PHYSICS

BOOKS - HT Olympiad Previous Year Paper

NSO QUESTION PAPER 2017 SET B

Science

**1.** A constant force is acted on a body which is initially at rest on a smooth track. The force

acts for a short time interval t, and causes the body to move at a certain final speed. What is the time interval required to move the same body when the force is reduced by half so that the body can move at the same final speed?

A. t

B. 2t

C. t/2

D. 4t

Answer: B

2. Five coils, each having the same resistance are joined according to the given circuit diagram. The equivalent resistance between points P and Q is 1 Ω. Then the resistance of each coil will be

A. 1Ω

B. 4Ω
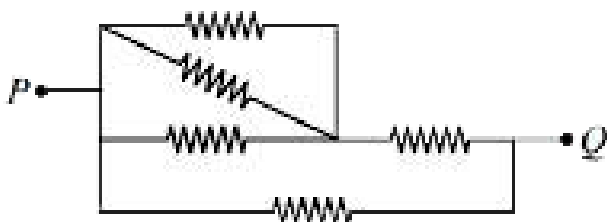
C. $\dfrac{1}{7}\Omega$
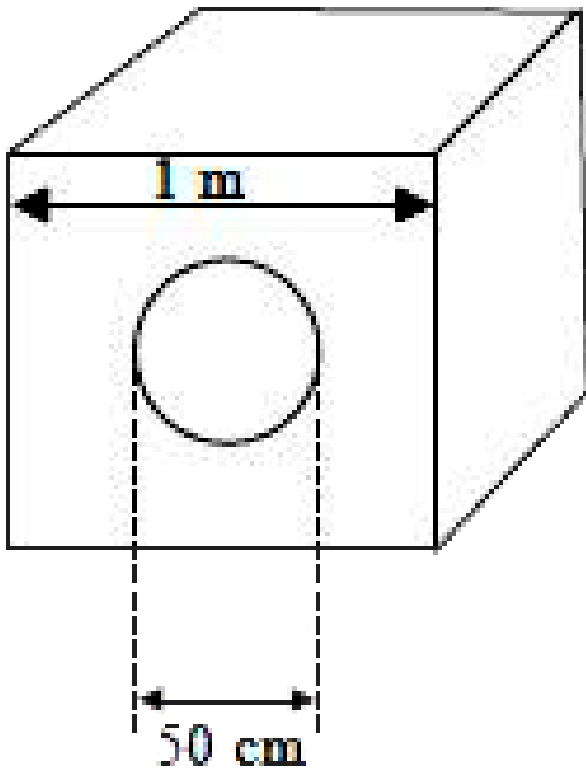
D. $\dfrac{7}{4}\Omega$

Answer: D

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3. A cube of side 1 m has a mass of 7500 kg before a through hole of diameter 50 cm is drilled on it. The hole is then completely filled with cement of density 3.2 g cm. What is the

density of the composite object?

A. $4320 kgm^{-3}$

B. $5355 kgm^{-3}$

C. $6655 kgm^{-3}$

D. $8130 kgm^{-3}$

Answer: C

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4. A slide with an image 4 cm $\times$ 2 cm is placed at a distance of 10 cm behind a converging lens and a clear image is formed on a screen 1.1 m from the slide. The size of the image on the screen is

A. $40cm \times 20cm$

B. $36cm \times 18cm$

C. $20cm \times 40cm$

D. $10cm \times 50cm$

Answer: A

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5. A mass of M kg is suspended by a weightless string of length l. A horizontal force is applied to displace it slowly until the string makes an

angle of $30°$ with the initial vertical direction.

What is the work done by the applied force?

A. $Mgl\left(1 - \dfrac{\sqrt{3}}{2}\right)$

B. $Mgl\left(1 - \dfrac{1}{2}\right)$

C. $M\dfrac{g\left(l\sqrt{3}\right)}{2}$

D. $\dfrac{Mgl}{4}$

Answer: A

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6. Read the given statements and select the corect option

Statement 1 : Thermonuclear bombs can be more devasting than the atomic bombs .

Statement 2 : Process of nuclear fusion is involved in atomic bomb.

A. Both statements 1 and 2 are true and statement 2 is the correct explanation of statement 1.

B. Both statements 1 and 2 are true but statement 2 is not the correct explanation of statement 1.

C. Statement 1 is true but statement 2 is false.

D. Statement 1 is false but statement 2 is true.

Answer: C

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7. Two students X and Y perform experiments on series and parallel combination of two given resistors R_1 and R_2 and plot the graphs as shown here. Which of the following options is true about the graphs obtained by the students?
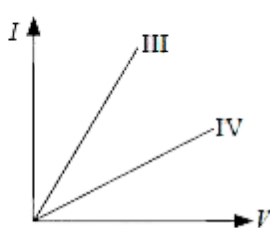
(V is potential difference and I is current)

(V is potential difference and I is current)
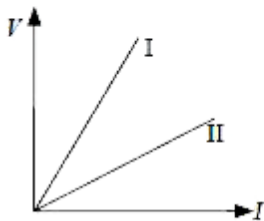
Graph by student X   Graph by student Y

	Series	Parallel
A.	I, III	II, IV
B.	I, IV	II, III
C.	II, III	I, IV
D.	II, IV	I, III

8. A car accelerates from rest at a constant rate for some time after which it decelerates at a constant rate β to come to rest. If the total time elapsed is t, the maximum velocity acquired by the car is given by :

A. $\dfrac{\alpha + \beta}{\alpha \beta t^2}$

B. $\dfrac{(\alpha^2 - \beta^2)t^2}{\alpha \beta}$

C. $\dfrac{\alpha \beta t^2}{2(\alpha + \beta)}$

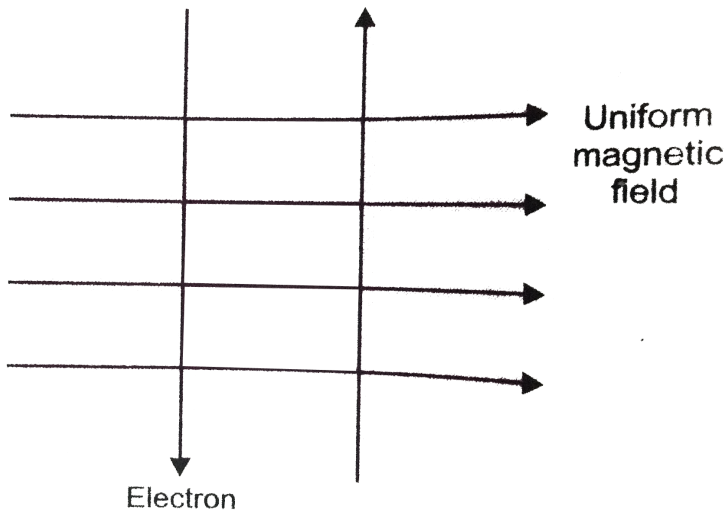D. $\dfrac{(\alpha + \beta)t^2}{\alpha\beta}$

Answer: C

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9. A uniform magnetic field exists in the plane of paper pointing from left to right as shown in figure. In the field, an electron and a proton move as shown. The electron and the proton

experience:

Electron

Uniform magnetic field

A. Forces both pointing into the plane of

paper

B. Forces both pointing out of the plane of

paper

C. Forces pointing into the plane of paper and out of the plane of paper respectively

D. Forces pointing opposite and along the direction of the uniform magnetic field respectively.

Answer: A

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10. A prism ABC (with BC as base) is placed in different orientations. A narrow beam of white light is incident on the prism as shown in (figure 2.21) In which of the following cases, after dispersion, the third colour from the top corresponds to the colour of the sky ?
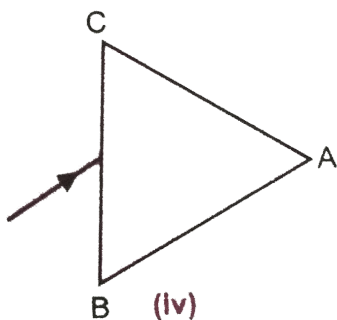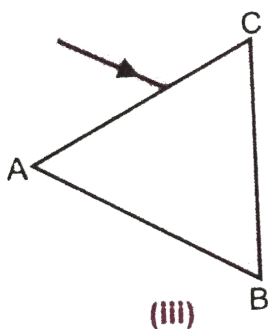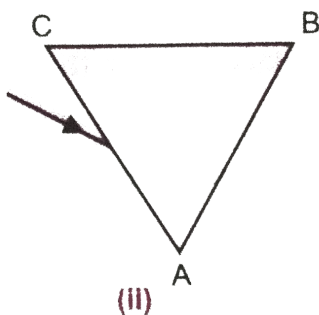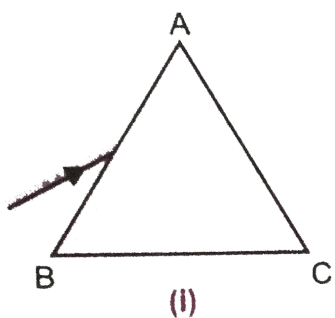
A. (i)

B. (ii)

C. (iii)

D. (iv)

Answer: B

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11. There are two walls X and Y which are 120 m apart from each other. A boy standing 40 m away from wall X claps his hands once. If the

speed of sound in air is 330 m s^{-1}, then what is the time interval between the first and the second echo that he hears?

A. 0.05 s

B. 0.24 s

C. 1 s

D. 2 s

Answer: B

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12. When a ray of light enters a water filled glass tank from a glass face making a non-zero angle to the normal, the emergent ray from the opposite face will follow a path which is

    A. Deviated to the right from incident ray

    B. Deviated to the left from incident ray

    C. Same as incident ray

    D. Parallel but not along the incident ray,
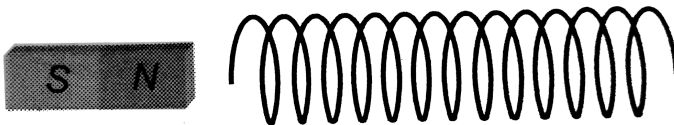
Answer: D

1. The variation of induced emf (E) with time (t) in a coil if a short bar magnet is moved along its axis with a constant velocity is best represent as

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