PHYSICS

BOOKS - NTA MOCK TESTS

NEET MOCK TEST 3

Physics

1. In a stationary wave respresented by $y = 2a\cos(kx)\sin(\omega t)$ the intensity at a certain point is maximum when

A. $\cos(kx)$ is maximum

B. $\cos(kx)$ is minimum

C. $\sin(\omega t)$ is maximum

D. $\sin(\omega t)$ is minimum

Answer: A

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2. Two coplanar concentric circular coils of radii r and 2r, have the same number of turns n. The smaller coil carries a clockwise current i,

while the larger coil carries an anticlockwise current 2i. The magnetic field induction at the centre is

A. $\frac{3\mu_0 ni}{4r}$

B. zero

C. $\frac{\mu_0 ni}{4r}$

D. $\frac{\mu_0 ni}{2r}$

Answer: B

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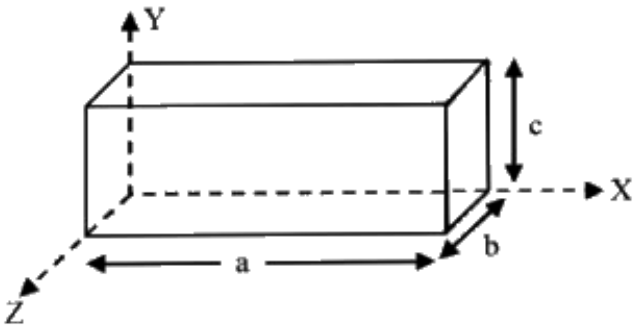
3. A solid metallic cuboid of homogeneous material having geometrical dimension as shown in the figure will have a ratio of resistances for the sense of current along x, y and z directions respectively, equal to



A. $a:b:c$

B. $a:c:b$

C. $a^2 : b^2 : c^2$

D. $a^2 : c^2 : b^2$

Answer: D

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4. Which of the following cannot be polarized?

A. Ultrasonic waves

B. Radiowaves

C. Ultraviolet rays

D. X - rays

Answer: A

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5. Two rods P and Q of equal lengths have thermal conductivities K_1 and K_2 and cross-sectional areas A_1 and A_2 respectively. If the temperature difference across the ends of each rod is the same, then the condition for

which the rate of flow of heat through each of them will be equal, is

A. $\frac{A_1}{A_2} = \frac{K_2}{K_1}$

B. $\frac{A_1}{A_2} = \frac{K_1}{K_2}$

C. $\frac{A_1}{A_2} = \sqrt{\frac{K_1}{K_2}}$

D. $\frac{A_1}{A_2} = \left(\frac{K_2}{K_1}\right)^2$

Answer: A

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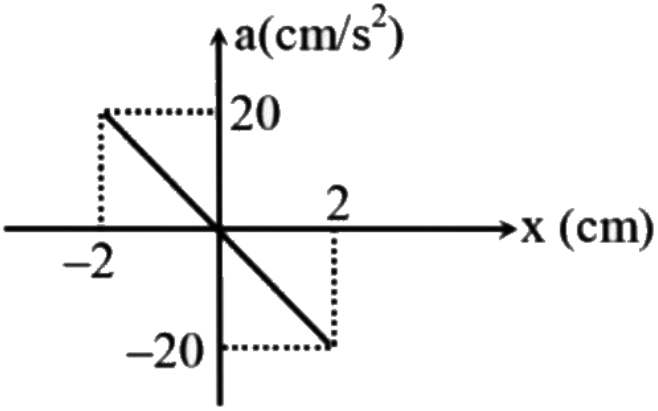
6. The acceleration-displacement graph of a particle executing simple harmonic motion is shown in the figure. The frequency of oscillation is



A. $\frac{\sqrt{2.5}}{\pi} s^{-1}$

B. $2\pi\sqrt{10} s^{-1}$

C. $\frac{1}{2\pi}\sqrt{5}s^{-1}$

D. $\frac{1}{2\pi}\sqrt{20}s^{-1}$

Answer: A

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7. Find coordinates of mass center of a uniform semicircular plate of radius r placed symmetric to the y-axis of a Cartesian coordinate system, with centre at origin.

A. $\frac{4R}{3\pi}$

B. $\frac{2R}{3\pi}$

C. $\frac{4R}{9\pi}$

D. $\frac{2R}{\pi}$

Answer: A

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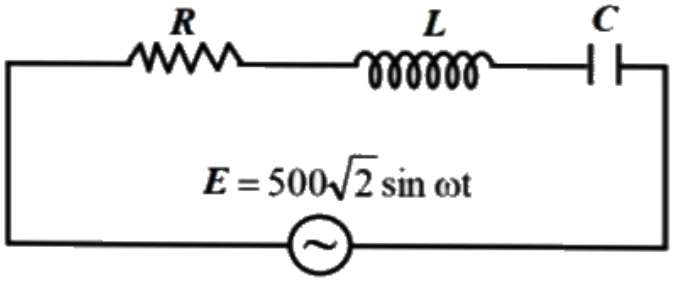
8. In the series $L - C - R$ circuit shown in the figure, the rms voltage across the resistor and inductor are 400 V and 700 V respectively.

If the applied voltage is $E = 500\sqrt{2}\sin(\omega t)$, then the peak voltage across the capacitor is



A. 1200 V

B. $1200\sqrt{2}V$

C. 400 V

D. $400\sqrt{2}V$

Answer: D

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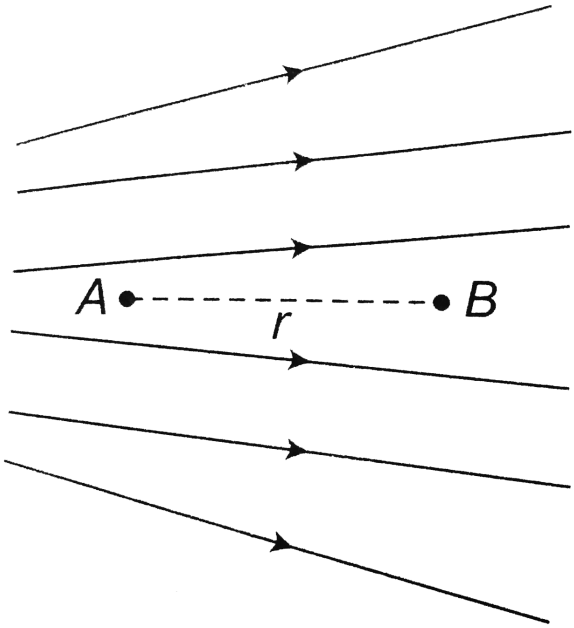
9. Figure shows the electric lines of force emerging from a charged body. If the electric field at A and B are E_A and E_B respectively and if the displacement between A and B is r

then



A. $E_A > E_B$

B. $E_A < E_B$

C. $E_A = \frac{E_B}{r}$

D. $E_A = \frac{E_B}{r^2}$

Answer: A

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10. When current in a coil changes from 5 A to 2 A in 0.1 s, average voltage of 50 V is produced. The self - inductance of the coil is :

A. 1.67 H

B. 6 H

C. 3 H

D. 0.67 H

Answer: A

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11. The potential energy of a particle of mass 5 kg moving in the $x-y$ plane is given by $U=(-7x+24y)J$, where x and y are given in metre. If the particle starts from rest, from the origin, then the speed of the particle at $t=2$s is

A. 5 m/s

B. 14 m/s

C. 17.5 m/s

D. 10 m/s

Answer: D

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12. A particle of mass m collides with another stationary particle of mass M such that the second particle starts moving and the first particle stops just after the collision. Then

which of the following conditions must always be valid ?

A. $e = 0$

B. $e = \frac{m}{M} \leq 1$

C. $e = \frac{m}{M} \geq 1$

D. $e = \frac{M}{m} \leq 1$

Answer: B

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13. The number of photoelectrons emitted for light of a frequency v (higher than the threshold frequency v_0) is proportional to

A. threshold frequency (v_0)

B. intensity of light

C. frequency of light (v)

D. $v - v_0$

Answer: B

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14. A charge q, moving with velocity υ, enters a uniform magnetic field. The charge keeps on revolving along a closed circular path in the magnetic field. The frequency of revolution does not depend upon

A. mass of the charge particle

B. velocity of the charge particle

C. magnitude of charge particle

D. intensity of the magnetic field

Answer: B

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15. A body is displaced from $(0, 0)$ to $(1m, 1m)$ along the path $x = y$ by a force $F = \left(x^2\hat{j} + y\hat{i}\right)N$. The work done by this force will be

A. $\frac{4}{3}J$

B. $\frac{5}{6}J$

C. $\frac{3}{2}J$

D. $\frac{7}{5}J$

Answer: B

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16. Assertion : Average speed is equal to the magnitude of average velocity.

Reason: Displacement of body is less or equal to distance.

A. Both Assertion and Reason are true and the Reason is correct explanation of the Assertion.

B. Both Assertion and Reason are true but Reason is not the correct explanation of the Assertion.

C. Assertion is true but the Reason is false.

D. Assertion is false but the Reason is true.

Answer: D

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17. A particle of mass m is projected at an angle α to the horizontal with an initial velocity u. The work done by gravity during the time it reaches its highest point is

A. $mu^2 \sin^2 \alpha$

B. $\frac{mu^2 \cos^2 \alpha}{2}$

C. $\frac{mu^2 \sin^2 \alpha}{2}$

D. $-\frac{mu^2 \sin^2 \alpha}{2}$

Answer: D

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18. A ball is released from the top of a tower of height h metre. It takes T second to reach the ground. What is the position of the ball in $\frac{T}{3}$ second?

A. $\frac{17h}{18}$ metre from the ground

B. $\frac{8h}{9}$ metre from the ground

C. $\frac{7h}{9}$ metre from the ground

D. $\frac{h}{9}$ metre from the ground

Answer: B

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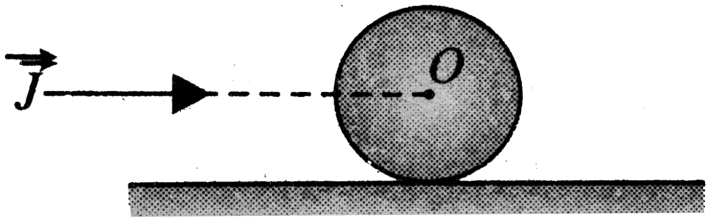
19. An impulse J is applied on a ring of mass m along a line passing through its centre O. The ring is placed on a rough horizontal surface. The linear velocity of centre of ring once it starts rolling without slipping is



A. $\frac{J}{m}$

B. $\frac{J}{2m}$

C. $\frac{J}{4m}$

D. $\frac{J}{3m}$

Answer: B

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20. The speed of light (C), gravitational constant (G) and plank's constant (h) are taken as fundamental units in a system. The

dimensions of time in this new system should be.

A. $G^{\frac{1}{2}}h^{\frac{1}{2}}C^{\frac{-5}{2}}$

B. $G^{\frac{-1}{2}}h^{\frac{1}{2}}C^{\frac{1}{2}}$

C. $G^{\frac{1}{2}}h^{\frac{1}{2}}C^{\frac{-3}{2}}$

D. $G^{\frac{1}{2}}h^{\frac{1}{2}}C^{\frac{1}{2}}$

Answer: A

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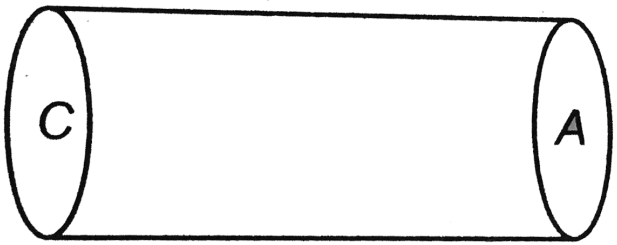
21. A hollow cylinder has a charge q within it. If ϕ is the electric flux in unit of voltmeter associated with the curved surface B the flux linked with the plane surface A in unit of voltmeter will be



A. $\frac{q}{2\varepsilon_0}$

B. $\frac{\phi}{3}$

C. $\frac{q}{\varepsilon_0} - \phi$

D. $\frac{1}{2}\left(\frac{q}{\varepsilon_0}-\phi\right)$

Answer: D

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22. A cubical box with porous walls containing an equal number of O_2 and H_2 molecules is placed in a larger evacuated chamber. The entire system is maintained at constant temperature T. The ratio of v_{rms} of O_2 molecules to that of the v_{rms} of H_2 molecules,

found in the chamber outside the box after a short interval is

A. $\frac{1}{2\sqrt{2}}$

B. $\frac{1}{4}$

C. $\frac{1}{\sqrt{2}}$

D. $\sqrt{2}$

Answer: B

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23. In a adiabatic process pressure is increased by $2/3\,\%$ if $C_P/C_V = 3/2$. Then the volume decreases by about

A. $\frac{4}{9}\,\%$

B. $\frac{2}{3}\,\%$

C. $4\,\%$

D. $\frac{9}{4}\,\%$

Answer: A

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24. A particle is projected from ground at some angle with horizontal (Assuming point of projection to the origin and the horizontal and vertical directions to be the x and y axis) the particle passes through the points (3, 4) m and (4, 3) m during its motion then the range of the particle would be : $\left(g = 10m/s^2\right)$

A. 36 m

B. $\frac{37}{7}$ m

C. 4 m

D. 16 m

Answer: B

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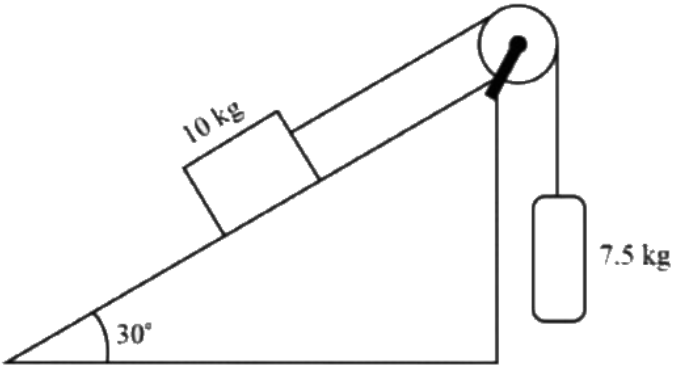
25. The acceleration of the 10 kg mass block shown in the figure is : -



A. $\frac{3.5}{17.5}g$

B. $\frac{7.5}{17.5}g$

C. $\frac{14.5}{17.5}g$

D. $\frac{g}{7}$

Answer: D

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26. Two tangent galvanometers having coils of the same radius are connected in series. A current flowing in them produces deflections of 60° and 45° respectively. The ratio of the number of turns in the coils is

A. $(4/3)$

B. $\left(\sqrt{3}+1\right)$

C. $\left(\frac{\sqrt{3}+1}{\sqrt{3}-1}\right)$

D. $\sqrt{3}$

Answer: D

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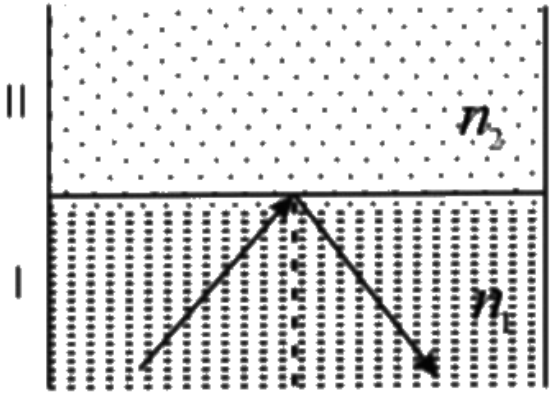
27. A light ray moving in medium-I (of refractive index n_1) is incident on interface of two media and it is totally internally reflected at the interface. Now, refractive index n_2 of

medium-II is decreased, then



A. ray will move completely parallel to the interface

B. ray will be still totally internally reflected at interface

C. ray will be totally transmitted into medium-II only, if angle of incidence is increased

D. ray will be totally transmitted in medium-II

Answer: B

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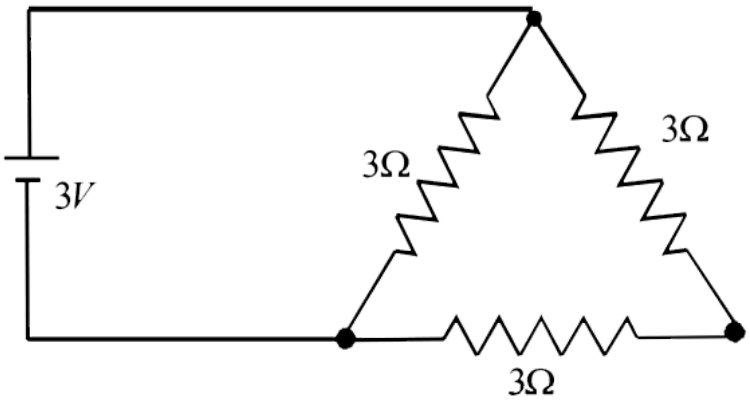
28. A 3 volt battery with negligible internal resistance is connected in a circuit as shown in the figure. The current I, in the circuit will be



A. 1A

B. 1.5 A

C. 2A

D. $\frac{1}{3}$ A

Answer: B

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29. The Young's modulus of the material of a wire is $2 \times 10^{10} Nm^{-2}$ If the elongation strain is 1% then the energy stored in the wire per unit volume in Jm^{-3} is

A. $10^{6} Jm^{-3}$

B. $10^8 Jm^{-3}$

C. $2 \times 10^6 Jm^{-3}$

D. $2 \times 10^8 Jm^{-3}$

Answer: A

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30. Plank 's constant (h) speed of light in vacuum (c) and Newton 's gravitational constant (G) are three fundamental constant.

Which of the following combinations of these has the dimension of length?

A. $\frac{\sqrt{hG}}{c^{\frac{3}{2}}}$

B. $\frac{\sqrt{hG}}{c^{\frac{5}{2}}}$

C. $\sqrt{\frac{hc}{G}}$

D. $\sqrt{\frac{cG}{h^{\frac{3}{2}}}}$

Answer: A

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31. A ball is thrown upwards, it takes 4 s to reach back to the ground. Find its initial velocity

A. 30 m/s

B. 10 m/s

C. 40 m/s

D. 20 m/s

Answer: D

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32. When a satellite moves around the earth in a certain orbit, the quantity which remains constant is

A. Angular velocity

B. Kinetic energy

C. Areal velocity

D. Potential energy

Answer: C

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33. The maximum energy in thermal radiation from a source occurs at the wavelength 4000Å. The effective temperature of the source

A. 7325 K

B. 800 K

C. $10^4 K$

D. $10^6 K$

Answer: A

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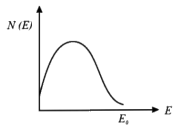
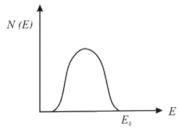
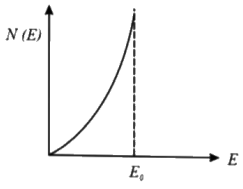
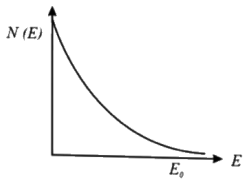
34. The energy spectrum of β - particle [number $N(E)$ as a function of β - energy E] emitted from a radioactive source is

A. 

B. 

C. 

D. 

Answer: A

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35. A stone is dropped from a height of 45 m on a horizontal level ground. There is horizontal wind blowing due to which horizontal acceleration of the stone becomes $10m/s^2$. (Take $g = 10m/s^2$). The time taken

(t) by stone to reach the ground and the net horizontal displacement (x) of the stone form the time it is dropped an till it reaches the ground are respectively

A. $t = 3s, x = 45m$

B. $t = 4s, x = 54m$

C. $t = 3s, x = 54m$

D. $t = 4s, x = 45m$

Answer: A

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36. A car is negotiating a curved road of radius R . The road is banked at an angle θ. The coefficient of friction between the tyres of the car and the road is μ_s . The maximum safe velocity on this road is:

A. $\sqrt{gR^2 \dfrac{\mu_s + \tan\theta}{1 - \mu_s \tan\theta}}$

B. $\sqrt{gR \dfrac{\mu_s + \tan\theta}{1 - \mu_s \tan\theta}}$

C. $\sqrt{\dfrac{g}{R} \dfrac{\mu_s + \tan\theta}{1 - \mu_s \tan\theta}}$

D. $\sqrt{\dfrac{g}{R^2} \dfrac{\mu_s + \tan\theta}{1 - \mu_s \tan\theta}}$

Answer: B

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37. If an electron drops from 4th orbit to 2nd orbit in an H-atom, then

A. It gains 2.55 eV of potential energy

B. it gains 2.55 eV of total energy

C. it emits a 2.55 eV photon

D. it emits a 255 eV photon

Answer: C

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38. A magnetic needle suspended horizontally by an unspun silk fibre, oscillates in the horizontal plane because of the restoring force originating mainly from

A. The torsion of the silk fibre

B. The horizontal component of earth's magnetic field

C. The force of gravity

D. All the above factors

Answer: B

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39. A gas is present in a cylinder fitted with movable piston. Above and below the piston there is equal number of moles of gas. The volume above is two times the volume below at a temperature of 300 K. At what

temperature will the volume above be four times the volume below-

A. 600 K

B. 400 K

C. 200 K

D. 120 K

Answer: D

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40. In Young's experiment , the fringe width of the fringes with light of wavelength 6000 Å is 2.0 mm . What will be the fringe width if the entire apparatus is immersed in a liquid of refractive index 1.33 ?

A. 0.5 mm

B. 1 mm

C. 1.5 mm

D. 2 mm

Answer: C

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41. Assertion: Reduction factor (K) of a tangent galvanometer helps in reduction to current.

Reason: Reduction factor increases with increase of current.

A. If both Assertion and Reason are true and the Reason is correct explanation of the Assertion.

B. If both Assertion and Reason are true but Reason is not explanation of the Assertion.

C. If Assertion is true but the Reason is false.

D. If Assertion is false but Reason is true.

Answer: C

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42. Solar radiation is an example of

A. transverse electromagnetic wave

B. longitudinal electromagnetic wave

C. stationary wave

D. none of the above

Answer: A

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43. A screen is placed 90 cm from an object. The image an object on the screen is formed by a convex lens two different locations separated by 20 cm. the focal length of the lens is

A. 18 cm

B. 21.4 cm

C. 60 cm

D. 85.6 cm

Answer: B

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44. A marble block of mass 2 kg lying on ice when given a velocity of $6m/s$ is stopped by friction in 10s. Then the coefficient of friction is

A. 0.02

B. 0.03

C. 0.06

D. 0.01

Answer: C

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45. A clock which keeps correct time at $20^\circ C$ is subjected to $40^\circ C$. If coefficient of linear expansion of the pendulum is $12 \times 10^{-6} / {}^\circ C$. How much will it gain or loss in time ?

A. $10.3 \ \text{s day}^{-1}$

B. $20.6 \ \text{s day}^{-1}$

C. $5 \quad \mathrm{s\ day}^{-1}$

D. $20 \quad \mathrm{min\ day}^{-1}$

Answer: A

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