

PHYSICS

(2 hours)

This paper must be answered in English

Name	
Class	
Class No.	

GENERAL INSTRUCTIONS

1. You should write your Name, Class and Class Number in the spaces provided on this cover.
2. There are **TWO** sections, A and B, in this Paper. Section A and B carry 35% and 65% respectively. You are advised to finish Section A in about 40 minutes.
3. Section A consists of multiple-choice questions in this question paper, while Section B contains conventional questions printed separately in Question-Answer Book **B**.
4. Answers to Section A should be marked on the Multiple-choice Answer Sheet while answers to Section B should be written in the spaces provided in Question-Answer Book **B**. **The Answer Sheet for Section A and the Question-Answer Book for Section B will be collected separately at the end of the examination.**
5. The diagrams in this paper are **NOT** necessarily drawn to scale.
6. The last pages of the Question-Answer Book for Section B contain a list of data, formulae and relationships which you may find useful.

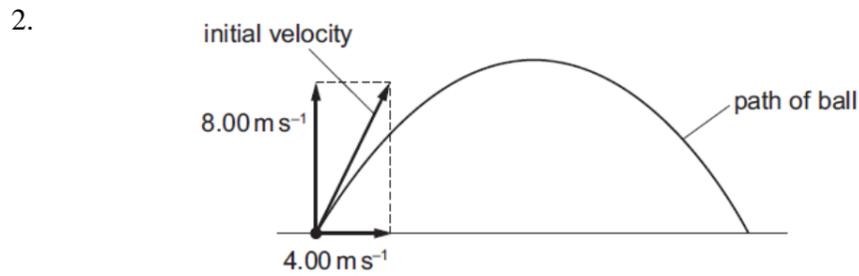
INSTRUCTIONS FOR SECTION A (MULTIPLE-CHOICE QUESTIONS)

1. Read carefully the instructions on the Answer Sheet. After the announcement of the start of the examination, you should first insert the information required in the spaces provided.
2. When told to open this book, you should check that all the questions are there. Look for the words '**END OF SECTION A**' after the last question.
3. All questions carry equal marks.
4. **ANSWER ALL QUESTIONS.** You are advised to use an HB pencil to mark all the answers on the Answer Sheet, so that wrong marks can be completely erased with a clean rubber. You must mark the answers clearly; otherwise you will lose marks if the answers cannot be captured.
5. You should mark only **ONE** answer for each question. If you mark more than one answer, you will receive **NO MARKS** for that question.
6. No marks will be deducted for wrong answers.

Section A (35 %)

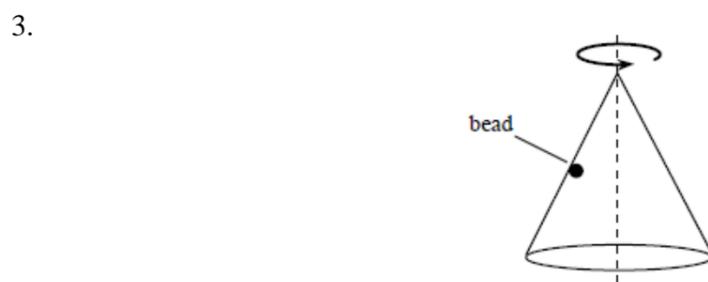
There are 26 questions.

1. A ball is kicked upwards at an angle of 45° to horizontal ground. After a short flight, the ball returns to the ground. It may be assumed that air resistance is negligible. What is never zero during the flight of the ball ?
- A. the vertical component of the ball's momentum
 - B. the vertical component of the ball's velocity
 - C. the horizontal component of the ball's acceleration
 - D. the horizontal component of the ball's velocity



An astronaut on the Moon, where there is no air resistance, throws a ball. The ball's initial velocity has a vertical component of 8 m s^{-1} and a horizontal component of 4 m s^{-1} , as shown. The acceleration of free fall on the Moon is 1.62 m s^{-2} . What will be the speed of the ball 9 s after being thrown ?

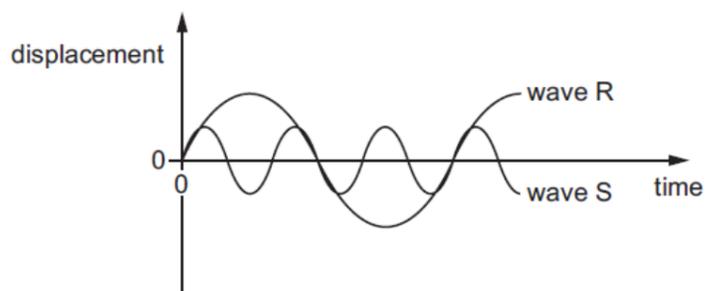
- A. 6.6 m s^{-1}
- B. 7.7 m s^{-1}
- C. 10.6 m s^{-1}
- D. 14.6 m s^{-1}



A small bead inside a hollow cone spinning at uniform speed appears to be 'pinned' at the inner wall of the cone. Which of the following correctly shows the forces acting on the bead ?

- A.
- B.
- C.
- D.

13.



The diagram shows two waves *R* and *S*. Wave *R* has an amplitude of 8 cm and a period of 30 ms. What are the amplitude and the period of wave *S* ?

	Amplitude / cm	Period / ms
A.	2	10
B.	2	15
C.	4	10
D.	4	90

14. Which of the following statements is/are true?

- (1) If two objects are in the same state, they must have the same average molecular potential energy.
- (2) If two objects are at the same temperature, they must have the same average molecular kinetic energy.
- (3) If two objects have the same mass, they must have the same internal energy.

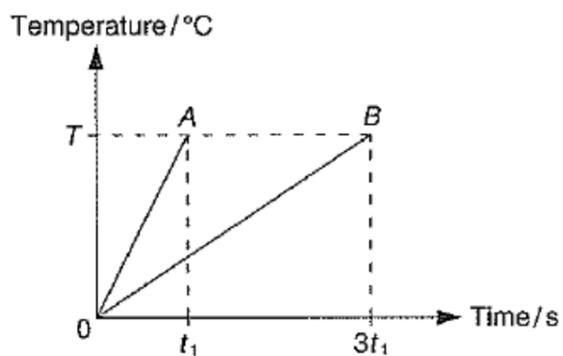
- | | | | |
|----|------------------|----|------------------|
| A. | (1) only | B. | (2) only |
| C. | (1) and (3) only | D. | (2) and (3) only |

15. Melting ice of mass 150 g is added to 350 g of Coke at 27 °C. Assume that no energy is lost to or gained from the surroundings. Find the final temperature of the mixture.

Specific heat capacity of Coke = 5300 J kg⁻¹ °C⁻¹
 Specific heat capacity of water = 4200 J kg⁻¹ °C⁻¹
 Specific latent heat of fusion of ice = 3.34 × 10⁵ J kg⁻¹

- | | | | |
|----|---------|----|--------|
| A. | -4.6 °C | B. | 0 °C |
| C. | 4.6 °C | D. | 7.1 °C |

16. Two objects *A* and *B* are heated at the same rate. The figure shows how the temperatures of the two objects changes with time. The mass of *B* is five times the mass of *A*. The specific heat capacity of *A* is 500 J kg⁻¹ °C⁻¹. Find the specific heat capacity of *B*.



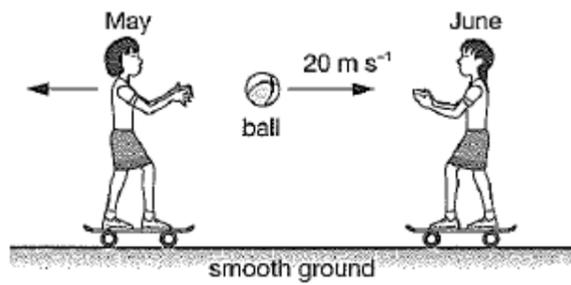
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|----|--|----|--|
| A. | 33.3 J kg ⁻¹ °C ⁻¹ | B. | 300 J kg ⁻¹ °C ⁻¹ |
| C. | 833 J kg ⁻¹ °C ⁻¹ | D. | 7500 J kg ⁻¹ °C ⁻¹ |

22. A mass of 20 kg is being dragged up a rough ramp at constant speed from P to Q as shown in the figure.



The work done against friction is 350 J. Find the work done on the mass to drag it from P to Q .

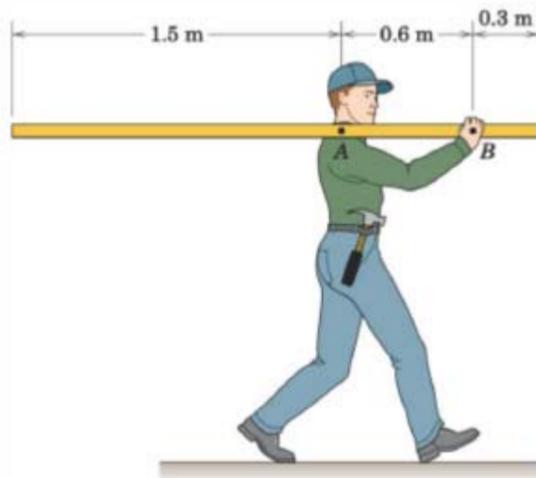
- A. 42 J
 B. 350 J
 C. 390 J
 D. 740 J
23. May and June stand on two different trolleys on a smooth ground. They are at rest initially. May throws a ball horizontally to June at a speed of 20 m s^{-1} . After catching the ball, the speed of June is 0.5 m s^{-1} . May's mass and June's mass are the same and the mass of ball is 1 kg. Which of the following statements is/are correct?



- (1) The change in momentum of May is equal to that of June.
 (2) The force exerted on the ball by May must equal to that by June.
 (3) May moves backwards at a speed of 0.51 m s^{-1} after throwing the ball.

- A. (1) only
 B. (2) only
 C. (3) only
 D. (1) and (2) only

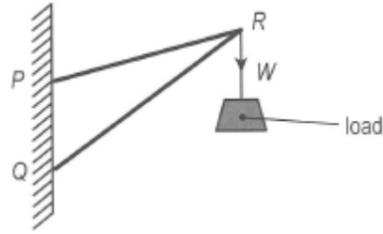
24. In the figure below, a man carries a uniform rigid board of mass 6 kg. Find the forces acting on the man by the board at A and B respectively.



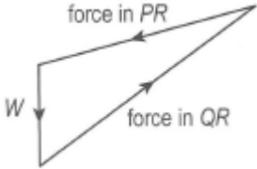
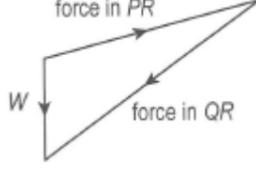
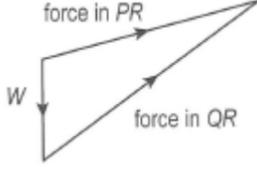
- | | At A | At B |
|----|----------------|----------------|
| A. | 29 N upwards | 29 N upwards |
| B. | 0 N | 58 N downwards |
| C. | 88 N upwards | 29 N downwards |
| D. | 88 N downwards | 29 N upwards |

25. A wooden block is sliding down on a rough inclined plane at a constant speed. Which of the following statements must be correct?
- A. There must be an applied force acting on the on the block to overcome the friction.
 - B. The mechanical energy of the block is conserved.
 - C. There is a net force acting on the block.
 - D. The momentum of the block is conserved.

26. A load W is hung onto a joint of two rigid light rods, PR and QR , which are fixed to a vertical wall at points P and Q respectively as shown in the figure.



Which of the following figures shows the forces acting at point R correctly?

- A. 
- B. 
- C. 
- D. 

END OF SECTION A