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2023 THEORY

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கல்விப் பொதுத் தராதரப் பத்திர(உயர் தர)ப் பரீட்சை, 2023 ஓகஸ்ற்
General Certificate of Education (Adv. Level) Examination, August 2023

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பௌதிகவியல் I
Physics I

Advanced Level Physics
Amith Pussella

PHT6210 2023Th 2021-10-14

Multiple Choice Questions

1. Figure (a) shows the scale of a micrometer screw gauge when the spindle and the anvil touch each other. Figure (b) shows the scale when a metal sphere is properly placed between the spindle and the anvil. The pitch of the screw is 0·5 mm and the circular scale is divided into 50 equal divisions.

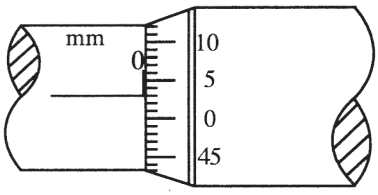


Figure (a)

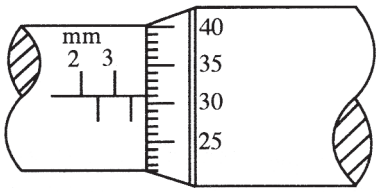
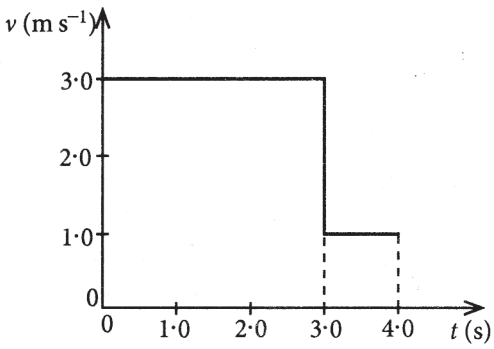


Figure (b)

What is the correct diameter of the metal sphere?

(1) 3·28 mm (2) 3·31 mm (3) 3·78 mm (4) 3·81 mm (5) 3·84 mm

2. The figure shows the velocity (v) - time (t) graph for an object moving along a straight line. What is the average velocity of the object from $t = 0$ to $t = 4$ s?



(1) 1·5 m s^{-1} (2) 2·0 m s^{-1}
(3) 2·5 m s^{-1} (4) 2·7 m s^{-1}
(5) 3·3 m s^{-1}

3. A, B, C, D and E are five coplanar forces of equal magnitudes acting on a body as shown in figure (a). Which of the following diagrams best represents the direction of the resultant of these forces?

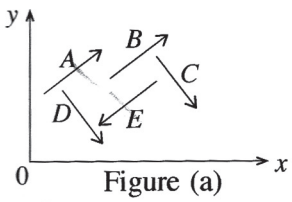
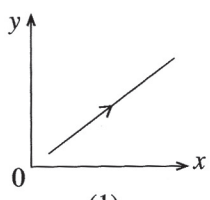
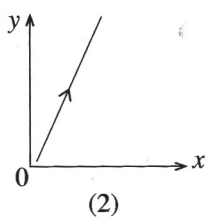


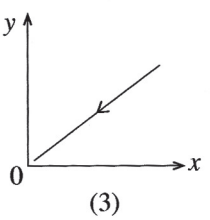
Figure (a)



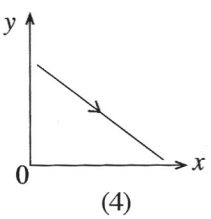
(1)



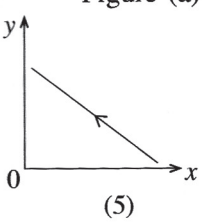
(2)



(3)

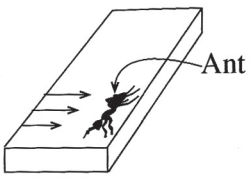


(4)



(5)

4. An ant of mass 2×10^{-6} kg (2 milligrams), which is stationary at the edge of a horizontal smooth strip is removed in 0.2 s by blowing with mouth. The direction of blowing is horizontal as shown by the arrows in the figure. If the ant is thrown out in the direction of the blowing with a horizontal velocity of 0.5 m s^{-1}, the average force exerted on the ant by the blow is



(1) 5×10^{-6} N (2) 1×10^{-5} N (3) 2×10^{-5} N (4) 1×10^{-3} N (5) 5×10^{-3} N

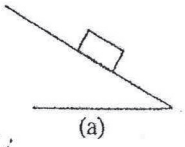
5. a, b, c and d are physical quantities having different dimensions, and k is a dimensionless constant. Consider the following relationships.

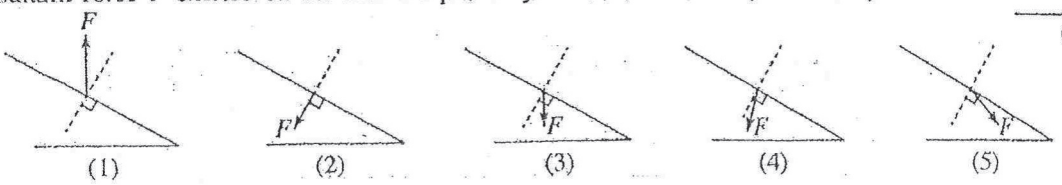
(A) $ka^3 = b$ (B) $d = ac$ (C) $a = kb$

Of the above relationships

(1) only B is dimensionally valid.
(2) only C is dimensionally valid.
(3) only A and B are dimensionally valid.
(4) only A and C are dimensionally valid.
(5) all A, B and C are dimensionally valid.

6. A rectangular block rests on an inclined plane as shown in figure (a). The direction of the resultant force F exerted on the inclined plane by the block is best represented by

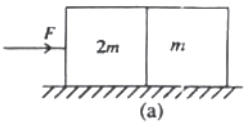


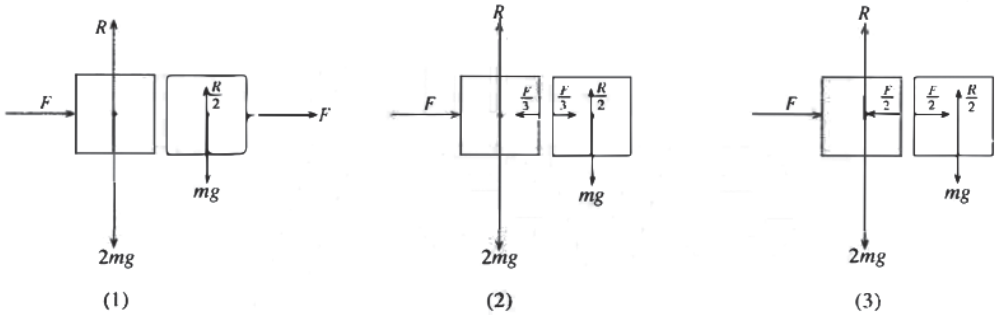


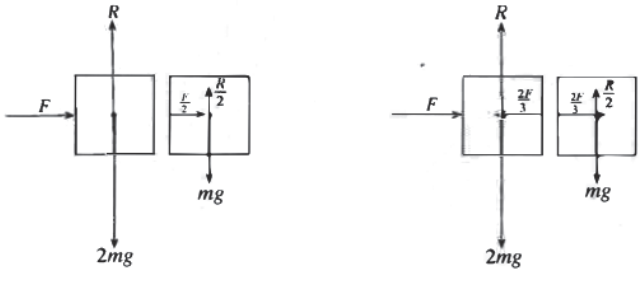
7. The percentage error of a certain length measurement has to be kept below 1%. If the error due to the measuring instrument is 1 mm, the measuring length has to be greater than

(1) 1 mm (2) 1 cm (3) 10 cm (4) 1 m (5) 10 m

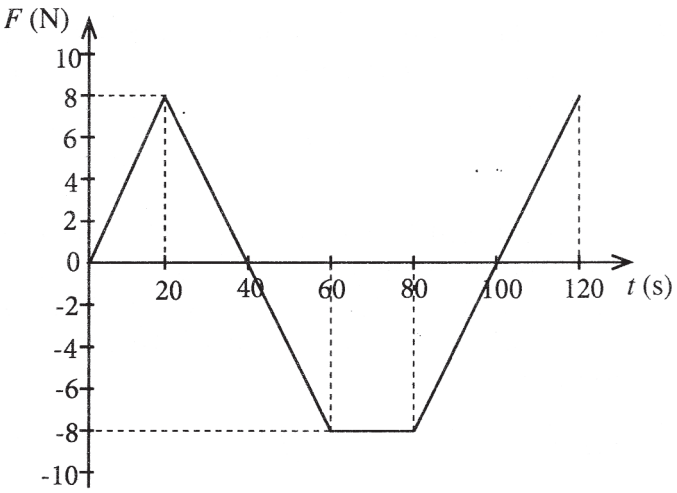
8. Two blocks of mass $2m$ and m are placed in contact on a smooth surface as shown in the figure (a). If an external horizontal force F is applied on the block of mass $2m$, which of the following figures shows the forces acting on the two blocks correctly?







9. An object of mass m stationary at time $t = 0$ is subjected to a force F, directed along a straight line, that varies with time t as shown in the graph. Select the correct statement from the followings.



After the motion has started, the velocity of the object becomes zero,

(1) at $t = 40$ s only.

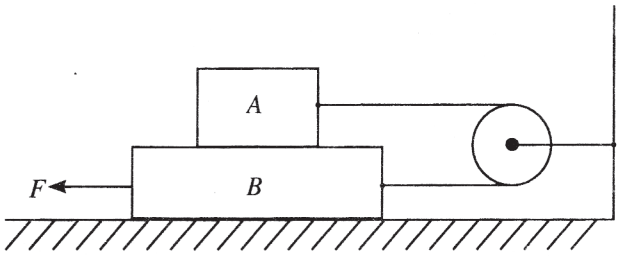
(2) at $t = 70$ s only.

(3) at $t = 40$ s and $t = 100$ s.

(4) at $t = 70$ s and $t = 120$ s.

(5) during the time interval from $t = 60$ s to $t = 80$ s.

10. Two blocks A and B of mass 0·5 kg and 1·0 kg respectively are connected by a massless inextensible string which goes over a massless, smooth pulley as shown in the figure. The coefficient of dynamic friction between all contact surfaces is 0·25. What is the force F needed to drag the block B to the left with a constant speed?



(1) 2·50 N (2) 3·75 N (3) 5·00 N (4) 6·25 N (5) 7·50 N