PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET TEST 98

Physics

1. The product of linear momentum and angular momentum of an electron of the

hydrogen atom is proportional to n^x, where x is

A. 0

B. 1

C. -2

D. 2

Answer: A

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2. When $_{}(3)Li^{7}$ nuclei are bombarded by protons , and the resultant nuclei are $_{}(4)Be^{8}$, the emitted particle will be

A. Neutrons

B. Alpha particles

C. Beta particles

D. Gamma photons

Answer: D

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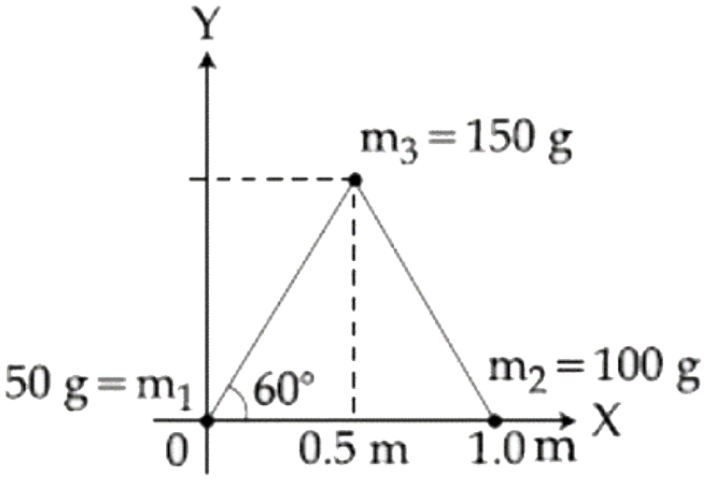
3. Three particles of massses 50 g, 100 g and 150 g are placed at the vertices of an equilateral triangle of side 1m (as shown in the figure) . The (x, y) coordinates of the centre of mass will be :



A. $\left(\frac{7}{12}m, \frac{\sqrt{3}}{4}m\right)$

B. $\left(\frac{7}{12}m, \frac{\sqrt{3}}{8}m\right)$

C. $\left(\frac{\sqrt{3}}{4}m, \frac{5}{12}m\right)$

D. $\left(\frac{\sqrt{3}}{8}m, \frac{7}{12}m\right)$

Answer: A

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4. Two perfectly elastic particles A and B of equal masses travelling along a line joining them with velocities $15m/s$ and $10m/s$

respectively collide. Their velocities after the elastic collision will be (in m/s) respectively

A. $10 \mathrm{m\ s^{-1}}, 15 \ \mathrm{m\ s^{-1}}$

B. $20 \mathrm{m\ s^{-1}}, 5 \ \mathrm{m\ s^{-1}}$

C. $0 \mathrm{m\ s^{-1}}, 25 \ \mathrm{m\ s^{-1}}$

D. $5 \mathrm{m\ s^{-1}}, 20 \ \mathrm{m\ s^{-1}}$

Answer: A

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5. What is the linear velocity of a body on the surface of the earth at the equator ? Given the radius of the earth is 6400 km . Period of rotation of the earth = 24 hours.

A. $465\mathrm{m\ s^{-1}}$

B. $165\mathrm{m\ s^{-1}}$

C. $665\mathrm{m\ s^{-1}}$

D. $410\mathrm{m\ s^{-1}}$

Answer: A

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6. The angle of dip at a certain place on earth is 60° and the magnitude of the earth's horizontal component of the magnetic field is 0.26 G . The magnetic field at the place on earth is

A. 0.13 G

B. 0.26 G

C. 0.52 G

D. 0.65 G

Answer: C

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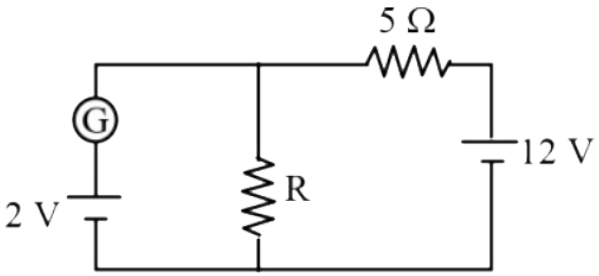
7. For what value of R , the current in galvanometer is zero ?



A. 5Ω

B. 2Ω

C. 7Ω

D. 1Ω

Answer: D

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8. An unknown resistance R_1 is connected is series with a resistance of 10Ω. This combination is connected to one gap of a meter bridge, while other gap is connected to another resistance R_2. The balance point is at

$50cm$ Now , when the 10Ω resistance is removed, the balanced point shifts to $40cm$ Then the value of R_1 is.

A. 20Ω

B. 10Ω

C. 60Ω

D. 40Ω

Answer: A

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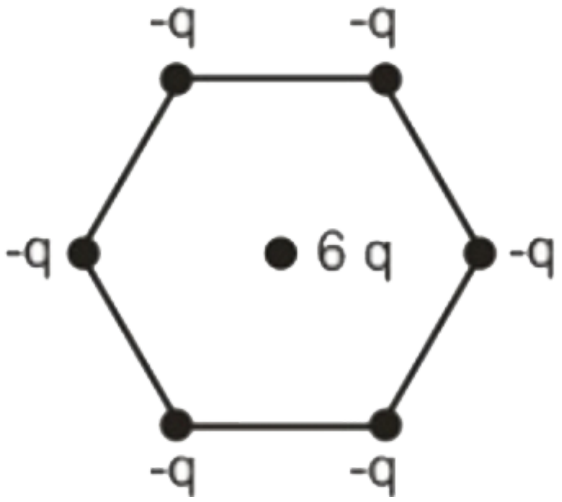
9. Six negative equal charge are placed at the vertical of a regular hexagon . 6q charge is placed at the centre of the hexagon . Find the electric dipole moment of the system.



A. zero

B. 6qa

C. 3qa

D. qa

Answer: A

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10. A series combination of N_1 capacitors (each of capacity C_1) is charged to potential difference 3V. Another parallel combination of N_2 capacitors (each of capacity C_2) is charged to potential difference V. The total energy

stored in both the combinations is same, The value of C_1 in terms of C_2 is

A. $\frac{C_2 N_1 N_2}{9}$

B. $\frac{C_2 N_1^2 N_2^2}{9}$

C. $\frac{C_2 N_1}{9 N_2}$

D. $\frac{C_2 N_2}{9 N_1}$

Answer: A

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11. The dimensional formula for magnetic flux is

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

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

C. $\left[ML^2T^{-1}A^{-2}\right]$

D. $\left[ML^{-1}T^{-2}A^{-1}\right]$

Answer: A

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12. In a transformer, number of turns in the primary coil are 140 and that in the secondry coil are 280. If current i primary ciol is 4A, then that in the secondary coil is

A. $4A$

B. $2A$

C. $6A$

D. $10A$

Answer: B

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13. Two planets of radii in the ratio $2:3$ are made from the materials of density in the ratio $3:2$. Then the ratio of acceleration due to gravity g_1 / g_2 at the surface of two planets will be

A. 1

B. 2.25

C. 0.50

D. 0.12

Answer: A

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14. A planet in a distant solar systyem is 10 times more massive than the earth and its radius is 10 times smaller. Given that the escape velocity from the earth is $11 kms^{-1}$, the escape velocity from the surface of the planet would be

A. $0.11 \ \mathrm{km\ s^{-1}}$

B. 1.1km s^{-1}

C. 11km s^{-1}

D. 110km s^{-1}

Answer: D

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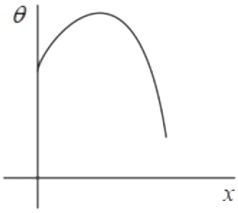
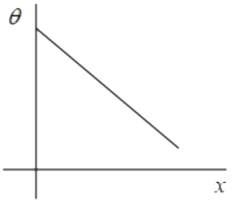
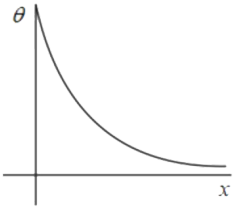
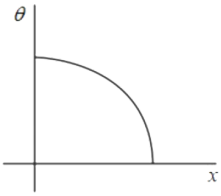
15. A long metallic bar is carrying heat from one of its ends to the other end under steady-state. The variation of temperature θ along

the length x of the bar from its hot end is best described by which of the following figure.

A. 

B. 

C. 

D. 

Answer: B

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16. In a Carnot engine , the temperature of the reservoir is $927^\circ C$ and that of sink is $127^\circ C$. If the work done by the engine when it transfers heat from the reservoir to sink is $12.6 \times 10^6 J$. the quantity of heat absorbed by the engine from the reservoir is

A. $18.9 \times 10^6 J$

B. $20.5 \times 10^6 J$

C. $15.7 \times 10^6 J$

D. $12.6 \times 10^6 J$

Answer: A

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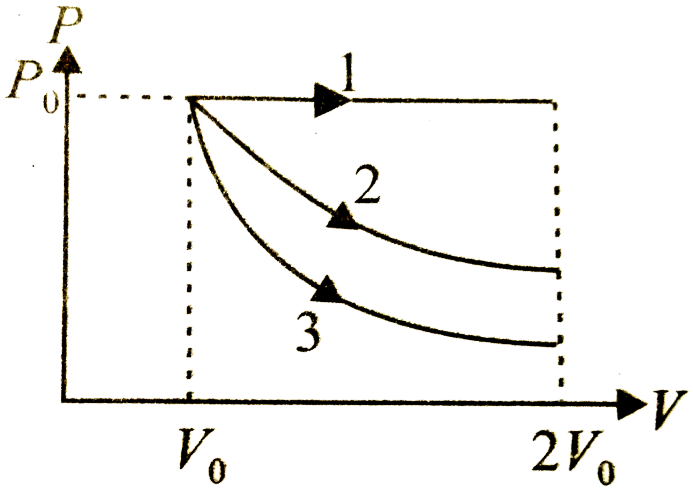
17. A gas is expanded form volume $V_0 \rightarrow 2V_0$ under three different processes as shown in the figure . Process 1 is isobaric process process 2 is isothermal and and process 3 is

adiabatic .

Let $\Delta U_1, \Delta U_2$ and ΔU_3 be the change in internal energy of the gs in these three processes then



A. $\Delta U_1 > \Delta U_2 > \Delta U_3$

B. $\Delta U_1 < \Delta U_2 < \Delta U_3$

C. $\Delta U_2 < \Delta U_1 < \Delta U_3$

D. $\Delta U_2 < \Delta U_3 < \Delta U_1$

Answer: A

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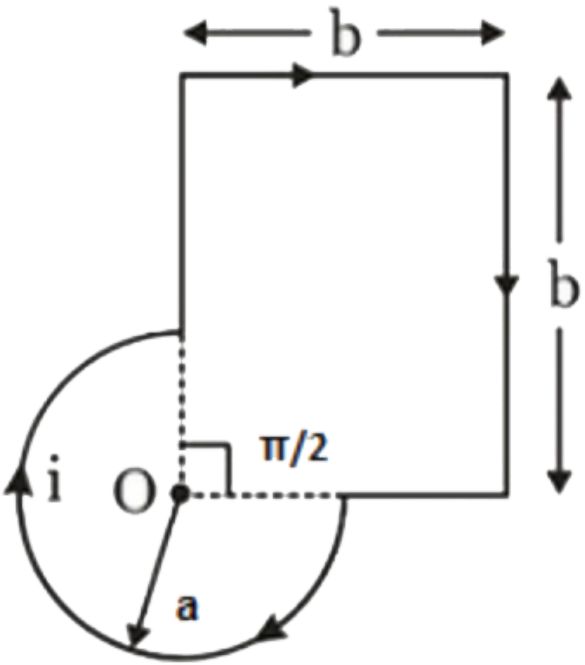
18. The magnitude of the magnetic field at O (centre of the circular part) due to the current

- carrying coil as shown is :



A. $\frac{\mu_0 i}{4\pi}\left(\frac{4\pi}{a}+\frac{\sqrt{2}}{b}\right)$

B. $\frac{\mu_0 i}{2\pi}\left(\frac{3\pi}{2a}+\frac{\sqrt{2}}{b}\right)$

C. $\frac{\mu_0 i}{2\pi}\left(\frac{\pi}{3a}+\frac{3}{\sqrt{2}b}\right)$

D. $\frac{\mu_0 i}{4\pi}\left(\frac{3\pi}{a}+\frac{\sqrt{2}}{b}\right)$

Answer: D

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19. The strength of the magnetic field around a long straight current carrying conductor :

A. Same everywhere around the wire at any distance

B. Inversely proportional to the distance from the wire

C. Inversely proportional to the square of the distance from the wire

D. Directly proportional to the square of the distance from the wire

Answer: B

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20. A stone of density 2000 kg m^{-3} completely immersed in a lake is allowed to sink from rest . If the effect of friction is neglected , than after 4 seconds , the stone will reach a depth of

A. 78.4 m

B. 39.2 m

C. 19.6 m

D. 9.8 m

Answer: B

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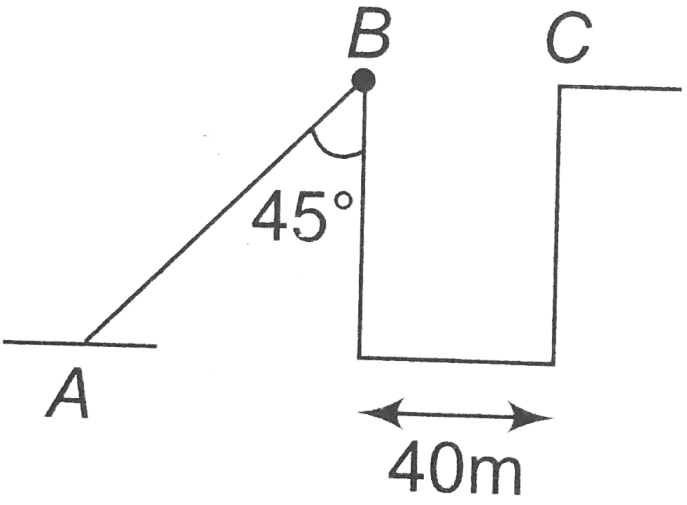
21. A body is projected up a smooth inclined plane with velocity V from the point A as shown in the figure. The angle of inclination is 45° and the top is connected to a well of diameter 40m. If the body just manages to across the well, what is the value of V? Length

of inclined plane is $20\sqrt{2}m$.



A. $40 \ \mathrm{m\,s^{-1}}$

B. $40\sqrt{2} \ \mathrm{m\,s^{-1}}$

C. $20 \ \mathrm{m\,s^{-1}}$

D. $20\sqrt{2} \ \mathrm{m\,s^{-1}}$

Answer: D

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22. A heavy uniform chain lies on a horizontal table-top. If the coefficient of friction between the chain and table surface is 0.25, then the maximum fraction of length of the chain, that can hang over one edge of the table is

A. $20\ \%$

B. $25\ \%$

C. $35\ \%$

D. $15\ \%$

Answer: A

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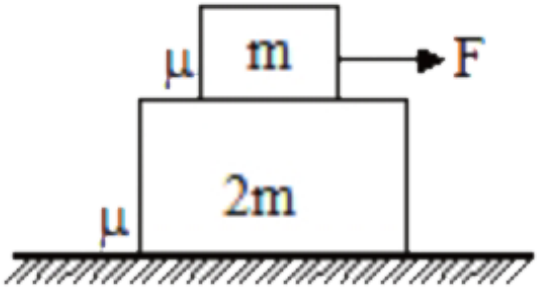
23. The system of two blocks is at rest an shown in the figure. A variable Horizontal force is applied to the upper block. The maximum possible constant force exerted by the horizontal ground surface on the lower block

is (coefficient of friction for both the contracts is μ)



A. $3mg\sqrt{1+\mu^2}$

B. $3\mu mg$

C. μmg

D. $mg\sqrt{9+\mu^2}$

Answer: A

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24. IF in a nuclear fission, piece of uranium of mass 5.0g is lost, the energy obtained in kWh is

A. 1.25×10^7

B. 2.25×10^7

C. 3.25×10^7

D. 0.25×10^7

Answer: A

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25. In a nuclear reactor the function of the moderator is,

A. Number of neutrons

B. Speed of neutrons

C. Escape of neutrons

D. Temperature of the reactor

Answer: B

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26. THE magnitude of maximum accesleration is π times that of maximum velocity of a simble harmonic oscillator The time period of the oscillator. The time period of the oscillator in second is,

A. 4

B. 2

C. 1

D. 0.5

Answer: B

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27. A pole is floating in a liquid with 80 cm of its length immersed. It is pushed doun a certain distance and then released. Time period of vertical oscillation is

A. $\frac{4\pi}{7}s$

B. $\frac{3\pi}{7}s$

C. $\frac{2\pi}{7}s$

D. $\frac{\pi}{7}s$

Answer: A

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28. A photo cell is receiving light from a source placed at a distance of $1m$. If the same source is to be placed at a distance of $2m$, then the ejected electron

A. moves with one - fourth energy as that of the initial energy.

B. moves with one - fourth of momentum as that of the initial momentum.

C. will be half in number.

D. will be one - fourth in number.

Answer: D

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29. The frequency of incident light falling on a photosensitive metal plate is doubled, the K.E of the emitted photo-electrons is

A. Double the earlier value

B. Unchanged

C. More than doubled

D. Less than doubled

Answer: C

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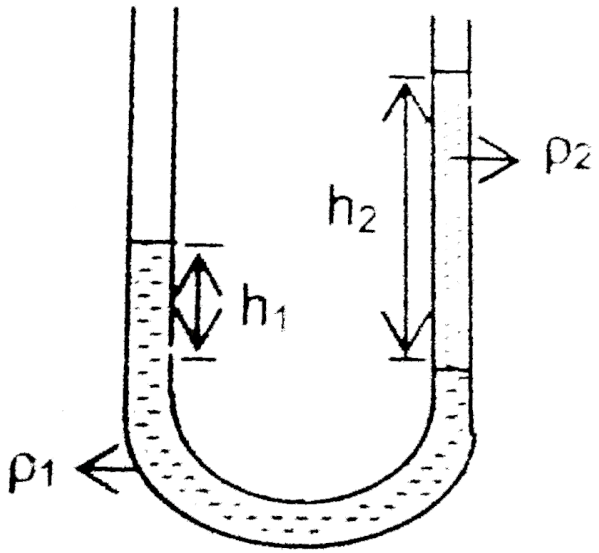

30.

Two liquids which do not react chemically are placed in a bent tube as shown in figure. The height of the liquids above their surface of separation are

A. directly proportional to their densities

B. inversely proportional to their densities

C. directly proportional to square of their densities

D. equal

Answer: B

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31. A soap bubble A of radius 0.03 m and another bubble B of radius 0.04 m are brought together, so that the combined

bubble has a common interface of radius r, then the value of r is

A. 0.24 m

B. 0.48 m

C. 0.12 m

D. 0.50 m

Answer: C

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32. An air bubble in a glass slab with refractive index 1.5 (near normal incidence) is $5cm$ deep when viewed from one surface and $3cm$ deep when viewed from the opposite face. The thickness (in cm) of the slab is

A. 8

B. 10

C. 12

D. 16

Answer: C

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33. A ray of light passing through a prism having refractive index $\sqrt{2}$ suffers minimum devitation. It is found that the angle of incidence is double the angle of refraction within the prism. Then angle of prism is

A. 60°

B. 90°

C. 75°

D. 30°

Answer: B

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34. A uniform meter scale of mass $1kg$ is placed on table such that a part of the scale is beyond the edge. If a body of mass $0.25kg$ is hung at the end of the scale then the minimum length of scale that should lie on the table so that it does not tilt is

A. 90 cm

B. 80 cm

C. 70 cm

D. 60 cm

Answer: D

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35. Two solid cylinders P and Q of same mass and same radius start rolling down a fixed inclined plane from the same height at the

same time. Cylinder P has most of its mass concentrated near its surface, while Q has most its mass concentrated near the axis. Which statement(s) is (are) correct?

A. Both cylinder A and B reach the ground at the same time

B. Cylinder A has larger linear acceleration than cylinder B

C. Cylinder B reaches the ground with larger angular speed

D. Both cylinder A and B reach the ground with the same translational kinetic energy

Answer: C

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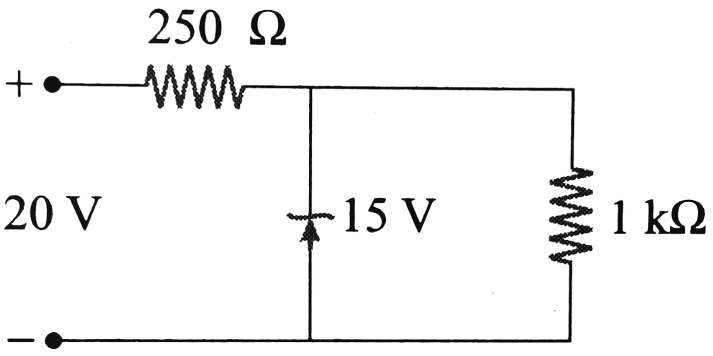
36. A zener diode, having breakdown voltage equal to $15V$ is used in a voltage regulator circuit shown in the figure. The current

through the diode is



A. 10 mA

B. 15 mA

C. 20 mA

D. 5 mA

Answer: D

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37. In an n-p-n transistor circuit, the collector current ia 10 mA. If 90% of the electrons emitted reach the collector.

A. The base current will be 1 mA

B. The base current will be -1 mA

C. The emitter current will be 9 mA

D. The emitter current will be 15 mA

Answer: A

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38. For a rigid diatomic molecule, univerisal gas constant $R = mc_p$, where $'C_p'$ is the molar specific heat at constant pressure and 'n' is a number. Hence n is equal to

A. 0.2257

B. 0.4

C. 0.2857

D. 0.3557

Answer: C

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39. A spherical liquid drop is placed on a horizontal plane . A small distrubance cause the volume of the drop to oscillate . The time period oscillation (T) of the liquid drop depends on radius (r) of the drop , density (ρ) and surface tension tension (S) of the liquid. Which amount the following will be be a

possible expression for T (where k is a dimensionless constant)?

A. $k\sqrt{\frac{\rho r}{S}}$

B. $k\sqrt{\frac{\rho^2 r}{S}}$

C. $k\sqrt{\frac{\rho r^3}{S}}$

D. $k\sqrt{\frac{\rho r^3}{S^2}}$

Answer: C

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40. Angular width of central maxima in the Fraunhofer diffraction pattern of a slit is measured. The slit is illuminated by light of wavelength 6000Å. When the slit is illuminated by light of another wavelength, the angular width decreases by 30%. The wavelength of this light will be

A. 3500Å

B. 4200Å

C. 4700Å

D. 6000Å

Answer: B

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41. In the ideal double-slit experiment, when a glass-plate(refractive index 1.5) of thickness t is introduced in the path of one of the interfering beams (wave-length λ), the intensity at the position where the central maximum occurred previously remains

unchanged. The minimum thickness of the glass-plate is

A. λ

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

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

D. 2λ

Answer: D

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42. A string of density $7.5gcm^{-3}$ and area of cross - section $0.2mm^2$ is stretched under a tension of 20 N. When it is plucked at the mid-point, the speed of the transverse wave on the wire is

A. $116 \ \mathrm{m\,s^{-1}}$

B. $40 \ \mathrm{m\,s^{-1}}$

C. $200 \ \mathrm{m\,s^{-1}}$

D. $80 \ \mathrm{m\,s^{-1}}$

Answer: A

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43. A closed organ pipe and an open organ pipe are tuned to the same fundamental frequency. The ratio of their lengths is

A. $1:1$

B. $2:1$

C. $1:4$

D. $1:2$

Answer: D

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44. An engine pumps water through a hose pipe. Water passes through the pipe and leaves it with a velocity of $2ms^1$. The mass per unit length of water in the pipe is $100kgm^{-1}$. What is the power of the engine?

A. 400 W

B. 200 W

C. 100 W

D. 800 W

Answer: D

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45. Power applied to a particle varices with time as $P = \left(3t^2 - 2t + 1\right)$ watt, where t is in second. Find the change in its kinetic energy between time $t = 2s$ and $t = 4s$.

A. 46 J

B. 52 J

C. 92 J

D. 104 J

Answer: A