



Secondary School Mathematics & Science Competition

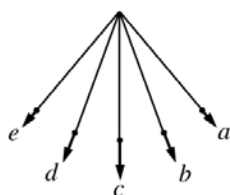
Physics

Sample Past Paper 2011

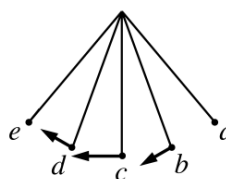
Assume: Gravitational acceleration on the surface of earth is 10ms^{-2}
 Specific heat capacity of water $4200\text{Jkg}^{-1}\text{C}^{-1}$
 Specific latent heat of fusion of the ice is $3.34 \times 10^5\text{Jkg}^{-1}$
 Specific latent heat of vaporization of the water is $2.26 \times 10^6\text{Jkg}^{-1}$
 Universal gas constant is $8.31\text{JK}^{-1}\text{mol}^{-1}$

Q. 1 Which of the following best illustrates the net force of a pendulum bob at points a through e?

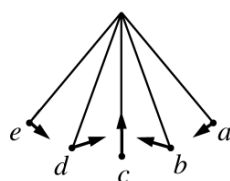
A.



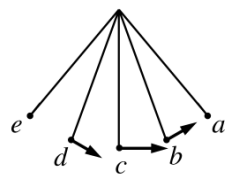
B.



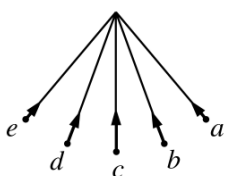
C.



D.



E.



Q. 2 A stone is thrown vertically upwards with a velocity 20ms^{-1} , at the same instant, another stone is released from rest at height 20m vertically above the first stone. The stones will collide when the first is at height of

- A. 5m
- B. 7.5m
- C. 10m
- D. 12.5m
- E. 15m

Q. 3 A 1.25kg block is dropped on a nail and drives the nail 25cm into a piece of wood. If the stone is moving at 20ms^{-1} when it hits the nail, the average force exerted on the nail while the nail is going into the wood is most nearly

- A. 10N
- B. 12.5N
- C. 25N
- D. 625N
- E. 1000N

Q. 4 An image is formed on a screen by a thin converging lens. By moving the lens towards to the screen, a second image is formed. Which of the following properties about the second image is/are correct?

- (1) Laterally inverted.
- (2) Inverted.
- (3) Diminished.

- A. (2) only
- B. (3) only
- C. (1) and (2) only
- D. (2) and (3) only
- E. None of above

Q. 5 Two objects have same temperature. Which of the following statements is/are true?

- (1) They have the same amount of internal energy.
- (2) They have the same amount of total kinetic energy of the molecules in the object.
- (3) No net energy is transferred from one object to another when they are in contact.

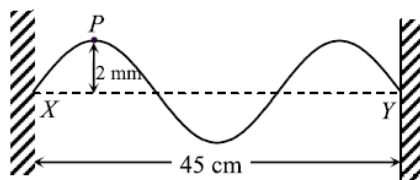
- | | |
|---------------------|---------------------|
| A. (2) only | B. (3) only |
| C. (1) and (2) only | D. (2) and (3) only |
| E. None of above | |

Q. 6 An ideal gas is enclosed in a container at temperature $T^{\circ}\text{C}$. The temperature is now raised to $2T^{\circ}\text{C}$, whilst the volume is kept constant. Which of the following statements is correct?

- (1) The average separation of the molecules is reduced by a factor of $\sqrt{2}$.
- (2) The average speed of the molecules is doubled.
- (3) The average kinetic energy of the molecules is doubled.

- | | |
|---------------------|---------------------|
| A. (2) only | B. (3) only |
| C. (1) and (2) only | D. (2) and (3) only |
| E. None of above | |

Q. 7



String XY is fixed at both ends. The distance between X and Y is 45 cm. Two identical sinusoidal waves travel along XY in opposite directions and form a stationary wave with an antinode at point P . The figure shows the string when P is 2 mm, its maximum displacement, from the equilibrium position.

What is the amplitude and wavelength of each of the travelling waves on the string?

| | Amplitude | Wavelength |
|----|-----------|------------|
| A. | 4mm | 30mm |
| B. | 4mm | 15mm |
| C. | 1mm | 45mm |
| D. | 2mm | 30mm |
| E. | 2mm | 15mm |



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Answer

| | | | | | | | | | |
|----|---|----|---|----|---|----|---|----|---|
| 1. | C | 2. | E | 3. | E | 4. | D | 5. | B |
| 6. | B | 7. | D | | | | | | |