



PHYSICS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

PRACTICE SET 19

Paper 1 Physics Chemistry

1. A stone of mass 1 kg tied to a string 4 m long and is rotated at constant speed of 40 m/s a vertical circle. The ratio of the tension at the top and the bottom, is ($g = 10 \text{ m/s}^2$)

A. 11 : 12

B. 39 : 41

C. 41 : 39

D. 12: 41

Answer: B



Watch Video Solution

2. A satellite of mass m revolving in a circular orbit of radius r_s around the earth of mass M has a total energy E . then, its angular momentum will be

A. $\frac{\sqrt{E}}{m_s r_s^2}$

B. $\frac{E}{2m_s r_s^2}$

C. $\sqrt{2 E m_s r_s^2}$

D. $\sqrt{2 E m_s r_s}$

Answer: C



Watch Video Solution

3. Two particles of mass m and M are initially at rest and infinitely separated from each other. Due to mutual interaction, they approach each other.

Their relative velocity of approach at a separation d between them, is

A. $\left[\frac{2 Gd}{M + m} \right]^{1/2}$

B. $\left[\frac{2 G(M + m)}{d} \right]^{1/2}$

C. $\frac{2 GM + m}{d}$

D. None of these

Answer: B



Watch Video Solution

4. The time required for the light to pass through a glass slab (refractive index=1.5) of thickness u mm is ($c=3 \times 10^8 \text{ms}^{-1}$ speed of light in free space)

A. $2 \times 10^{-5} \text{s}$

B. $2 \times 10^{11} \text{ s}$

C. $2 \times 10^{-11} \text{ s}$

D. 10^{-11} s

Answer: C

 [Watch Video Solution](#)

5. A body is executing simple harmonic motion with an angular frequency ω rad/s. The velocity of the body at 20 mm displacement, when the amplitude of motion is 60 mm, is

A. 40 mm/s

B. 60 mm/s

C. 113 mm/s

D. 120 mm/s

Answer: C



[Watch Video Solution](#)

6. The ratio of the radii of gyration of a circular disc about a tangential axis in the plane of the disc and a circular ring of the same radius about a tangential axis in the plane of the ring is

A. 2:3

B. 2:1

C. $\sqrt{5}:\sqrt{6}$

D. $1:\sqrt{2}$

Answer: C



[Watch Video Solution](#)

7. The compressibility of water is 4×10^{-5} per unit atmospheric pressure. The decrease in volume of 100 cubic centimetre of water under a pressure of 100 atmosphere will be

A. 0.4 cm^3

B. $4 \times 10^{-5} \text{ cm}^3$

C. 0.025 cm^3

D. 0.004 cm^3

Answer: A



Watch Video Solution

8. A cane filled with water is revolved in a vertical circle of radius 4 m and water just does not fall down. The time period of revolution will be –

A. 2 s

B. 4 s

C. 8 s

D. 10 s

Answer: B

 [Watch Video Solution](#)

9. 310 J of heat is required to rise the temperature of 2 moles of an ideal gas at constant pressure from $25^{\circ}C$ to $35^{\circ}C$. The amount of heat required to raise the temperature of the gas through the same range at constant volume, is

A. 384 J

B. 144 J

C. 276 J

D. 452 J

Answer: B

 [Watch Video Solution](#)

10. The pressure inside a small air bubble of radius $0.1mm$ situated just below the surface of water will be equal to

(Take surface tension of water $70 \times 10^{-3} \text{ N m}^{-1}$ and atmospheric pressure =

A. $2.054 \times 10^3 \text{ Pa}$

B. $1.027 \times 10^3 \text{ Pa}$

C. $1.027 \times 10^5 \text{ Pa}$

D. $2.054 \times 10^5 \text{ Pa}$

Answer: C



[Watch Video Solution](#)

11. An air bubble in a water tank rises from the bottom to the top. Which of the following statements are true?

A. Bubble rises upwards because pressure at the bottom is less than that at the top

B. Bubble rises upwards because pressure at the bottom is greater than that at the top

C. As the bubble rises, its size increases

D. As the bubble rises, its size decreases

Answer: B



[Watch Video Solution](#)

12. Two identical flutes produce fundamental notes of frequency 300Hz at 27°C . If the temperature of air in one flute is increased to 31°C , the number of the beats heard per second will be

A. 1

B. 2

C. 3

D. 4

Answer: B



[Watch Video Solution](#)

13. A plano-concave lens is made of glass of refractive index 1.5 and the radius of curvature of its curved face is 100 cm. What is the power of the lens?

A. +0.5 D

B. -0.5 D

C. -2 D

D. +2D

Answer: B



[Watch Video Solution](#)

14. The dimensional formula of physical quantity is $[M^a L^b T^c]$. Then that physical quantity is

A. spring constant, if $a = 1$, $b = 1$ and $c = -2$

B. surface tension, if $a = 1$, $b = 1$, and $c = -2$

C. force, if $a = 1$, $b = 1$ and $c = 2$

D. angular frequency, if $a = 0$, $b = 0$, and $c = -1$

Answer: D



Watch Video Solution

15. Before the saturation state of a diode at the plate voltages of 400 V and 200 V respectively the currents are i_1 and i_2 respectively. The ratio i_1/i_2 will be

A. $\sqrt{2}/4$

B. $2\sqrt{2}$

C. 2

D. $1/2$

Answer: C



[Watch Video Solution](#)

16. Silver has a work function of 4.7 eV. When ultraviolet light of wavelength 100 nm is incident upon it, a potential of 7.7 V is required to stop the photo electrons from reaching the collector plate. How much potential will be required to stop the photoelectrons when light of wavelength 200nm is incident upon silver?

A. 15.4 eV

B. 2.35 V

C. 3.85 V

D. 1.5V

Answer: D



[Watch Video Solution](#)

17. A particle of mass 1mg has the same wavelength as an electron moving with a velocity of $3 \times 10^6\text{ms}^{-1}$. The velocity of the particle is

A. $2.7 \times 10^{-18} \text{ m/s}$

B. $9 \times 10^{-2} \text{ m/s}$

C. $3 \times 10^{-31} \text{ m/s}$

D. $2.7 \times 10^{-21} \text{ m/s}$

Answer: A



Watch Video Solution

18. A thin rod of mass m and length $2L$ is made to rotate about an axis passing through its center and perpendicular to it. If its angular velocity changes from O to ω in time t , the torque acting on it is

A. $\frac{ml^2\omega}{12t}$

B. $\frac{ml^2\omega}{3t}$

C. $\frac{ml^2\omega}{t}$

D. $\frac{4ml^2\omega}{3t}$

Answer: B



Watch Video Solution

19. A galvanometer of resistance 50Ω is connected to a battery of $3V$ along with resistance of 2950Ω in series. A full scale deflection of 30 divisions is obtained in the galvanometer. In order to reduce this deflection to 20 division the above series resistance should be

A. 5050Ω

B. 5550Ω

C. 6050Ω

D. 4450Ω

Answer: D



Watch Video Solution

20. Unpolarised light falls on two polarizing sheets placed one on top of the other. What must be the angle between the characteristic directions of the sheets if the intensity of the final transmitted light is one-third the maximum intensity of the first transmitted beam?

A. 75°

B. 55°

C. 35°

D. 15°

Answer: B

[Watch Video Solution](#)

21. In a diode AM- detector, the output circuit consist of $R = 1k\Omega$ and $C = 10pF$. A carrier signal of $100kHz$ is to be detected. Is it good?

A. Yes

B. No

C. Information is not sufficient

D. None of the above

Answer: B

 [Watch Video Solution](#)

22. The ends of a stretched wire of length L are fixed at $x = 0$ and $x = L$. In one experiment, the displacement of the wire is $y_1 = A \sin(\pi/L) \sin \omega t$ and energy is E_1 and in another experiment its displacement is $y_2 = A \sin(2\pi x/L) \sin 2\omega t$ and energy is E_2 . Then

A. $E_2 = E_1$

B. $E_2 = 2E_1$

C. $E_2 = 4E_1$

D. $E_2 = 16E_1$

Answer: C



Watch Video Solution

23. Resistance of a given wire is obtained by measuring the current flowing in it and the voltage difference applied across it. If the percentage errors in the measurement of the current and the voltage difference are 3 % each, then error in the value of resistance of the wire is :

A. 6 %

B. zero

C. 1 %

D. 3 %

Answer: A



Watch Video Solution

24. Two tuning forks of frequencies 256Hz and 258Hz are sounded together. The time interval, between two consecutive maxima heard by an observer is

A. 2 s

B. 0.5 s

C. 250 s

D. 252 s

Answer: B



[Watch Video Solution](#)

25. A particle of mass m is projected with velocity v moving at an angle of 45° with horizontal. The magnitude of angular momentum of projectile about point of projection when particle is at maximum height, is

A. zero

B. $\frac{mvh^2}{\sqrt{2}}$

C. $\frac{mv^2h}{2}$

D. $\frac{mvh}{\sqrt{2}}$

Answer: D



Watch Video Solution

26. A stress of $3.18 \times 10^8 \text{ Nm}^{-2}$ is applied to a steel rod of length 1 m along its length, its Young's modulus is $2 \times 10^{11} \text{ Nm}^{-2}$. Then the elongation in mm produced in the rod, is

A. 3.18

B. 6.36

C. 5.18

D. 1.59

Answer: D



[Watch Video Solution](#)

27. A piece of solid weighs 120 g in air, 80 g in water and 60 g in a liquid.

The relative density of the solid and that of the liquid are respectively

A. 3,2

B. $2, \frac{3}{4}$

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

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

Answer: D



[Watch Video Solution](#)

28. If the temperature of a hot body is increased by 50 %, then the increase in the quantity of emitted heat radiation will be

A. 125 %

B. 200 %

C. 300 %

D. 400 %

Answer: D



Watch Video Solution

29. Water is moving with a speed of 5.18ms^{-1} through a pipe with a cross-sectional area of 4.20cm^2 . The water gradually descends 9.66m as the pipe increase in area to 7.60cm^2 . The speed of flow at the lower level is

A. 3.0 ms^{-1}

B. 5.7 ms^{-1}

C. 3.82 ms^{-1}

D. 2.86 ms^{-1}

Answer: D



[Watch Video Solution](#)

30. The plates of a parallel plate capacitor are charged up to 100v . Now, after removing the battery, a 2mm thick plate is inserted between the plates. Then, to maintain the same potential difference, the distance between the capacitor plates is increased by 1.6mm . The dielectric constant of the plate is .

A. 5

B. 1.25

C. 4

D. 2.5

Answer: A



[Watch Video Solution](#)

31. If a diamagnetic solution is poured into a U-tube and one arm of this U-tube placed between the poles of a strong magnet with the meniscus in a line with the field, then the level of the solution will

- A. rise
- B. fall
- C. oscillate slowly
- D. remains as such

Answer: B



[Watch Video Solution](#)

32. A sound wave of frequency v travels horizontally to right. It is reflected from a large vertical plane surface moving to the left with a speed v . The speed of sound in the medium is c , then

- A. the frequency of the reflected wave is $\frac{v(c + v)}{c - v}$

B. the wavelength of the reflected wave is $\frac{c(c-v)}{v(c-v)}$

C. the number of waves striking the surface per second is $\frac{v(c-v)}{c}$

D. the number of beats heard by a stationary listener to the left of the reflecting surface, is $\frac{v}{c-v}$

Answer: A

 [View Text Solution](#)

33. A mass (M) is suspended from a spring of negligible mass. The spring is pulled a little and then released so that the mass executes SHM of time period T . If the mass is increased by m , the time period becomes $\frac{5T}{3}$.

Then the ratio of $\frac{m}{M}$ is .

A. $\frac{3}{5}$

B. $\frac{25}{9}$

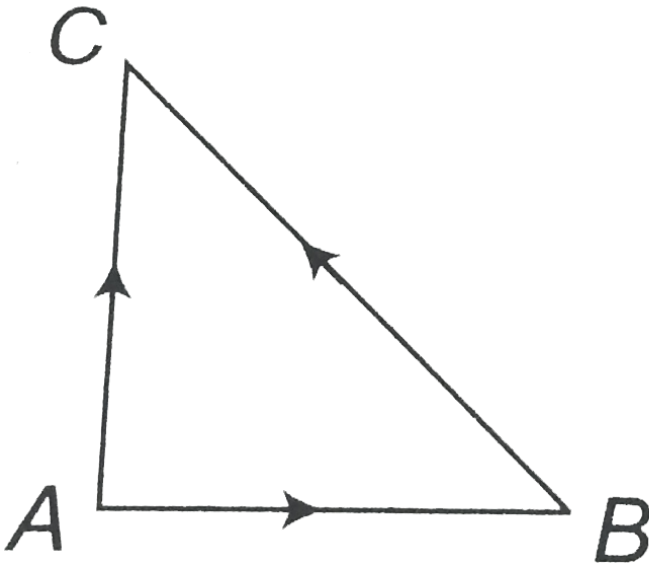
C. $\frac{16}{9}$

D. $\frac{5}{3}$

Answer: C

 Watch Video Solution

34. Three forces start acting simultaneously on a particle moving with velocity \vec{v} . These forces are represented in magnitude and direction by the three sides of a triangle ABC (as shown). The particle will now move with velocity.



A. less than v

B. greater than v

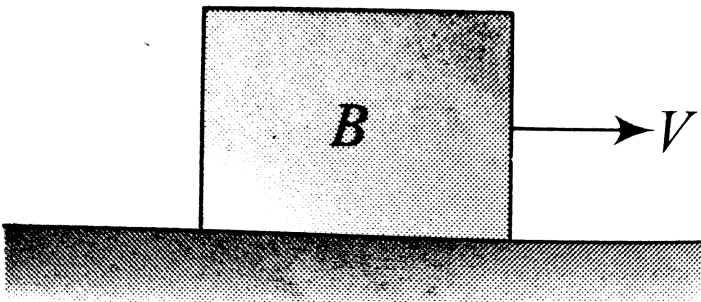
C. v in the direction of largest force BC

D. v remaining unchanged

Answer: D

 [Watch Video Solution](#)

35. A block B is pushed momentarily along a horizontal surface with an initial velocity v . If μ is the coefficient of sliding friction between B and the surface, block B will come to rest after a time:



A. $\frac{v}{g\mu}$

B. $\frac{g\mu}{v}$

C. $\frac{g}{v}$

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

Answer: A



Watch Video Solution

36. A step down transformer converts transmission line voltage from 2200 V to 220 V. Primary coil is having 5000 turns. Efficiency of transformer is 90% and output power is 8 kW. Evaluate number of turns in secondary coil and input power.

A. 5000

B. 50

C. 500

D. 5

Answer: C



Watch Video Solution

37. When connected across the terminals of a cell, a voltmeter measures 5 V and a connected ammeter measures 10 A of current. A resistance of 2 ohm s is connected across the terminals of the cell. The current flowing through this resistance will be

- A. 2.5 A
- B. 2.0 A
- C. 5.0 A
- D. 7.5 A

Answer: B

[Watch Video Solution](#)

38. The length of a simple pendulum executing simple harmonic motion is increased by 21 % . The percentage increase in the time period of the

pendulum of increased length is

- A. 11 %
- B. 21 %
- C. 42 %
- D. 10.5 %

Answer: D



[Watch Video Solution](#)

39. In Young's double slit experiment, the two slits acts as coherent sources of equal amplitude A and wavelength λ . In another experiment with the same set up the two slits are of equal amplitude A and wavelength λ but are incoherent. The ratio of the intensity of light at the mid-point of the screen in the first case to that in the second case is

- A. 1:2
- B. 2:1

C. 4:1

D. 1:1

Answer: B



Watch Video Solution

40. Let the angle between two nonzero vector \vec{A} and \vec{B} is 120° and its resultant be \vec{C} .

A. $C = |A - B|$

B. $C < |A - B|$

C. $C > |A - B|$

D. $C = |A + B|$

Answer: B



Watch Video Solution

41. Due to a force of $(6\hat{i} + 2\hat{j})N$ the displacement of a body is $(3\hat{i} - \hat{j})$

, then the work done is

A. 16 J

B. 12 J

C. 8 J

D. zero

Answer: A



[Watch Video Solution](#)

42. In Thomson experiment of finding e/m for electrons, beam of electron is replaced by that of muons (particle with same charges as of electrons but mass 208 times that of electrons). No deflection condition in this case satisfied if

A. B is increased 208 times

B. E is increased 208 times

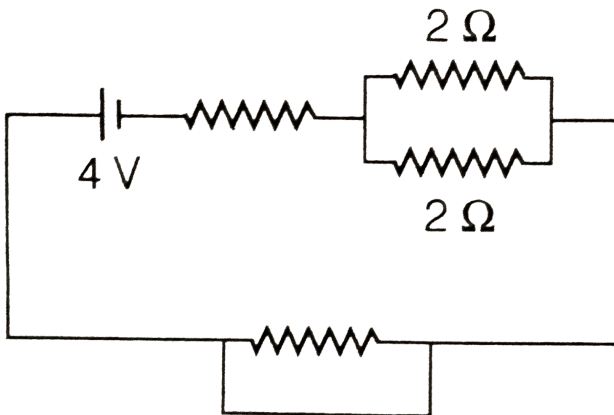
C. B is increased 14.4 times

D. None of the above

Answer: C

 [Watch Video Solution](#)

43. The current passing through the ideal ammeter in the dircuit given below is



A. 1.25 A

B. 1 A

C. 0.75 A

D. 0.5 A

Answer: D



[View Text Solution](#)

44. In a cyclotron, if a deuteron can gain an energy of 40 MeV, then a proton can gain an energy of

A. 40 MeV

B. 80 MeV

C. 20 MeV

D. 60 MeV

Answer: B



[Watch Video Solution](#)

45. An AC circuit contains a resistance of 40Ω and an inductance of 0.68 H and an alternating effective emf of 500 V at a frequency of 125 cycles/s .

Then, the current in the circuit is

A. 0.025 A

B. 0.25 A

C. 0.975 A

D. 1.5 A

Answer: C



[Watch Video Solution](#)

46. A circuit has a self inductance of 1 H and carries a current of 2 A . To prevent sparking when the circuit is switched off, a capacitor which can withstand 400 V is used. The least capacitance of the capacitor connected across the switch must be equal to

A. $50\mu F$

B. $25\mu F$

C. $100\mu F$

D. $12.5\mu F$

Answer: B



Watch Video Solution

47. If M_o is the mass of an oxygen isotope ${}_8O^{17}$, M_p and M_N are the masses of a proton and neutron respectively, the nuclear binding energy of the isotope is:

A. $(M_o - 8M_p)c^2$

B. $(M_o - 8M_p - 9M_n)c^2$

C. $M_o c^2$

D. $(M_o - 17M_n)c^2$

Answer: B



Watch Video Solution

48. A magnetic field

- A. always exerts a force on a charged particle
- B. never exerts a force on a charged particle
- C. exerts a force, if the charged particle is moving across the magnetic field lines
- D. exerts a force, if the charged particle is moving along the magnetic field lines

Answer: C



Watch Video Solution

49. A parallel plate air capacitor has a capacitance C . When it is half filled with a dielectric of dielectric constant 5, the percentage increase in the capacitance will be

- A. 400 %
- B. 66.6 %
- C. 33.3 %
- D. 200 %

Answer: B



[Watch Video Solution](#)

50. ${}_{92}\text{U}^{235}$ undergoes successive disintegrations with the end product of ${}_{82}\text{Pb}^{203}$. The number of α and β particles emitted are

- A. $\alpha = 6, \beta = 4$
- B. $\alpha = 6, \beta = 0$

C. $\alpha = 8, \beta = 6$

D. $\alpha = 3, \beta = 3$

Answer: C



Watch Video Solution