PHYSICS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

PRACTICE SET 07

Paper 1 Physics Chemistry

1. If two waves represented by $y_1 = 4\sin\omega t$ and $y_2 = 3\sin\left(\omega t + \frac{\pi}{3}\right)$ interfere at a point, the amplitude of the resulting wave will be about

A. 7

B. 6

C. 5

D. 3.5

Answer: A

Watch Video Solution

2. The rate of cooling at 600 K, if surrounding temperature is 300 K is R. The rate of cooling at 900 K is

A. $\frac{16}{3}R$

B. 2R

C. 3R

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

Answer: B

Watch Video Solution

3. If $\vec{A} = \vec{B} + \vec{C}$, and the magnitudes of $\vec{A}, \vec{B}, \vec{C}$ are 5,4, and 3 units, then the angle between $\vec{A}$ and $\vec{C}$ is

A. $\cos^{-1}(3/5)$

B. $\cos^{-1}(4/5)$

C. $\pi/2$

D. $\sin^{-1}(3/4)$

Answer: C

Watch Video Solution

4. Two wires of the same materila and the same diiamter have their lenghts in the ration $1:3$ and are under tension in the ration $1:4$ the ratio between the fundametal frequencies is

A. $\frac{5}{2}$

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

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

D. $\frac{2}{5}$

Answer: B

Watch Video Solution

5. Velocity and acceleration vectors of charged particle moving perpendicular to the direction of magnetic field at a given instant of time are $\overrightarrow{v} = 2\hat{i} + c\hat{j}$ and $\overrightarrow{a} = 3\hat{i} + 4\hat{j}$ respectively. Then that value of 'c' is

A. 3

B. 1.5

C. -1.5

D. -3

Answer: C

Watch Video Solution

6. Plane of vibration and plane of polarisation of a beam of light

A. are identical to each other

B. are orthognal to each other

C. make an angle, which depeds on the colour of light

D. rotate with respect of each other along the path of the beam

Answer: B

Watch Video Solution

7. A point charge of 10^{-7}C is situated at the centre of a cube of side 1m. Calculate the electric flux through its surface.

A. $10^4 Nm^2/C$

B. $10^3 Nm^2/C$

C. $1.13 \times 10^4 Nm^2/C$

D. $1.13 \times 10^3 Nm^2/C$

Answer: C

Watch Video Solution

8. Electric field inside a conductor can be zero only, if potential inside the onductor is

A. zero

B. constant

C. aboe an specified value

D. both are independet of each other

Answer: B

Watch Video Solution

9. Given that $y = A\sin\left[\left(\frac{2\pi}{\lambda}(ct - x)\right)\right]$ where y and x are measured in metres ,Which of the following statements is true ?

A. The unit of λ is same as that of x and A

B. The unit of λ is same as that of x but not A.

C. The unit of c is same as that of $\frac{2\pi}{\lambda}$

D. The unit of $(c - t)$ is same as that of $\frac{2\pi}{\lambda}$

Answer: C

Watch Video Solution

10. Area of a parallel plate capacitor of capacitance 2F and separation between the plates $0.5cm$ will be

A. $1.13 \times 10^9 m^2$

B. $1.13 \times 10^6 m^2$

C. $10^8 m^2$

D. $1.13 m^2$

Answer: A

Watch Video Solution

11. In a sonometer a metal of length of 20 cm and diameter 0.2 mm is stretched by aload of 2 kg. wt. if the density of materila of the wire is $7.8gm/cm^3$. Find the fundamental frequenct of vibrations of the wire.

A. 706.3Hz

B. 705.3 Hz

C. 708.3 Hz

D. 707.3 Hz

Answer: D

Watch Video Solution

12. If the equation for the displacement of a particle moving in a circular path is given by $(\theta) = 2t^3 + 0.5$, where θ is in radians and t in seconds, then the angular velocity of particle after $2s$ from its start is

A. 8 rad/s

B. 12 rad/s

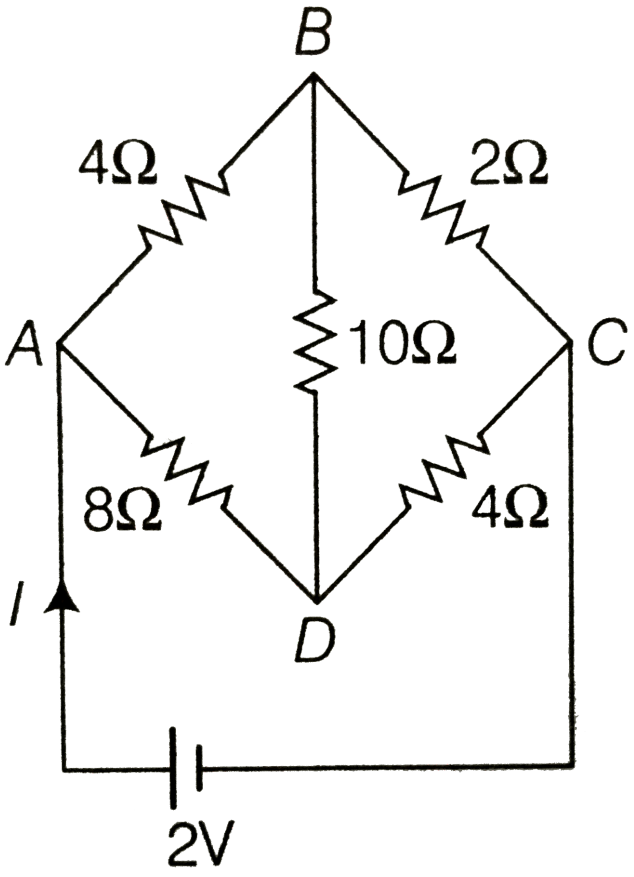
C. 24 rad/s

D. 36 rad/s

Answer: C

Watch Video Solution

13. If the Wheateston's network shown in the figure, the current I in the circuit is



A. $1A$

B. $2A$

C. 0.25 A

D. 0.5 A

Answer: D

Watch Video Solution

14. From an infinite stright conductor carrying a current of 100 A, the magnetic field at a distance 5m

A. 4 T

B. $4 \times 10^{-6} T$

C. $3.8 \times 10^{-6} T$

D. None of these

Answer: B

Watch Video Solution

15. A gas bubble oscillates with a time period T proportional to $p^a d^b E^c$ where P is pressure , d is the density and E is the energy. The values of a,b and C are :

A. $-5/6, 1/2, 1/3$

B. $5/6, 1/3, 1/2$

C. $5/6, 1/2, 1/3$

D. None of these

Answer: A

Watch Video Solution

16. An iron rod of $0.1m^2$ area of cross- section is subjected to a magnetising field of 1000 A/m . If susceptibility of irons is 599, its magnetic permeability (T/A/m)

A. 2.50×10^{-4}

B. 3.80×10^{-4}

C. 7.54×10^{-4}

D. 7.20×10^{-4}

Answer: C

Watch Video Solution

17. An magnetic field of lux density 10 T acts normal to a coil of 50 turns having $100cm^2$ area. If coil is removed from magnetic field in 0.1 is emf induced is

A. 10 V

B. 50 V

C. zero

D. 100 V

Answer: B

Watch Video Solution

18. If the coefficient of mutual induction of primary and secondry of an induction coil is 6H and a current of 5A is cut-off in 2×10^{-4}s, the induced emf in secondary coil is

A. $1.5 \times 10^{5} V$

B. 6V

C. $1.5 \times 10^{-4} V$

D. $2.3 \times 10^{2} V$

Answer: A

Watch Video Solution

Watch Video Solution

19. In two separate set-ups of the Young's double slit experiment, fringes of equal width are observed when lights of wavelength in the ratio of $1:2$ are used. If the ratio of the slit separation in the two cases is $2:1$, the ratio of the distance between the plane of the slits and the screen in the two set-ups are

A. $4:1$

B. $1:1$

C. $1:4$

D. $2:1$

Answer: A

Watch Video Solution

20. A mass of 10 kg is suspended from a spring balance. It is pulled aside by a horizontal string so that it makes an angle of 60° with the vertical. The new rading of the balance is

A. 20 kg-wt

B. 10 kg-wt

C. $10\sqrt{3}$ kg-wt

D. $20\sqrt{3}$ kg-wt

Answer: A

Watch Video Solution

21. A telescop with an objective aperture 0.25 m is uded to obseve two stars. If the wavelength of light used is 5000Å . Find the minimum angular sepration between them.

A. 2.44×10^{-6} rad

B. 2.44×10^{-5} rad

C. 1.22×10^{-7} rad

D. 1.22×10^{-4} rad

Answer: A

Watch Video Solution

22. Stationary bomb explodesinto three pieces. One piece of 2kg mass moves with a velocity of $8ms^{-1}$ at right angles to the other piece of mass 1 kg moving. With a velocity of $12ms^{-1}$. If the mass of the third piece is $0.5kg$, then its velocity is

A. $10ms^{-1}$

B. $20ms^{-1}$

C. $30ms^{-1}$

D. $40ms^{-1}$

Answer: D

Watch Video Solution

23. The current gain for a transistor working as a common-base amplifier is 0.96. If the emitter current is $7.2mA$, the base current will be

A. $0.45mA$

B. $0.29mA$

C. $093mA$

D. zero

Answer: B

Watch Video Solution

24. If a source of power 8 kW producees 10^{22} photons/second, the wavelength of the radiation is

A. $1 \cdot 5 \times 10^{-6} m$

B. $2 \cdot 5 \times 10^{-7} m$

C. $1.4 \times 10^{-3} m$

D. $1.2 \times 10^{-5} m$

Answer: B

Watch Video Solution

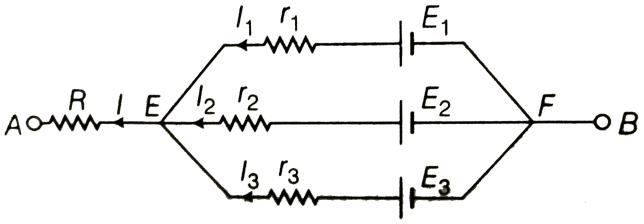
Watch Video Solution

25. In the circuit as shown in figure,

$E_1 = 2V, E_2 = 2V, E_3 = 1V,$ and $R = r_1 = r_2 = r_3 \Omega$

.

The potential difference between points A and B will be



A. 1V

B. 2 V

C. 3 V

D. 4 V

Answer: B

26. If the fundamental units of length, mass and time are doubled, the unit of force will

A. doubled

B. tripled

C. quadrupled

D. eight times the original value

Answer: C

27. The inner and outer radius of a toroid core are 28 cm and 29 cm respectively and around the core 3700 turns of a wire are wounded. If the current in the wire is 10 A, then the magnetic moment of the toroid is

A. 1679 Am

B. 1879 m

C. 2000 Am

D. 1900 Am

Answer: A

Watch Video Solution

28. A bucket of water is being removled in vertical circle of radius 1m. Minimum frequency required to prevent the water from getting down the path is

A. $\frac{20\pi}{\sqrt{10}}$

B. $\frac{2\pi}{\sqrt{5}}$

C. $\frac{\sqrt{10}}{2\pi}$

D. $\frac{\sqrt{5}}{2\pi}$

Answer: C

Watch Video Solution

29. The velocity v of a particle at time t is given by $v = at + \frac{b}{t+c}$, where a, b and c are constants. The dimensions of a, b, c are respectively :-

A. $\begin{matrix} a & b & c \\ [L] & [LT] & [T^2] \end{matrix}$

B. $\begin{matrix} a & b & c \\ [L^2] & [T] & [LT^{-2}] \end{matrix}$

C. $\begin{matrix} a & b & c \\ [LT^2] & [LT] & [L] \end{matrix}$

D. $\begin{matrix} a & b & c \\ [LT^2] & [L] & [T] \end{matrix}$

Answer: D

Watch Video Solution

30. Two circular discs are of same thickness. The diameter of A is twice that of B. The moment of inertia of A as compared to that of B is

A. twice

B. 4 times

C. 8 times

D. 16 times

Answer: D

Watch Video Solution

31. A forcee of $\left(3\hat{i}+4\hat{k}\right)N$ is acted upon a flywheel tangentially . The radius vector of the flywheel is $\left(2\hat{j}-6\hat{k}\right)$ m. the torque acting on the flywheel is

A. 25 Nm

B. $20.6Nm$

C. $\sqrt{42}Nm$

D. None of these

Answer: B

Watch Video Solution

32. Two plane mirros are inclined at an anle θ. It is found that a ray incident on one mirror at any angle is rendered paralle ot itself after reflection from both the mirrors. The value of θ is

A. 30°

B. 60°

C. 90°

D. 120°

Answer: C

Watch Video Solution

33. A seocnd pendulum that gives correct time on earth, when shifted to mooon $\left(g_m = \frac{1}{6} g_e\right)$ the time loss in 1 min by second pendulum will be

A. 10 s

B. 87 s

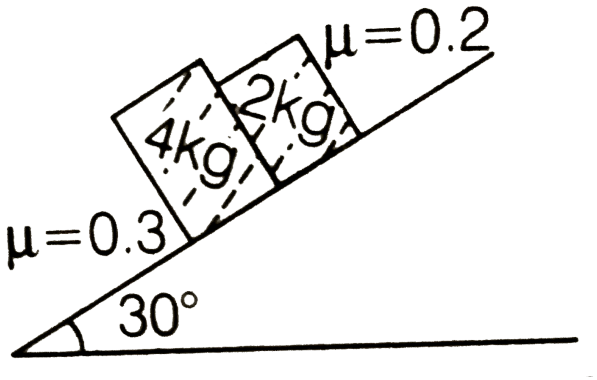
C. 60s

D. 30 s

Answer: B

Watch Video Solution

34. Two blocks 4 kg and 2 kg are sliding down an incline plane as shown in figure. The acceleration of 2 kg block is.



A. $1.66m/s^2$

B. $2.66m/s^2$

C. $3.66m/s^2$

D. $4.66m/s^2$

Answer: B

Watch Video Solution

35. A particle in SHM has maximum velocity equals to 36 m/s and maximum acceleration of $216\pi m/s^2$. The time period of SHM will be

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

B. $3\pi s$

C. $6\pi s$

D. $3s$

Answer: A

Watch Video Solution

36. A steel wire of 4.0 m is stretched through 2.0 mm. The cross - sectional area of the wire is $2.0mm^2$. If young's modulus of steel is $2.0 \times 10^{11} Nm^{-2}$ find (i) the energy density of the wire, (ii) the elastic potential energy stored in the wire.

A. $0.3J$

B. $0.4KJ$

C. zero

D. ∞

Answer: A

Watch Video Solution

37. The bulk modulus of water is $2.3 \times 10^9 N/m^2$ its compressibility is

A. $22.7 atm$

B. 44 atm

C. 4.4×10^{-5} per atm

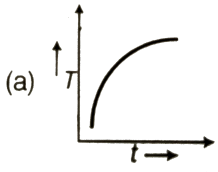
D. 22.7 atm

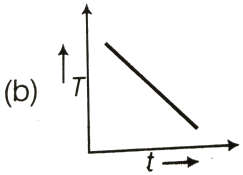
Answer: C

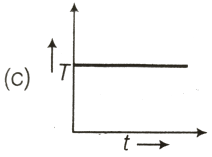
Watch Video Solution

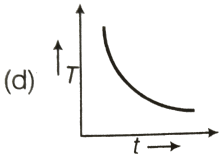
Watch Video Solution

38. Which graph represents the variation of surface tension with temperature over small temperature ranges for water?

A. 

B. 

C. 

D. 

Answer: B

Watch Video Solution

39. The force of cohesion and adhesions between

A. melecules of same material and molecules of different kinds of material

B. molecules of same material

C. molecules of same material

D. None of the above

Answer: A

Watch Video Solution

40. The echo of a gun shot is heard 8 sec. after the gun is fired. How far from him is the surface that reflects the sound (velocity of sound in air = 350 m/s)

A. 1400 m

B. 2800 m

C. 700 m

D. 350 m

Answer: A

Watch Video Solution

41. What is the ratio of shortest wavelength of the Balmer series ot the shortest waelength of the Lyman series?

A. $4:1$

B. $4:3$

C. $4:9$

D. $5:9$

Answer: A

Watch Video Solution

42. A stretched string fixed at both end has n nods, then the lengths of the string is

A. $(n-1)\frac{\lambda}{2}$

B. $(3n+1)\frac{\lambda}{2}$

C. $(n+1)\frac{\lambda}{2}$

D. $5\frac{(n+1)\lambda}{2}$

Answer: A

Watch Video Solution

43. The speed of wave in acertain medium is 690 m/s. if 3600 waeve pass over a certain point of the medium in 1 min, then the wavelenght will be

A. $11.5ms^{-1}$

B. 32 m

C. 16 m

D. 8 m

Answer: A

Watch Video Solution

44. Stationary waves are produced in 10 m long stretched string. If the string vibrates in 5 segments and wave velocity 20 m/s then the frequency is :-

A. 10 Hz

B. 5 Hz

C. 4 Hz

D. 2 Hz

Answer: B

Watch Video Solution

45. The ratio of rms speed of the molecule of a gas at NTP to its value at temperture 2457 K is

A. $1:3$

B. $9:1$

C. $1:12$

D. $3:1$

Answer: A

Watch Video Solution

46. A body of mass m kg falling from a distance 3R above the earth's surface. What is its kinetic enrgy when it reaches a distance 'R' above the surface of the earth of radius R and mass M ?

A. $\frac{2}{3}\frac{GMm}{R}$

B. $\frac{1}{3}\frac{GMm}{R}$

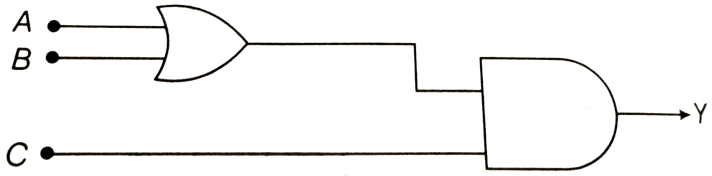
C. $\frac{1}{2}\frac{GMm}{R}$

D. $\frac{1}{4}\frac{GMm}{R}$

Answer: D

Watch Video Solution

47. To get output Y=1 from circuit of figure the input must be



A. $\begin{matrix} A & B & C \\ 0 & 1 & 0 \end{matrix}$

B. $\begin{matrix} A & B & C \\ 1 & 0 & 0 \end{matrix}$

C. $\begin{matrix} A & B & C \\ 1 & 0 & 1 \end{matrix}$

D. $\begin{matrix} A & B & C \\ 1 & 1 & 0 \end{matrix}$

Answer: C

Watch Video Solution

48. The maximum wavelength of radiation emitted at 900 K is 4 μm, the value of the same at 1200 K will be

A. 1m

B. $1\mu m$

C. $0.3\mu m$

D. $3\mu m$

Answer: D

Watch Video Solution

49. Positronium is just like a H-atom with the proton replaced by the positively charged anti-particle of the

electron (called the positron which is as massive as the electron). What would be the ground state energy of positronium ?

A. $-3.4eV$

B. $-5.2eV$

C. $-6.8eV$

D. $-10.2eV$

Answer: C

Watch Video Solution

50. When a dampled harmonic oscillator completes 100 oscillations, its amplitude is reduced to $\frac{1}{3}$ of its initial value. When will be its amplitude when it completes 200 oscillations?

A. $\frac{1}{5}$

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

C. $\frac{1}{6}$

D. $\frac{1}{9}$

Answer: D

Watch Video Solution