PHYSICS

BOOKS - NTA MOCK TESTS

NEET MOCK TEST 07

Physics

1. Temperature of an ideal gas is 300 K. The change in temperature of the gas when its volume changes from V to 2V in the process p = aV (Here, a is a positive constant) is

    A. 900 K

    B. 1200 K

    C. 600 K

    D. 300 K

Answer: B

2. A short bar magnet of magnetic moment $0 \cdot 4JT^{-1}$ is placed in a uniform magnetic field of $0 \cdot 16T$. The magnet is in stable equilibrium when the potencial energy is

A. $-0.064J$

B. zero

C. $-0.082J$

D. $0.064J$

Answer: A

3. The dimension of coefficient of viscosity is :

A. $ML^{-1}T^{-2}$

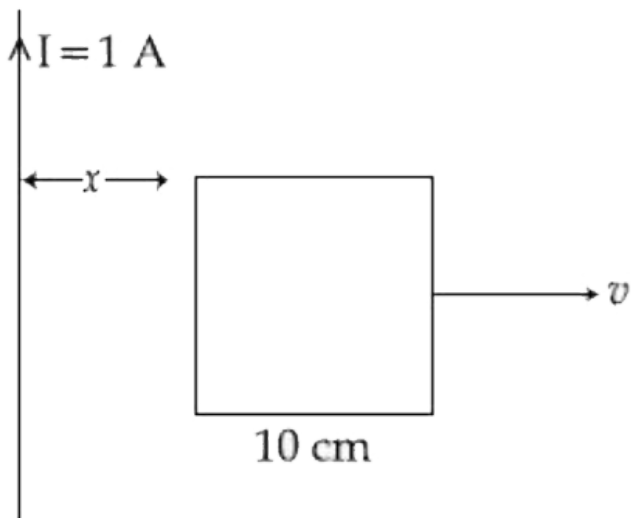B. MLT^{-1}

C. $ML^{-1}T^{-1}$

D. $ML^{-2}T^{-2}$

Answer: C

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4. A square frame of side 10 cm and a long straight wire carrying current 1 A are in the plane of the paper. Starting from close to the wire, the frame moves towards the right with a constant speed of $10ms^{-1}$ (sec figure). The e.m.f induced at the time the left arm of the frame is at x = 10 cm

from the wire is

A. $0.75\mu v$

B. $1\mu v$

C. $2\mu v$

D. $0.5\mu v$

Answer: B

5. A ball is projected at an angle $60°$ with the horizontal with speed 30 m/s. What will be the speed of the ball when it makes an angle $45°$ with the horizontal ?

    A. 30 m/s

    B. $15\sqrt{2}m/s$

    C. $\dfrac{15}{\sqrt{2}}m/s$

    D. $30\sqrt{2}m/s$
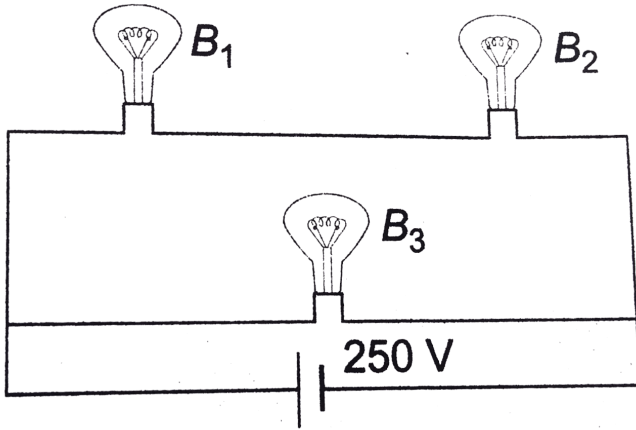
Answer: B

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6. A $100W$ bulb B_1, and two $60W$ bulbs B_2 and B_3 are connected to a $250V$ source as shown in the figure. Now W_1, W_2 and W_3 are the output

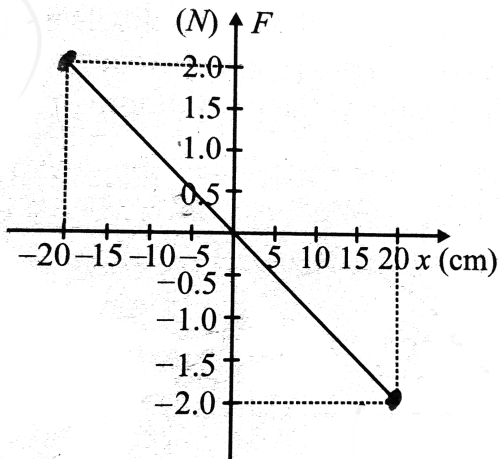powers of the bulbs B_1, B_2 and B_3 respectively. Then

A. $W_1 > W_2 = W_3$

B. $W_1 > W_2 > W_3$

C. $W_1 < W_2 = W_3$

D. $W_1 < W_2 < W_3$

Answer: D

7.

Figure. Shows the variation of force acting on a particle of mass 400 g executing simple harmonic motion. The frequency of oscillation of the particle is

A. $4s^{-1}$

B. $(5/2\pi)s^{-1}$

C. $(1/8\pi)s^{-1}$

D. $(1/2\pi)s^{-1}$

Answer: B

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8. Water of volume 2 litre in a container is heated with a coil of $1kW$ at $27°C$. The lid of the container is open and energy dissipates at rate of $160J/s$. In how much time temperature will rise from $27°C \rightarrow 77°C$

Given specific heat of water is

$[4.2kJ/kg]$

    A. 8 min 20 sec

    B. 6 sin 2 sec

    C. 7 min

    D. 14 min

Answer: A

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9. Angular speed of hour hand of a clock in degree per second is

A. $\dfrac{1}{30}$

B. $\dfrac{1}{60}$

C. $\dfrac{1}{120}$

D. $\dfrac{1}{720}$

Answer: C

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10. Which of the following is more close to a black body?

A. Black board paint

B. Green leaves

C. Black holes

D. Red roses

Answer: A

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11. The fundamental frequency of a string stretched with a weight of 4 kg is 256 Hz . The weight required to produce its octave is

A. 16 kg - wt

B. 12 kg - wt

C. 24 kg - wt

D. 8 kg - wt

Answer: A

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12. Volume (V) of the nucleus is related to mass number (A) as

A. $V \propto A^2$

B. $V \propto A^{1/3}$

C. $V \propto A^{2/3}$

D. $V \propto A$

13. When a wire of length $10m$ is subjected to a force of $100N$ along its length, the lateral strain produced is 0.01×10^{-3}. The poisson's ratio was found to be 0.4. If area of cross section of wire is $0.25m^2$, its young's modulus is

A. $1.6 \times 10^8 Nm^{-2}$

B. $2.5 \times 10^{10} Nm^{-2}$

C. $1.25 \times 10^{11} Nm^{-2}$

D. $16 \times 10^9 Nm^{-2}$

14. A body is moved along a straight line by a machine delivering constant power . The distance moved by the body is time t is proptional to

A. $t^{3/4}$

B. $t^{3/2}$

C. $t^{1/4}$
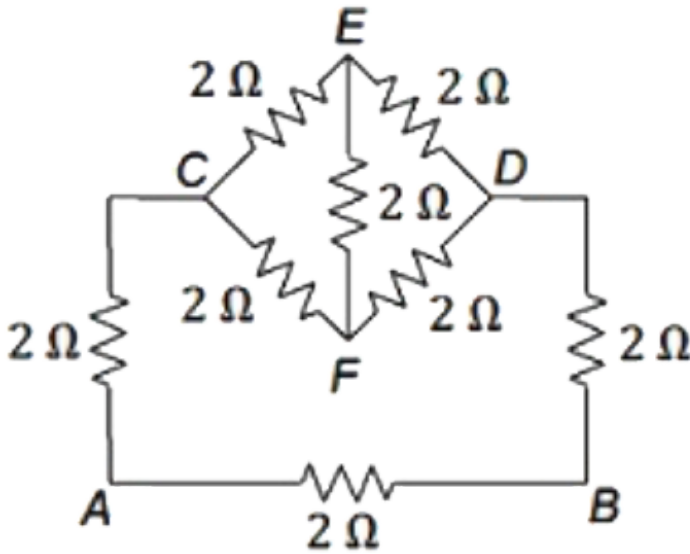
D. $t^{1/4}$

Answer: B

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15. The resistance of the following circuit figure between A and B is

A. $(3/2)\Omega$

B. 2Ω

C. 4Ω

D. 8Ω

Answer: A

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16. A unifrom electric field having a magnitude E_0 and direction along the positive X-axis exists. If the protential V is zero at $x = 0$, then its value at $X = +x$ will be

   A. $V(x) = +xE_0$

   B. $V(x) = -xE_0$

   C. $V(x) = x^2E_0$

   D. $V(x) = -x^2E_0$

Answer: B

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17. Which of the following forces can cause a change in the potential energy?

   A. Both conservative and non - conservative forces

B. Conservative force only

C. Non - conservative force only

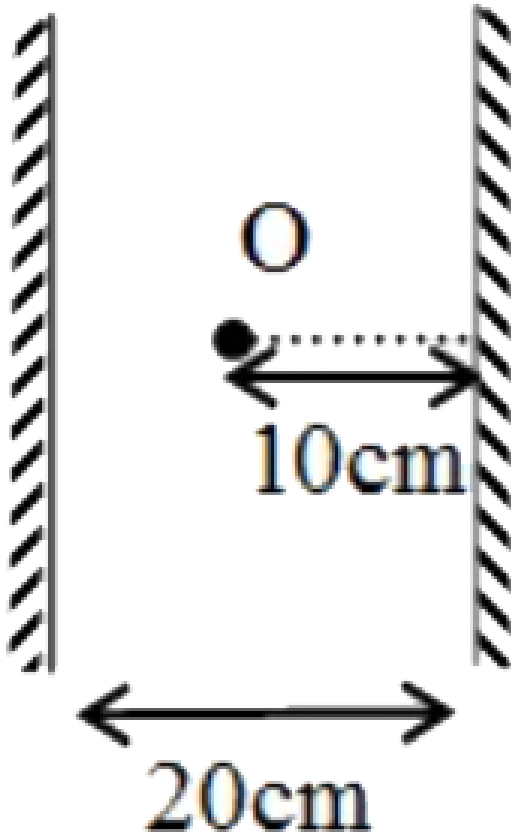D. Neither conservative nor non - conservative forces.

Answer: B

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18. Two plane mirrors are kept parallel at 20 cm from each other. A point object O is placed exactly in between them. Calculate distance between

second images formed by two mirros.

O

10cm

20cm

A. 80 cm

B. 60 cm

C. 40 cm

D. 10 cm

Answer: A

19. A uniform chain of mass 4 kg and length 2 m is kept on table such that $3/10^{th}$ of the chain hangs freely from the edge of the table. How much work has to be done in pulling the entire chain on the table?

A. 7.2 J

B. 120 J

C. 1200 J

D. 3.6 J

Answer: D

20. The Earth's atmosphere consists primarily of oxygen (21%) and nitrogen (78%). The rms speed of oxygen molecules (O_2) in the atmosphere at a certain location is 535 m/s. The rms speed of the nitrogen molecules at this location will be [Given 1 amu $= 1.66 \times 10^{-26}$ kg, molecular mass of $O_2 = 32$, molecular mass

A. 572 m/s

B. 437 m/s

C. 835 m/s

D. 715 m/s

Answer: A

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21. An ideal gas with pressure P, volume V and temperature T is expanded isothermally to a volume 2V and final pressure P_I. The same gas is expanded adiabatically to a volume 2V and final pressure in this case is

P_A. In terms of the ratio of the two specific heats for the gas γ, the ratio P_I / P_A is

A. $2^{\gamma - 1}$

B. $2^{1 - \gamma}$

C. 2^{γ}

D. 2γ

Answer: A

22. A block of mass 4 kg is kept on a rough horizontal surface. The coefficient of static friction is 0.8. If a force of 19 N is applied on the block parallel to the floor, then the force of friction between the block and floor is

A. 32 N

B. 18 N

C. 19 N

D. 9.8 N

Answer: C

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23. Calculate the momentum transferred to a surface when a radiation of energy E falls normally on it. Assume that the reflectivity of the surface is unity.

A. E/c

B. $2E/c$

C. Ec

D. E/c^2

Answer: B

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24. A projectile is fired from the surface of earth of radius R with a velocity ηv_e where v_e is the escape velocity and $\eta < 1$. Neglecting air resistance, the orbital velocity of projectile is -

A. $v_e \sqrt{1 - \eta^2}$

B. $v_e \sqrt{\dfrac{\eta^2}{5}}$

C. $\dfrac{2}{5} v_e \sqrt{\eta}$

D. $\dfrac{2\eta}{5} v_e$

Answer: A

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25. Relative permittivity and permeability of a material are ε_r and μ_r respectively which of the following values of these quantities are allowed for a diamagnetic material ?

A. $\varepsilon_r = 1.5, \mu_r = 1.5$
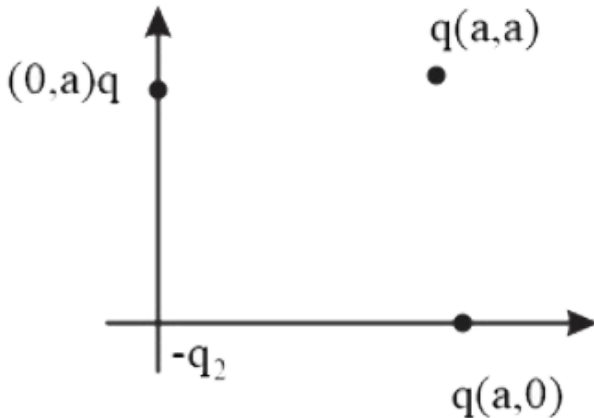
B. $\varepsilon_r = 0.5$, $\mu_r = 1.5$

C. $\varepsilon_r = 1.5$, $\mu_r = 0.5$

D. $\varepsilon_r = 0.5$, $\mu_r = 0.5$

Answer: C

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26. Calculate the net force acting on the charge present at the origin.

A. $\dfrac{qq_2}{4\pi\varepsilon_0 a^2} \times \sqrt{2}$

B. $\dfrac{qq_2}{4\pi\varepsilon_0 \sqrt{2}a^2} + \dfrac{qq_1}{8\pi\varepsilon_0 a^2}$

C. $\dfrac{qq_2}{4\pi\varepsilon_0 a^2}\left(\sqrt{2} + \dfrac{1}{2}\right)$

D. $\dfrac{qq_2}{4\pi\varepsilon_0 a^2}\left(\dfrac{1}{2} - \sqrt{2}\right)$

Answer: C

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27. An obsever looks at a distant tree of height 10m with a telescope of magnifying power of 20. to the observer the tree appears:

A. 20 times taller.

B. 20 times nearer.

C. 10 times taller.

D. 10 times nearer.

Answer: A

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28. A nucleus $._n^m X$ emits one α – particle and two β – particles. The resulting nucleus is

A. $._{n-4}^{m-4} Z$

B. $._{n-4}^{m-6} Z$

C. $._n^{m-4} X$

D. $._{n-2}^{m-4} Y$

Answer: C

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29. Electric displacement is given by $D = \varepsilon E$, here, $\varepsilon =$ electric permittivity, E = electric field strength

The dimensions of electric displacement are

A. $\left[ML^{-2}TA \right]$

B. $\left[L^{-2}T^{-1}A \right]$

C. $\left[L^{-2}TA\right]$

D. None of these

Answer: C

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30. On the basis of kinetic theory of gases, the mean $K.E.$ of 1 mole of gas per degree of freedom is

A. $\dfrac{1}{2}kT$

B. $\dfrac{3}{2}kT$

C. $\dfrac{3}{2}RT$

D. $\dfrac{1}{2}RT$

Answer: D

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31. A parallel beam of light of wavelength 600 nm is incident normally on a slit of width d. If the distance between the slits and the screen is 0.8 m and the distance of 2nd order maximum from the centre of the screen is 15 mm. The width of the slit is

A. $9.2 \times 10^{-4} mm$

B. $6.4 \times 10^{-4} m$

C. $6.32 \times 10^{-6} mm$

D. None of these

Answer: B

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32. Two bodies begin a free fall from rest from the same height 2 seconds apart. How long after the first body begins to fall, the two bodies will be 40 m apart? $\left(\text{Take } g = 10 \text{ms}^{-2}\right)$
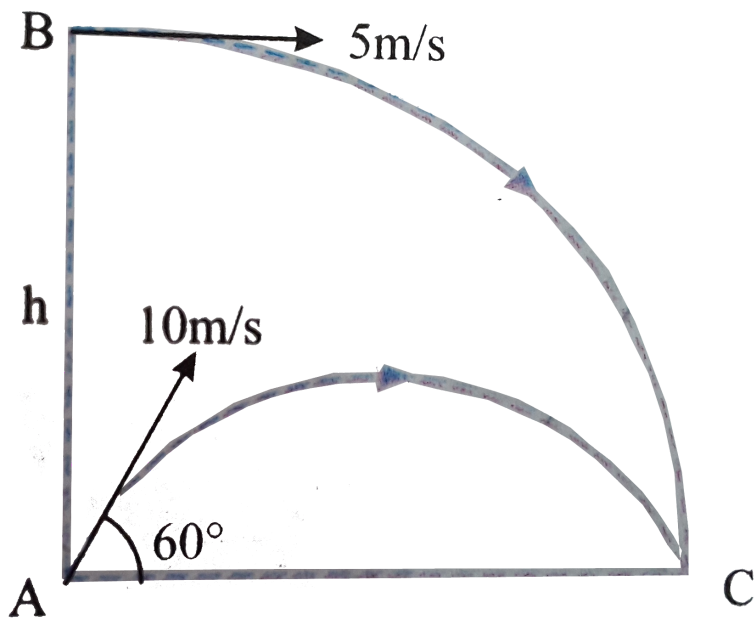
A. 1 s

B. 2 s

C. 3 s

D. 4 s

Answer: C

33. A particle A is projected from the ground with an initial velocity of $10m/s$ at an angle of $60°$ with horizontal. From what height should an another particle B be projected horizontally with velocity $5m/s$ so that both the particles collide in ground at point C if both are projected

simultaneously $g = 10m/s^2$.

A. 10 m

B. 30 m
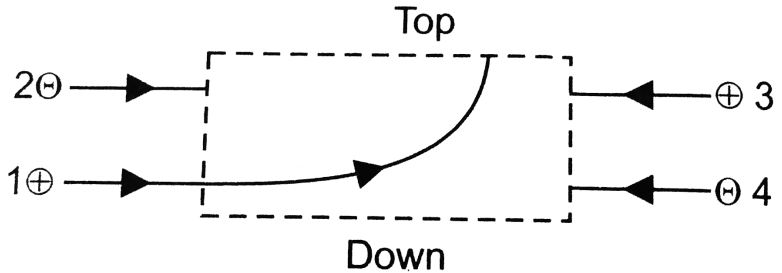
C. 15 m

D. 25 m

Answer: C

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34. The figure shows the path of a positively charged particle 1 through a rectangualr region of unifrom electric field as shown in the figure. What is the direction of electric field and the direction of deflection of particles

2, 3 and 4 ?

A. top, down, top, down

B. top, down, down, top

C. down, top, top , down

D. down, top, down, down

Answer: A

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35. Near and far points of a human eye are

A. 25 cm and infinite

B. 25 cm and 100 cm

C. 55 cm and 200 cm

D. 0 cm and 25 cm

Answer: A

36. A block of mass m is moving on a rough horizontal surface. μ is the coefficient of kinetic friction between the block and the surface. What is the net force exerted by the surface on the block?

A. $mg\sqrt{1 + \mu^2}$

B. μmg

C. mg

D. $mg\sqrt{1 - \mu^2}$

Answer: A

37. A stone is tied to one end of a string and rotated in horizontal circle with a uniform angular velocity. The tension in the string is T, if the length of the string is halved and its angular velocity is doubled , the tension in the string will be

   A. 2T

   B. 4T

   C. T

   D. 8T

Answer: A

38. A straight conductor of length 0.4 m is moved with a speed of 7 m/s perpendicular to the magnetic field of intensity of $0.9Wb/m^2$. The induced e.m.f. across the conductor will be

   A. 7.25 V

   B. 5.52 V

   C. 1.25 V

   D. 2.52 V

Answer: D

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39. Two spheres A and B have diameters in the ratio $1:2$, densities in the ratio $2:1$ and specific heat in the ratio $1:3$. Find the ratio of their thermal capacities.

   A. $1:6$

B. $1 : 12$

C. $1 : 3$

D. $1 : 4$

Answer: B

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40. A fish is near the centre of a spherical water filled($\mu = 4/3$)fish bowl, a child stands in air at a distance $2R$ (R is the radius of curvature of the sphere)from the centre of the bowl. At what distance from the centre would the child nose appear to the fish situated at the centrer:

A. R

B. 2R

C. 3R

D. 4R

Answer: C

41. A conducting circular loop of radius r carries a constant current i. It is placed in a uniform magnetic field B_0 such that B_0 is perpendicular to the plane of loop. What is the magnetic force acting on the loop?

A. irB_0

B. $2\pi irB_0$

C. zero

D. πirB_0

Answer: C

42. A 4 kg mass and a 1 kg mass are moving with equal kinetic energies.
The ratio of the magnitudes of their linear momenta is

A. $1:2$

B. $1:1$

C. $2:1$

D. 4:1`

Answer: C

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43. A bullet of mass 10 g moving horizontally with a velocity of $400ms^{-1}$
strikes a wooden block of mass 2kg which is suspended by a light
inextensible string of length 5 m. As a result, the centre of gravity of the
block is found to rise a vertical distance of 10 cm. The speed of the bullet
after it emerges out horizontally from the block will be

A. $100ms^{-1}$

B. $80ms^{-1}$

C. $120ms^{-1}$

D. $160ms^{-1}$

Answer: C

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44. The ratio of the magnetic field at the centre of a current carrying circular coil to its magnetic moment is x. If the current and radius both are doubled the new ratio will become

A. 2x

B. 4x

C. x/4

D. x/8

Answer: D

45. In a series $L - R$ circuit, under which condition the power loss will be least for an a.c voltage source?

    A. high resistance and high inductance

    B. high resistance and low inductance

    C. low resistance and high inductance

    D. low resistance and low inductance

Answer: C