PHYSICS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

MHTCET 2016

Physics

1. In potentiometer experiment, null point isobtained at a particular point for a cell on

potentiometer wire x cm long. If the lengthof the potentiometer wire is increasedwithout changing the cell, the balancing length will (Driving source is not changed)

A. increase

B. decrease

C. not change

D. become zero

Answer: A

Watch Video Solution

2. An iron rod is placed parallel to magnetic field of intensity $2000Am^{-1}$. The magnetic flux through the rod is 6×10^{-1} Wb and its cross-sectional area is $3cm^2$. The magnetic permeability of the rod in Wb $A^{-1}m^{-1}$ is

A. 10^{-1}

B. 10^{-2}

C. 10^{-3}

D. 10^{-4}

Answer: C

Watch Video Solution

3. Alternating current of peak value $\left(\frac{2}{\pi}\right)$ ampere flows through the primary coil of the transformer. The coefficient of mutual inductance between primary and secondary coil is 1 henry. The peak e.m.f. induced in secondary coil is (Frequency of AC= 50 Hz)

A. 100V

B. 200V

C. 300V

D. 400V

Answer: B

 Watch Video Solution

4. An electron of mass m has de-Broglie wavelength ·A when accelerated through potential differe_nce V. When proton of mass M, is accelerated through potential diff ere

nee 9 V,. the de-BrOglie wavelength associated v,rith it will be_ (Assume -that wavelength is-determin•ed. at low voltage)

A. $\frac{\lambda}{3}\frac{\sqrt{M}}{m}$

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

C. $\frac{\lambda}{3}\frac{\sqrt{m}}{M}$

D. $\frac{\lambda}{3}\frac{m}{M}$

Answer: C

Watch Video Solution

5. Interference fringes are produced on a screen by using two light sources of intensities / and 9/. The phase difference between the beams $\frac{\pi}{2}$ is at point P and πat point Q on the screen. The difference between the resultant intensities at point P and Q is

A. 2

B. 4

C. 6

D. 8

Answer: C

Watch Video Solution

6. From Brewster's law, except for polished metallic surfaces, the polarising angle

A. depends on wavelength and is different for different colours

B. independent of wavelength and is different for different colours

C. independent of wavelength and is same for different colours

D. depends on wavelength and is same for different colours

Answer: A

Watch Video Solution

7. Two particles X and Y having equal charges, after being accelerated through the same potential difference, enter a region of uniform

magnetic field and describe circular paths of radii R_1 and R_2, respectively. The ratio of masses of X and Y is

A. $\frac{r_1}{r_2}$

B. $\sqrt{\frac{r_1}{r_2}}$

C. $\left[\frac{r_2}{r_1}\right]^2$

D. $\left[\frac{r_1}{r_2}\right]^2$

Answer: A

Watch Video Solution

8. When an electron in hydrogen atom revolves in stationary orbit, it

A. does not radiate light though its velocity changes

B. does not radiate light and velocity remains unchanged

C. radiates light but its velocity is unchanged

D. radiates light with the change of energy

Answer: A

Watch Video Solution

9. The magnetic field (B) inside a long solenoid having n turns per unit length and carrying current / when iron core is kept in it is (μ_o = permeability of vacuum, χ = magnetic susceptibility)

A. $\mu_0 nl(1 - Chi)$

B. $\mu_0 nl\chi$

C. $\mu_0 nl^2(1+\chi)$

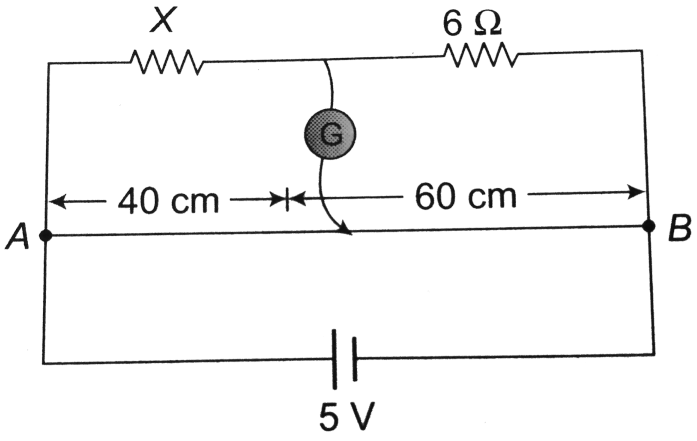
D. $\mu_0 nl(1+\chi)$

Answer: D

Watch Video Solution

10. In the circuit shown, a meter bridge is in its balanced state. The meter bridge wire has a resistance $.1ohm/cm$. The value of unknown resistance X and the current drawn from the

battery of negligible resistance is



A. 1A

B. 1.5A

C. 2A

D. 5A

Answer: A

Watch Video Solution

11. Three parallel plate air capacitors are connected in parallel. Each capacitor has plate area $\frac{A}{3}$ and the separation between the plates is d, 2d and 3d respectively. The equivalent capacity of combination is (ε_0 = absolute permittivity of free space)

A. $\frac{7\varepsilon_0 A}{18d}$

B. $\frac{11\varepsilon_0 A}{18d}$

C. $\frac{13\varepsilon_0 A}{18d}$

D. $\frac{17\varepsilon_0 A}{18d}$

Answer: B

Watch Video Solution

12. In an oscillator, for sustained oscillations, Barkhausen criterion is $A\beta$ equal to (A = voltage gain without feedback and β = feedback factor)

A. zera

B. $\frac{1}{2}$

C. 1

D. 2

Answer: C

Watch Video Solution

13. Light of wavelength A which is less than threshold wavelength is incident on a photosensitive material. If incident wavelength is decreased so that emitted photoelectrons

are moving with same velocity, then stopping potential will

A. increase

B. decrease

C. be zero

D. become exactly half

Answer: A

Watch Video Solution

14. A ray of light travelling through rarer medium is incident at very small angle i on a glass slab and after refraction its velocity is reduced by 20%. The angle of deviation

A. $\frac{i}{8}$

B. $\frac{i}{5}$

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

D. $\frac{4i}{5}$

Answer: B

Watch Video Solution

Watch video solution

15. The maximum frequency of transmitted radio waves above which the radio waves are no longer reflected back by ionosphere is (N = maximum electron density of ionosphere, g = acceleration due to gravity)

A. gN

B. gN^2

C. $g\sqrt{N}$

D. g^2N^2

Answer: C

Watch Video Solution

16. Wire having tension 225 N produces six beats per second when it is tuned with a fork. When tension changes to 256 N, it is tuned with the same fork, the number of beats remain unchanged. The frequency of the fork will be

A. 186 Hz

B. 225 Hz

C. 256 Hz

D. 280 Hz

Answer: A

Watch Video Solution

17. Assuming the expression for the pressure exerted by the gas on the walls of the container, it can be shown that pressure is

A. $\left[\frac{1}{3}\right]^{rd}$ kinetic energy per unit volume of a gas

B. $\left[\frac{2}{3}\right]^{rd}$ kinetic energy per unit volume of a gas

C. $\left[\frac{3}{4}\right]^{th}$ kinetic energy per unit volume of a gas

D. $\frac{3}{2} \times$ kinetic energy per unit volume of a gas

Answer: B

Watch Video Solution

18. A mass m, connected to a horizontal spring performs SHM with amplitude A. While mass m, is passing through mean position, another mass m, is placed on it so that both the masses move together with amplitude A,. The ratio of

A. $\left[\frac{m_1}{m_1+m_2}\right]^{\frac{1}{2}}$

B. $\left[\frac{m_1+m_2}{m_1}\right]^{\frac{1}{2}}$

C. $\left[\frac{m_2}{m_1+m_2}\right]^{\frac{1}{2}}$

D. $\left[\frac{m_1+m_2}{m_2}\right]^{\frac{1}{2}}$

Answer: A

Watch Video Solution

19. A particle moves along a circle of radius r with constant tangential acceleration. If the velocity of the particle is v at the end of second revolution, after the revolution has started, then the tangential acceleration is

A. $\frac{v^2}{8\pi r}$

B. $\frac{v^2}{6\pi r}$

C. $\frac{v^2}{4\pi r}$

D. $\frac{v^2}{2\pi r}$

Answer: A

Watch Video Solution

20. Two strings A and B made of same material are stretched by same tension. The radius of string A is double of the radius of B. A

transverse wave travels on A with speed v_A and on B with speed v_B. The ratio $\frac{v_A}{v_B}$ is

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

B. $\frac{1}{2}$

C. 2

D. 4

Answer: C

Watch Video Solution

21. Which of the following quantity does not change due to damping of oscillations?

A. Angular frequency

B. Time period

C. Initial phase

D. Amplitude

Answer: C

Watch Video Solution

22. If the end correction of an open pipe is 0.8 cm, then the inner radius of that pipe will be

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

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

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

D. 0.2cm

Answer: C

Watch Video Solution

23. A progressive wave is represented by $y = 12\sin(5t - 4x)$ cm. On this wave, how far away are the two points having phase difference of 90° ?

A. $\frac{\pi}{2} cm$

B. $\frac{\pi}{4} cm$

C. $\frac{\pi}{8} cm$

D. $\frac{\pi}{16} cm$

Answer: C

Watch Video Solution

Watch Video Solution

24. Two bodies of masses m and 4m are placed at a distance r. The gravitational potential at a point on the line joining them where the gravitational field is zero is:

A. $-\frac{4Gm}{r}$

B. $-\frac{8Gm}{r}$

C. $-\frac{16Gm}{r}$

D. $-\frac{32Gm}{r}$

Answer: D

Watch Video Solution

25. A black rectangular surface of area A emits energy E per second at $27^\circ C$. If length and breadth are reduced to initial value and temperature is raised to $327^\circ C$, then energy emitted per second becomes

A. $\frac{4E}{9}$

B. $\frac{7E}{9}$

C. $\frac{10E}{9}$

D. $\frac{16E}{9}$

Answer: A

Watch Video Solution

26. For a gas $\frac{R}{C_V}$ = 0.4, where R is the universal gas constant and C, is molar specific heat at constant volume. The gas is made up of molecules which are

A. rigid diatomic

B. monoatomic

C. non-rigid diatomic

D. polyatomic

Answer: D

Watch Video Solution

27. In vertical circular motion, the ratio of kinetic energy of a particle at highest point to that at lowest point is

A. 5

B. 2

C. 0.5

D. 0.2

Answer: D

Watch Video Solution

28. Two wires having same length and material are stretched by same force. Their diameters are in the ratio 1:3. The ratio of strain energy

per unit volume for these two wires (smaller to larger diameter) when stretched is

A. $3:1$

B. $9:1$

C. $27:1$

D. $81:1$

Answer: B

Watch Video Solution

29. A ring and a disc roll on the horizontal surface without slipping, with same linear velocity. If bolh have same mass and total kinetic energy of the ring is 4 J, then total kinetic energy of the disc is

A. 3J

B. 4J

C. 5J

D. 6J

Answer: A

Watch Video Solution

30. When the observer moves towards the stationary source with velocity, v_1, the apparent frequency of emitted note is f_1. When the observer moves away from the source with velocity v_1, the apparent frequency is f_2. If v is the velocity of sound in air and $\frac{f_1}{f_2} = 2$,then $\frac{v}{v_1} = ?$

A. 2

B. 3

C. 4

D. 5

Answer: B

 Watch Video Solution

31. A liquid drop having surface energy E is spread into 512 droplets of same size. The final surface energy of the droplets is

A. 2E

B. 4E

C. 8E

D. 12E

Answer: C

Watch Video Solution

32. Let M be the mass and L be the length of a thin uniform rod. In first case, axis of rotation is passing through centre and perpendicular to the length of the rod. In second case, axis of

rotation is passing through one end and perpendicular to the length of the rod. The ratio of radius of gyration in first case to second case is

A. 1

B. $\frac{1}{2}$

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

D. $\frac{1}{8}$

Answer: B

Watch Video Solution

33. A simple pendulum of length l has a maximum angular displacement θ. The maximum kinetic energy of the bob of mass m will be

A. $mgl(1+\cos\theta)$

B. $mgl\left(1+\cos^2\theta\right)$

C. $mgl(1-\cos\theta)$

D. $mgl(\cos\theta-1)$

Answer: C

Watch Video Solution

34. Calculate the angular speed of the hour hand of a clock .

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

B. 1/60`

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

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

Answer: C

Watch Video Solution

35. The value of gravitational accelerationg at a height h above the earth's surface is then (R = radius of earth)

A. h=R

B. $h = \frac{R}{2}$

C. $h = \frac{R}{3}$

D. $h = \frac{R}{4}$

Answer: A

Watch Video Solution

36. The schematic symbol of light emitting diode (LED) is

A. 

B. 

C. 

D. 

Answer: B

View Text Solution

37. The amount of work done in increasing the voltage across the plates of capacitor from 5 V to 10 V is W. The work done in increasing it from 10 V to 15 V will be

A. W

B. $0.6W$

C. $1.25W$

D. $1.67W$

Answer: D

Watch Video Solution

38. Magnetic flux passing through a coil is initially 4×10^{-4} Wb. It reduces to 10% of its original value in t second. If the emf induced is 0.72 mV then t in second is

A. 0.3

B. 0.4

C. 0.5

D. 0.6

Answer: C

 Watch Video Solution

39. Resolving power of telescope increases when

A. wavelength of light decreases

B. wavelength of light increases

C. focal length of eye-piece increases

D. focal length of eye-piece decreases

Answer: A

Watch Video Solution

40. When light of wavelength λ is incident on photosensitive surface, the stopping potential is V. When light of wavelength 3λ is incident on same surface, the stopping potential is $\frac{V}{6}$ Thereshould wave length for the surface is

A. 2λ

B. 3λ

C. 4λ

D. 5λ

Answer: D

Watch Video Solution

41. The bob of a simple pendulum performs SHM with period T in air and with period T_1 in water. Relation between T and T_1 is (neglect friction due to water, density of the material of

the bob is = $\frac{9}{8} \times 10^3 kgm^3$, density of water = $1g \hat{} -1)$

A. $T_1 = 3T$

B. $T_1 = 2T$

C. $T_1 = T$

D. $T_1 = \frac{T}{2}$

Answer: A

Watch Video Solution

42. A glass rod of radius r_1 is inserted symmetrically into a vertical capillary tube of radius r_2 such that their lower ends are at the same level. The arrangement is now dipped in water. The height to which water will rise into the tube will be ($\sigma =$ surface tension of water, $\rho =$ density of water)

A. $\dfrac{T}{(R+r)\rho g}$

B. $\dfrac{R\rho g}{2T}$

C. $\dfrac{2T}{(R-r)\rho g}$

D. $\frac{(R-r)\rho g}{T}$

Answer: C

Watch Video Solution

43. When open pipe is closed from one end, then third overtone of closed pipe is higher in frequency by 150 Hz than second overtone of open pipe. The fundamental frequency of open end pipe will be

A. 75 Hz

B. 150 Hz

C. 225 Hz

D. 300 Hz

Answer: D

Watch Video Solution

44. A disc of radius R and thickness has moment of inertia / about an axis passing through its centre and perpendicular to its plane. Disc is melted and recast into a solid

sphere. The moment of inertia of a sphere about its diameter is

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

B. $\frac{l}{6}$

C. $\frac{l}{32}$

D. $\frac{l}{64}$

Answer: A

Watch Video Solution

45. Let a steel bar of length l, breadth b and depth d be loaded at the centre by a load W. Then the sag of bending of beam is (Y = Young's modulus of material of steel)

A. $\frac{Wl^3}{2bd^3Y}$

B. $\frac{Wl^3}{4bd^3Y}$

C. $\frac{Wl^2}{2bd^3Y}$

D. $\frac{Wl^3}{2bd^2Y}$

Answer: B

View Text Solution

View Text Solution

46. In Bohr's theory of hydrogen atom, the electron jumps from higher orbit n to lower orbit p. The wavelength will be minimum for the transition

A. n=5 to p=4

B. n=4 to p=3

C. n=3 to p=2

D. n=2 to p = 1

Answer: A

 Watch Video Solution

47. Two identical parallel plate air capacitors are connected in series to a battery of emf V. If one of the capacitor is completely filled with dielectric material of constant K, then potential difference of the other capacitor will become

A. $\frac{K}{V(K+1)}$

B. $\frac{KV}{K+1}$

C. $\frac{K-1}{KV}$

D. $\frac{V}{K(K-1)}$

Answer:

Watch Video Solution

48. The L-C parallel resonant circuit

A. has a very high impedance

B. has a very high current

C. acts as resistance of very low value

D. has zero impedance

Answer: A

 Watch Video Solution

49. A galvanometer of resistance 30 2 is connected to a battery of emf 2 V with 1970 Q resistance in series. A full scale deflection of 20 divisions is obtained in the galvanometer. To

reduce the deflection to 10 divisions, the resistance in series required is

A. 4030Ω

B. 4000Ω

C. 3970Ω

D. 2000Ω

Answer: C

 Watch Video Solution

50. Two coherent sources P and Q produce interference at point A on the screen where there is a dark band which is formed between 4th bright band and 5th bright band. Wavelength of light used is 6000 Å. The path difference between PA and QA is

A. $104 \times 10^{-4} cm$

B. $2.7 \times 10^{-3} cm$

C. $405 \times 10^{-4} cm$

D. $6.2 \times 10^{-4} cm$

Answer: B

Watch Video Solution