shows a simple d.c. motor.



Which of the following correctly identifies the connection of carbon brushes to the positive terminal of the battery and, the correct value of the torque at the instant shown in the above diagram?

	<u>carbon brush connected to positive terminal</u>	<u>value of torque at instant shown</u>
A	J	maximum
B	J	minimum
C	K	maximum
D	K	minimum

- 29 The diagram shows a transformer connected to an a.c. source.



Which of the following statements is **false**?

- A The transformer is a step-down transformer.
 - B The e.m.f. across the secondary coil is greater than the applied e.m.f. across the primary coil.
 - C The current in the secondary coil is less than the current in the primary coil
 - D There is no current flowing in the secondary coil.
- 30 An equal amount of thermal energy is supplied to each of the following substances. Which one of them will have the largest temperature rise?

	<u>substance</u>	<u>mass / kg</u>	<u>specific heat capacity / J kg⁻¹ K⁻¹</u>
A	K	0.5	4200
B	J	1.0	1000
C	L	1.0	4200
D	M	2.0	1000

End of paper

