



PHYSICS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

PRACTICE SET 14

Paper 1 Physics Chemistry

1. A particle is moving along a circular along a circular path of radius 5 m with a uniform

speed 5ms^{-1} . What will be the average acceleration when the particle completes half revolution?

A. Zero

B. 10 m/s^2

C. $10\pi\text{ m/s}^2$

D. $\frac{10}{\pi}\text{m/s}^2$

Answer: D



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2. A rectangular block is $5\text{cm} \times 5\text{cm} \times 10\text{cm}$ in size. The block is floating in water with 5 cm side vertical. If it floats with 10 cm side vertical, what change will occur in the level of water?

A. No change

B. It will rise

C. It will fall

D. It may rise or fall depending on the density of block

Answer: A



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3. A wire of length L and radius a rigidly fixed at one end. On stretching the other end of the wire with a force F , the increase in its length is l , if another wire of same material but of length $2L$ and radius $2a$ is stretched with a force $2F$, the increase in its length will be

A. l

B. $2l$

C. $l/2$

D. 4 l

Answer: A



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4. A river of salty water is flowing with a velocity $2m/sec$. If the density of water is $1.2gm/cc$, the kinetic energy of each of cubic metre of water is

A. 2.4 J

B. 24 J

C. 2.4 kJ

D. 4.8 kJ

Answer: C



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5. If E = energy , G = gravitational constant, I =impulse and M =mass, then dimensions of $\frac{GIM^2}{E^2}$ are same as that of

A. time

B. mass

C. length

D. force

Answer: A



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6. Gravitational force between a point mass m and M separated by a distance is F . Now if a point mass $2m$ is placed next to m in contact

with it. The force on M due to m and the total force on M are

A. $2F, F$

B. $F, 2F$

C. $F, 3F$

D. F, F

Answer: C



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7. If the earth suddenly shrinks (without changing mass) to half of its present radius, the acceleration due to gravity will be

A. $4g$

B. $2g$

C. $g/2$

D. $g/4$

Answer: A



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8. If the length of a rectangular $l = 0.5$ cm, breath $b = 2.1$ cm and minimum possible measurement by scale = 0.1 cm then the area is

A. 22 cm^2

B. 22.1 cm^2

C. 22.05 cm^2

D. 22.2 cm^2

Answer: A



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9. If the maximum velocity and acceleration of a particle executing SHM are equal in magnitude the time period will be

A. 1.57 s

B. 3.14 s

C. 6.28 s

D. 12.56 s

Answer: C



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10. While measuring the speed of sound by performing a resonance column experiment, a student gets the first resonance condition at a column length of 18cm during winter. Repeating the same experiment during summer, she measures the column length to be $x\text{cm}$ for the second resonance. Then

A. $18 > x$

B. $x > 54$

C. $54 > x > 36$

$$D. 36 > x > 18$$

Answer: B



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11. The length of the second's pendulum is decreased by 0.3 cm, when it is shifted to Chennai from London. If the acceleration due to gravity at London is 981 cm/s^2 , the acceleration due to gravity at Chennai is (Assume $\pi^2 = 10$)

A. 981 cm/s^2

B. 978 cm/s^2

C. 984 cm/s^2

D. 975 cm/s^2

Answer: B



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12. Two gases A and B having the same temperature T , same pressure P and same volume V are mixed. If the mixture is at the

same temperature and occupies a volume V .

The pressure of the mixture is

A. $2p$

B. p

C. $p/2$

D. $4p$

Answer: A



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13. The Young's double slit experiment is performed with blue and with green light of wavelengths 4360\AA and 5460\AA respectively. If X is the distance of $4th$ maximum from the central one, then :

A. $x(\text{blue}) = x(\text{green})$

B. $x(\text{blue}) > x(\text{green})$

C. $x(\text{blue}) < x(\text{green})$

D. $\frac{x(\text{blue})}{x(\text{green})} = \frac{5460}{4360}$

Answer: C



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14. In one metre long open pipe what is the harmonic of resonance obtained with a tuning fork of frequency 480 Hz

A. First

B. Second

C. Third

D. Fourth

Answer: C



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15. The ratio of radii of two bubbles is 2:1.

What is the ratio of excess pressures inside them ?

A. 1:2

B. 1:4

C. 2:1

D. 4:1

Answer: A



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16. The coordinates of a particle moving in XY-plane at any instant of time t are $x = 4t^2$, $y = 3t^2$. The speed of the particle at that instant is

A. $10 t$

B. $5 t$

C. $3 t$

D. $2 t$

Answer: A



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17. A stretched string of length l , fixed at both ends can sustain stationary waves of wavelength λ given by

A. $\lambda = 2 \ln$

B. $\lambda = \frac{2l}{n}$

C. $\lambda = \frac{l^2}{2n}$

D. $\lambda = \frac{n^2}{2l}$

Answer: B



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18. A 6 V battery is connected to the terminals of a 3 m long wire of uniform thickness and resistance of 100Ω . The difference of potential between two points on the wire separated by a distance of 50 cm will be

A. 1 V

B. 1.5 V

C. 2 V

D. 3 V

Answer: A



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19. A $10\mu F$ capacitor and a $20\mu F$ capacitor are connected in series across a $200V$ supply line. The charged capacitors are then disconnected from the line and reconnected with their positive plates together and negative plates

together and no external voltage is applied.

what is the potential difference across each capacitor ?

A. $\frac{400}{9}$ V

B. $\frac{800}{3}$ V

C. 400 V

D. 200 V

Answer: A



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20. An open tube is in resonance with string (frequency of vibration of tube is n_0). If tube is dipped in water so that 75% of length of tube is inside water, then the ratio of the frequency of tube to string now will be

A. v_0

B. $2v_0$

C. $\frac{2}{3}v_0$

D. $\frac{3}{2}v_0$

Answer: B



21. Consider three vectors

$$A = \hat{i} + \hat{j} - 2\hat{k}, B = \hat{i} - \hat{j} + \hat{k} \quad \text{and}$$

$$C = 2\hat{i} - 3\hat{j} + 4\hat{k}. \text{ A vector } X \text{ of the form}$$

$\alpha A + \beta B$ (α and β are numbers) is

perpendicular to C . The ratio of α and β is

A. 1:1

B. 2:1

C. -1:1

D. 3:1

Answer: A



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22. If the angle between the pass axis of polariser and analyser is 45° , write the ratio of intensities of original light and the transmitted light after passing through analyser.

A. $\frac{l}{2}$

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

C. 1

D. $\frac{l}{4}$

Answer: D



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23. In an L C R circuit having $L = 8 \text{ H}$, $C = 0.5 \mu\text{F}$ and $R = 100\Omega$ in series, the resonance frequency in rad/s is

A. 600

B. 200

C. $250 / \pi$

D. 500

Answer: C



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24. A 50H alternating current of peak value 1 ampere flows through the primary coil of a transformer. If the mutual inductance between

the primary secondary be 1.5 henry, then the peak value of the induced voltage is

A. 75 V

B. 150 V

C. 225 V

D. 300 V

Answer: D



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25. A block of mass M is pulled along a horizontal frictionless surface by a rope of mass m . If a force P is applied at the free end of the rope, the force exerted by the rope on the block is

A. $\frac{Pm}{M + m}$

B. $\frac{Pm}{M - m}$

C. P

D. $\frac{PM}{M + m}$

Answer: D



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26. If work W is done in blowing a bubble of radius R from a soap solution. Then the work done is blowing a bubble of radius $2R$ from the same solution is

A. $2^{1/3} W$

B. $4 W$

C. $2 W$

D. $\frac{W}{2}$

Answer: B



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27. In the lowest energy level of hydrogen atom, the electron has the angular momentum

A. $\frac{\pi}{h}$

B. $\frac{h}{\pi}$

C. $\frac{h}{2\pi}$

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

Answer: B



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28. A proton, a deuteron and an α -particle with the same KE enter a region of uniform magnetic field, moving at right angles to B. What is the ratio of the radii of their circular paths ?

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

B. $1 : \sqrt{2} : \sqrt{2}$

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

D. $\sqrt{2}:\sqrt{2}:1$

Answer: A



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29. A milli-voltmeter of 25 milli-volt range is to be converted into an ammeter of 25 ampere range. The value (in ohm) of necessary shunt will be:

A. 0.001

B. 0.01

C. 1

D. 0.05

Answer: A



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30. The resistance of an ammeter is 13Ω and its scale is graduated for a current upto $100A$. After an additional shunt has been connected

to this ammeter it becomes possible to measure currents upto $750A$ by this meter.

The value of shunt resistance is

A. 2Ω

B. 0.2Ω

C. $2k\Omega$

D. 20Ω

Answer: A



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31. Out of given paramagnetic substance (Calcium, Chromium, Oxygen and Tungsten) which substance has maximum susceptibility

A. Calcium

B. Chromium

C. Oxygen

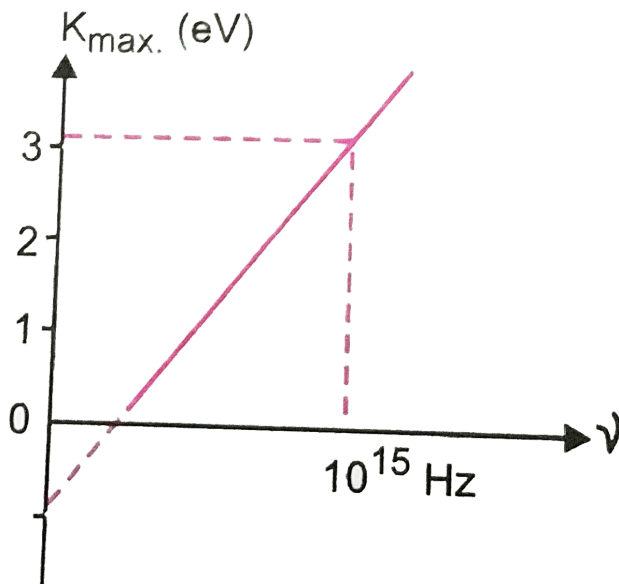
D. Tungsten

Answer: B



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32. represents a graph of most energetic photoelectrons K_{\max} (in eV) and frequency ν for a metal used as cathode in photoelectrons experiment. The threshold frequency of light for the photoelectric emission from the metal is



A. 1×10^{14} Hz

B. 1.5×10^{15} Hz

C. 2.1×10^{14} Hz

D. 2.8×10^{14} Hz

Answer: D



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33. A box of mass 2 kg is placed on the roof of a car. The box would remain stationary until the car attains a maximum acceleration.

Coefficient of static friction between the box and the roof of the car is 0.2 and $g = 10 \text{ ms}^{-2}$.

The maximum acceleration of the car, for the box to remain stationary, is

A. 8 ms^{-2}

B. 6 ms^{-2}

C. 4 ms^{-2}

D. 2 ms^{-2}

Answer: D



34. Two light waves of amplitudes A_1 and A_2 superimpose with each other such that $A_1 > A_2$. The difference between maximum and minimum amplitudes is

A. A_1

B. $2A_2$

C. $2A_1$

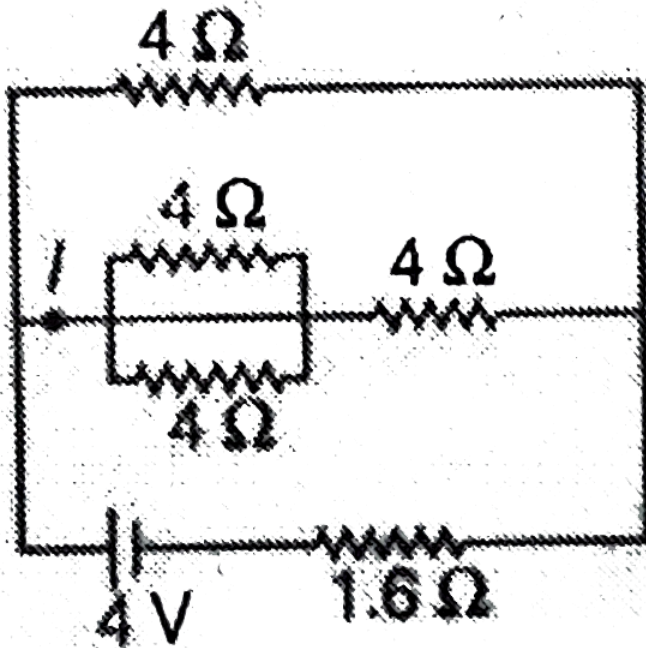
D. A_2

Answer: B



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35. In the circuit shown, the value of I in ampere is



A. 1

B. 0.60

C. 0.4

D. 1.5

Answer: C



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36. The magnetic flux linked with a coil at any instant 't' is given by $\phi = 5t^3 - 100t + 300$, the e.m.f. induced in the coil at $t = 2$ second is

A. 40 V

B. -40V

C. 300 V

D. 140 V

Answer: A



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37. A real object is placed at a distance f from the pole of a convex mirror, in front of the convex mirror. If focal length of the mirror is f ,

then distance of the image from the pole of the mirror is

A. $2f$

B. $\frac{f}{2}$

C. $4f$

D. $\frac{f}{4}$

Answer: B



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38. What should be the height of transmitting antenna if the T.V. telecast is to cover of a radius of 128km ?

Radius of earth = $6.4 \times 10^6\text{m}$.

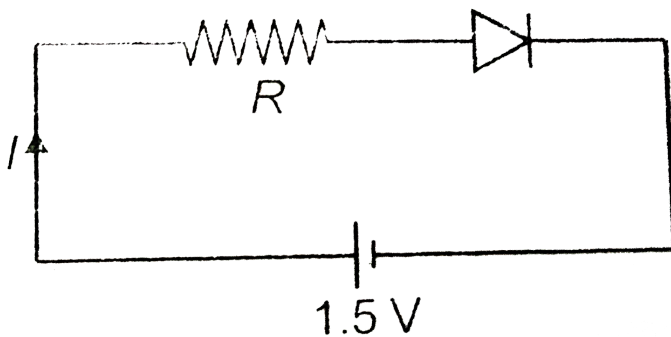
- A. 128 m
- B. 1280 m
- C. 100 m
- D. 1500 m

Answer: B



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39. The diode used in the circuit shown in the figure has a constant voltage drop of 0.5 V at all currents and a maximum power rating of 100 mW. What should be the value of the resistor R , connected in series with the diode, for obtaining maximum current put less I . ?



A. 200Ω

B. 6.67Ω

C. 5Ω

D. 1.5Ω

Answer: C



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40. A transistor with $\alpha = 0.98$ is operated in common emitter circuit with a load resistance of $5\text{ k}\Omega$. If the dynamic resistance of the

emitter junction is 70Ω , the voltage gain and power gain will be

A. 3500, 1.715×10^5

B. 4000, 2.715×10^5

C. 2500, 1.215×10^5

D. None of these

Answer: A



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41. Two bodies of same shape, same size and same radiating power have emissivities 0.2 and 0.4 The ratio of their temperature is .

A. $\sqrt{3}:1$

B. $\sqrt{2}:1$

C. $1:\sqrt{5}$

D. $1:\sqrt{8}$

Answer: B



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42. The ionization energy for the hydrogen atom is 13.6eV then calculate the required energy in eV to excite it from the ground state to 1^{st} excited state.

A. 3.4 eV

B. 10.2 eV

C. 12.1 eV

D. 1.5 eV

Answer: B



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43. A luminous object is separated from a screen by distance d . A convex lens is placed between the object and the screen such that it forms a distinct image on the screen. The maximum possible focal length of this convex lens is.

A. $4d$

B. $2d$

C. $\frac{d}{2}$

D. $\frac{d}{4}$

Answer: D



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44. A body cools from 60°C to 50°C in 10 min. Find its temperature at the end of next 10 min if the room temperature is 25°C . Assume Newton's law of cooling holds.

A. 45°C

B. $42.85^{\circ}C$

C. $40^{\circ}C$

D. $38.5^{\circ}C$

Answer: B



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45. The driver of a car travelling with speed $30ms^{-1}$ towards a hill sounds a horn of frequency 600 Hz. If the velocity of sound in air

is 330ms^{-1} , the frequency of reflected sound as heard by driver is

A. 500 Hz

B. 550 Hz

C. 720 Hz

D. 555 Hz

Answer: C



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46. The phase difference between two points separated by 0.8 m in a wave of frequency 120 Hz is 0.5π . The velocity of wave will be

A. 720 m/s

B. 384 m/s

C. 256 m/s

D. 144 m/s

Answer: B



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47. An electron of mass m and charge e moves from point A to point C which are respectively at potentials of $+5V$ and $-4V$. The electron will acquire the wavelength of

A. $\frac{2h}{\sqrt{3em}}$

B. $\frac{h}{\sqrt{18 \text{ em}}}$

C. $\frac{h^2}{\sqrt{5em}}$

D. $\frac{2h}{\sqrt{7 \text{ em}}}$

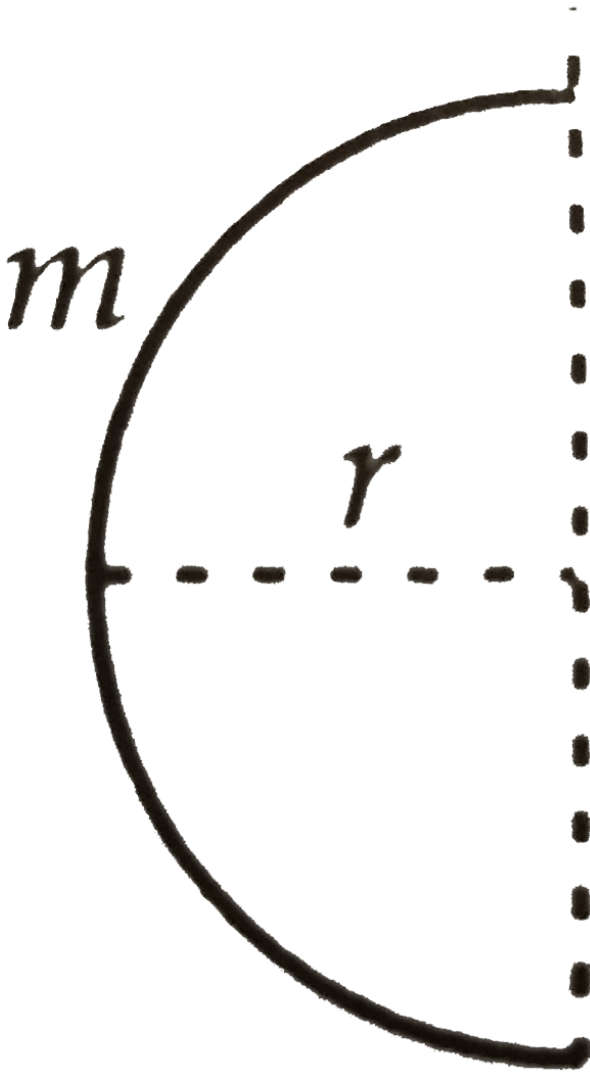
Answer: B



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48. A thin wire of length l and mass m is bent in the form of a semicircle as shown in the figure. Its moment of inertia about an axis

joining its free ends will be



A. ml^2

B. zero

C. $ml^2 / 2\pi^2$

D. $ml^2 / 2\pi^2$

Answer: C



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49. The speed of a uniform spherical shell after rolling down an inclined plane of vertical height h from rest, is

A. $\sqrt{\frac{10 \text{ gh}}{7}}$

B. $\sqrt{\frac{6 \text{ gh}}{5}}$

C. $\sqrt{\frac{4 \text{ gh}}{5}}$

D. $\sqrt{2 \text{ gh}}$

Answer: B



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50. If in a wire of Young's modulus Y , longitudinal strain X is produced then the

potential energy stored in its unit volume will
be:

A. $0.5Y X^2$

B. $0.5Y^2X$

C. $2 Y X^2$

D. $Y X^2$

Answer: A



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