		CORRESS HIGH		
		南洋女子由受校		
	NANYA	ANG GIRLS' HIGH SCHOOL		
	End-o	of-Year Examination 2016 Secondary Three		
PHYSICS				
Paper 1	Multiple Choice			
Monday Additional materials: C	Optical Answer Sheet (OAS)	10 October 2016		
READ THESE INSTRUCTIONS FIRST				
Do not open this booklet until you are told to do so. Write your name, register number and class in the spaces at the top of this page.				
Do not use staples, paper clips, highlighters, glue or correction fluid on the Multipl				

Register Number

Do not use staples, paper clips, highlighters, glue or correction fluid on the Multiple Choice **Optical Answer Sheet** (OAS) provided.

Name

Write in soft pencil your name, class and register number on the Optical Answer Sheet.

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 Optical Answer Sheet.

INFORMATION FOR CANDIDATES

Class

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

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

Any rough working should be done in this booklet.

The acceleration due to gravity (or gravitational field strength) g is taken to be 10 m s⁻² (or 10 N kg⁻¹) near the Earth's surface.

Setters: AWL & TBH

This document consists of **11** printed pages. **NANYANG GIRLS' HIGH SCHOOL**

[Turn over

45 minutes 08:45 – 09:30

- 1 Which of the following consists of only vector quantities?
 - **A** displacement, pressure, force
 - **B** length, weight, moment of force
 - **C** weight, force, acceleration
 - D moment of force, mass, velocity
- 2 A micrometer screw gauge reads -0.03 mm when it is totally closed.

The diagram below shows the reading taken when the micrometer screw gauge is used to measure the height of a cube.



What is the volume of the cube?

- **A** 5.268 cm³
- **B** 5.323 cm³
- **C** 526.8 cm³
- **D** 532.2 cm³
- **3** A man walked towards the east at 2.0 m s⁻¹ for 3.0 s. Then he turned and walked towards the south at 2.5 m s⁻¹ for 2.0 s. What was his average velocity?
 - **A** 0.90 m s⁻¹
 - **B** 1.6 m s⁻¹
 - **C** 2.2 m s⁻¹
 - **D** 2.3 m s⁻¹
- 4 A car slows down uniformly from 80 km h^{-1} to 10 km h^{-1} in 10 s. What is the average speed during the 10 s?
 - **A** 4.5 m s^{-1}
 - **B** 13 m s⁻¹
 - **C** 45 m s⁻¹
 - **D** 130 m s⁻¹

5 A car has oil dripping out of its petrol tank at a constant rate.

The pattern of drips on the road is shown in the diagram below.



Which statement correctly describes the motion of the car?

- A It accelerates and then travels at a steady speed.
- **B** It travels at a steady speed and then slows down.
- **C** It travels at a steady speed and then accelerates.
- D It accelerates constantly.

Answer questions 6 and 7 with reference to the displacement-time graph of an object shown below. Take North to be the positive direction.



- 6 What is the velocity of the object at 10.0 s?
 - **A** 0 m s⁻¹
 - **B** 7.0 m s⁻¹
 - $C = -7.0 \text{ m s}^{-1}$
 - **D** -10.0 m s^{-1}
- 7 Which correctly describes the motion of the object?

	distance travelled over 15.0 s	direction of motion at 15.0 s
Α	37 m	towards North
В	37 m	towards South
С	83 m	towards North
D	83 m	towards South

8 The resultant of two forces F_1 and F_2 acting at a point can have a minimum value of 1.0 N and a maximum value of 7.0 N. When the two forces act at right angles to each other, what is the magnitude of this resultant force?

4

- **A** 3.0 N
- **B** 5.0 N
- **C** 6.0 N
- **D** 8.0 N
- **9** A block of mass 20 kg is moving with a velocity of 5.0 m s⁻¹. What is the force required to stop the block in 2.0 seconds?
 - **A** 2.0 N
 - **B** 8.0 N
 - **C** 50 N
 - **D** 100 N
- **10** Which of the following statements about inertia is **not** correct?
 - A The greater the mass of a body, the greater is its reluctance to change from its state of rest into motion.
 - **B** For the same body, its inertia on earth is greater than that on the moon.
 - **C** A heavy bag that is dropped from a rising hot air balloon will rise up before it starts falling.
 - **D** When a car travelling with constant velocity along a straight road suddenly turns right. The passengers inside the car will feel that they are thrown to the left.
- 11 A man of mass 80 kg stands in a lift. The cable suddenly breaks and the lift falls freely from rest under the pull of gravity. What is the normal contact force between the man and the lift?
 - **A** 0 N
 - **B** 80 N
 - **C** 88 N
 - **D** 800 N
- **12** A horizontal force P is applied to a block of mass m on a rough horizontal surface. The acceleration of the block is a. If the force is changed to 3P and the frictional force remains unchanged, what will be the acceleration of the block?
 - A greater than 3a
 - B equal to 3a
 - **C** between *a* and 3*a*
 - D less than a

13 Two blocks of masses 4.0 kg and 6.0 kg are joined by a light, inextensible string. The blocks are made to move with uniform acceleration of 2.0 m s⁻² under the action of a force F.



What is the value of the tension in the string T and the applied force F?

	T / N	F/N
Α	8.0	12
В	8.0	20
С	12	12
D	12	20

14 Jane stands on a bathroom scale to find out her weight.

Which of the following pairs of forces is/are action and reaction pairs?

- (1) The force exerted by Jane on the scale and the force exerted by the scale on Jane.
- (2) The gravitational force exerted by the Earth on Jane and the force exerted by the scale on Jane.
- (3) The gravitational force exerted by the Earth on the scale and the gravitational force exerted by the Earth on Jane.
- A (1) only
- **B** (2) only
- **C** (1) and (3) only
- **D** (2) and (3) only

15 Four rectangular blocks of the same size are welded together to form a large block. The grey block is made of material that is denser than that of the white block. Which of the following configuration is the most stable?



16 A regular plane lamina with centre of mass X touches the ground at point G. Which diagram shows the lamina in equilibrium?



17 The diagram below shows a diving board that weighs 200 N. The weight of the diving board is acting through the centre of the diving board. The diving board is pivoted at P and a spring holds the board in a horizontal position.



What is the tension in the spring when a diver of weight 500 N stands still at one end of the board?

- **A** 800 N
- **B** 2000 N
- **C** 2300 N
- **D** 2800 N

18 A graduated uniform steel rod of length 40.0 cm is supported by two identical spring balances at the 0.0 cm mark and the 40.0 cm mark as shown in the diagram below. The reading on each spring balance is 1.0 N.



When a weight W is hung from the same rod at a certain position, the readings on the springs becomes 2.0 N and 2.5 N respectively as shown in the diagram below.



What is the weight W and its position on the rod?

	weight / N	position / cm
Α	2.0	16.0
В	2.0	24.0
С	2.5	16.0
D	2.5	24.0

19 The diagram below shows a simple hydraulic system.



8

What is the magnitude of the force, F that is required to lift a load of 120 N?

- **A** 2.0 N
- **B** 8.0 N
- **C** 180 N
- **D** 1800 N
- 20 The diagram below shows a mercury barometer.



What is the pressure at M?

- **A** 20 cm Hg
- **B** 60 cm Hg
- **C** 75 cm Hg
- **D** 80 cm Hg

21 In the apparatus shown below, P and Q are different liquids. Some of the air in the tube is removed and the final heights of the liquid columns are shown.



Which of the folloiwng statements is correct about the density of liquid P and liquid Q?

- A The density of P is 1.5 times that of Q.
- **B** The density of P is 2 times that of Q.
- **C** The density of Q is 1.5 times that of P.
- **D** The density of Q is 2 times that of P.
- 22 A lake is 15 m deep. What is the pressure at the bottom of the lake if the atmospheric pressure at the water surface is 1.0×10^5 Pa? (Take the density of water to be 1.0×10^3 kg m⁻³)
 - **A** 1.2 × 10⁵ Pa
 - **B** 1.5×10^5 Pa
 - **C** 1.6 × 10⁵ Pa
 - **D** 2.5×10^5 Pa
- 23 Some students climbed a flight of steps at school and each student is timed. Their weights and results are recorded below.

Which student developed the least power during the climb?

	weight/ N	time/s
Α	370	12
В	390	13
С	420	14
D	460	16

- **24** A construction crane lifts a 1250 N load vertically at the speed of 2.00 m s⁻¹. What is the power developed in the crane's motor if the motor is 80 % efficient?
 - **A** 2500 W
 - **B** 3100 W
 - **C** 6300 W
 - **D** 7800 W
- 25 A man looked into a plane mirror. In the mirror, he saw the image of a clock that was hung on the wall behind him as shown. What was the time?
 - **A** 2:26
 - **B** 5:11
 - **C** 8.56
 - **D** 9:34



26 The diagram below shows a ray of light that is being reflected.



What is the angle of incidence for this ray of light?

- A Q
- **B** 180°– Q
- **C** 180°- 2Q
- **D** $(180^{\circ} 2Q) \div 2$

- **27** A man is running towards a plane mirror at a speed of 2.5 m s⁻¹. How fast does he see himself running towards his image?
 - **A** 1.3 m s⁻¹
 - **B** 2.5 m s⁻¹
 - **C** 5.0 m s⁻¹
 - **D** 7.5 m s⁻¹
- 28 Which of the following is not an effect of refraction?
 - A A straight pencil appears to be bent when partially submerged in water.
 - **B** A light ray changes its direction as it travels through an optical fibre.
 - **C** A fish appears bigger than its actual size to an observer above water.
 - **D** A rainbow is observed when a ray of light passes through a glass prism.
- 29 A light ray is incident on a glass block. Which is the emergent ray?



- **30** When a ray of light passes from air to glass with an incident angle of 30°, the angle of refraction is 15°. If the incident angle is increased to 60°, what is the new angle of refraction?
 - **A** 27°
 - **B** 30°
 - **C** 37°
 - **D** 45°

End of paper

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