PHYSICS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

MHTCET 2011

Physics

1. A car of mass $1500kg$ is moving with a speed of $12.5ms^{-1}$ on a circular path of radius $20m$

on a level road What should be the frictional force to avoid slipping of car Calculate the cofficient of friction .

A. 0.2

B. 0.4

C. 0.6

D. 0.8`

Answer: D

Watch Video Solution

2. If the body is moving in a circle of radius r with a constant speed v , its angular velocity is

A. v^2 / r

B. vr

C. v / r

D. r/v

Answer: C

Watch Video Solution

3. A ball of mass 0.25 kg attached to the end of a string of length 1.96 m is moving in a horizontal circle. The string will break if the tension is more than 25 N . What is the maximum speed with which the ball can be moved

A. 14 m/s

B. 3 m/s

C. 3.92 m/s

D. 5 m/s

Answer: A

Watch Video Solution

4. A sphere is suspended by a thread of length l. What minimum horizontal velocity has to be imparted the ball for it to reach the height of the suspension?

A. gl

B. 2 gl

C. $\sqrt{gl}$

D. $\sqrt{2gl}$

Answer: B

Watch Video Solution

5. Which of the following is the evidence th show that there must be a force acting on earth and directed towards the sun ?

A. Deviation of the falling bodies towards east

B. Revolution of the earth round the sun

C. Phenonmenon of day and night

D. Apparent motion of sun round the earth

Answer: D

View Text Solution

6. If the density of a small planet is the same as that of earth while the radius of the planet is 0.2 times that of the earth the gravitational on the surface of that planet is :

A. 0.2 g

B. 0.4 g

C. 2g

D. 4g

Answer: A

 Watch Video Solution

7. The mass of the earth is 81 times that of the moon and the radius of the earth is 3.5 times that of the moon. The ratio of the escape

velocity on the surface of earth to that on the surface of moon will be

A. 0.2

B. 2.57

C. 4.81

D. 0.39

Answer: C

 Watch Video Solution

8. A wheel has a speed of 1200 revolution per minute and is made to slow down at a rate of $4rad/s^2$. The number of revolutions it makes before coming to rest is

A. 143

B. 272

C. 314

D. 722

Answer: C

Watch Video Solution

Watch video solution

9. A circular disc is to be made by using iron and aluminium, so that it acquires maximum moment of inertia about its geometrical axis. It is possible with

A. iron and aluminium layers in alternate order

B. aluminium at interior and iron surrounding it

C. iron at interior and aluminium surrounding it

D. Either (a) or (c)

Answer: B

 Watch Video Solution

10. A particle executes a simple harmonic motion of time period T. Find the time taken by the particle to go directly from its mean position to half the amplitude.

A. T/2

B. T/4

C. T/8

D. T12

Answer: D

Watch Video Solution

11. Two springs have their force constants K_1 and K_2 and they are stretched to the same extension. If $K_2 > K_1$ work done is

A. more is spring A

B. more in speing B

C. equal in both

D. nothing can be said

Answer: A

 Watch Video Solution

12. In the production of beats by two waves of same amplitude and nearly same frequency,

the maximum intensity to each of the constituent waves is

A. same

B. 2 times

C. 4 times

D. 8 times

Answer: C

Watch Video Solution

13. If 'S' is stress and 'Y' is young's modulus of material of a wire, the energy stored in the wire per unit volume is

A. $\frac{1}{2}\frac{S}{y}$

B. $\frac{S^2}{Y}$

C. $\frac{1}{2}\frac{S}{Y^2}$

D. $\frac{1}{2}\frac{S^2}{Y^2}$

Answer: B

Watch Video Solution

14. The load versus elongation graph for four wires of the same materials shown in the figure. The thinnest wire it represented by the line

A. OC

B. OD

C. OA

D. OB

Answer: D

View Text Solution

15. Two wires A and B are of same material. Their lengths are in the ratio 1:2 and diameters are in the ratio 2:1 when stretched by force F_A and F_B respectively they get equal increase in their lengths. Then the ratio $\frac{F_A}{F_B}$ should be

A. $1:2$

B. $1:2$

C. $2:1$

D. $8:1$

Answer: B

 Watch Video Solution

16. The radius R of the soap bubble is doubled under isothermal condition. If T be the surface tension of soap bubble. The work done in doing so it given by

A. $32\pi R^2 T$

B. $24\pi R^2 T$

C. $8\pi R^2 T$

D. $4\pi R^2 T$

Answer: A

Watch Video Solution

17. Bernoulli's equation is conservation of

A. energy

B. momentum

C. angular momentum

D. mass

Answer: A

Watch Video Solution

18. The equation of a sound wave is $y = 0.0015 \sin(62.4x + 316t)$ the wavelength of this wave is

A. 0.2 unit

B. 0.1 unit

C. 0.3 unit

D. None of these

Answer: B

Watch Video Solution

19. For the stationary wave $y = 4\sin\left(\frac{\pi x}{15}\right)\cos(96\pi t)$, the distance between a node and the next antinode is

A. 7.5

B. 15

C. 22.5

D. 30

Answer: A

Watch Video Solution

20. If the temperature increases, then what happens to the frequency of the sound produced by the organ pipe ?

A. unchanged

B. decreases

C. increases

D. not definite

Answer: C

Watch Video Solution

21. In a resonance tube the first resonance with a tuning fork occurs at 16 cm and second

at 49 cm . If the velocity of sound is 330 m/s , the frequency of tuning fork is

A. 500

B. 300

C. 330

D. 165

Answer: A

Watch Video Solution

22. A gas is compressed at constant temperature. Its molecules gain

A. speed

B. kinetic energy

C. internal energy

D. None of these

Answer: D

Watch Video Solution

23. A vessel is filled with an ideal gas at a pressure of 10 atmospheres and temp 27^0C. Half of the mass of the gas is removed from the vessel the temperature of the remaining gas is increased to 87^0C. Then the pressure of the gas in the vessel will be

A. 5 atm

B. 6 atm

C. 7 atm

D. 8 atm

Answer: B

Watch Video Solution

24. We consider the radition emitted by the human body which of the following statements is true?

A. The radition is emitted only furing the day.

B. The radiation is emitted during the summers and absorbed during the

winters.

C. The radiation emitted lies in the ultraviolet region and hence is not visible.

D. The radition emitted is in the infrared region.

Answer: D

Watch Video Solution

25. A black body at a temperature of $227^\circ C$ radiates heat energy at the rate of 5 cal/cm^2-sec. At a temperature of $727^\circ C$, the rate of heat radiated per unit area in cal/cm^2-sec will be

A. 80

B. 160

C. 250

D. 500

Answer: A

Watch Video Solution

26. The tourmaline crystal

A. absorbs ordinary light and transmits extra ordinary

B. absorbs extra ordinary light and tranmits ordinary light

C. both absorbs ordinary and extra ordinary light

D. both trnsmits ordinary light and extra ordinary light

Answer: A

Watch Video Solution

27. A glass slab of thickness $4cm$ contains the same number of waves as $5cm$ of water, when both are traversed by the same monochromatic light. If the refractive index of water is $4/3,$ then refractive index of glass is

A. $5/3$

B. $5/4$

C. $16/15$

D. $3/2$

Answer: A

Watch Video Solution

28. In a sim,le slit differection pattern intensisty and width of fringes are

A. unequal width

B. equal width

C. equal width and equal intensity

D. unequal width and unequal intensity

Answer: D

 Watch Video Solution

29. In Young's double slit experiment, if the slit widths are in the ratio $1:9$, then the ratio of

the intensity at minima to that at maxima will be

A. 1

B. $1/9$

C. $1/4$

D. $1/3$

Answer: C

Watch Video Solution

30. A plane wave front of wavelength λ is incident on a single slite of width b. What is the angular width for secondary maximum ?

A. $\frac{\lambda}{db}$

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

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

D. $\frac{b}{\lambda}$

Answer: B

Watch Video Solution

31. Three particles, each having a charge of $10\mu C$ are placed at the coners of an equilateral triangle of side $10cm$. The electrostatic potential energy of the system is (Given $\frac{1}{4\pi\varepsilon_0} = 9 \times 10^9 N - m^2 / C^2$)

A. Zero

B. ∞

C. 27 J

D. 100 J

Answer: C

Watch Video Solution

32. Energy per unit volume for a capacitor having area A and separation d kept at potential diffeence V is given by : -

A. $\frac{1}{2}\varepsilon_0 \frac{V^2}{d^2}$

B. $\frac{1}{2\varepsilon_0} \frac{V^2}{d^2}$

C. $\frac{1}{2}CV^2$

D. $\frac{Q^2}{2C}$

Answer: A

Watch Video Solution

33. If the distance between the plates of a parallel plate capacitor of capacity of μF is doubled, then new capacity will be

A. $5\mu F$

B. `2

C. 0 muF`

D. $10\mu F$

Answer: A

Watch Video Solution

34. If the temperature of cold junction of thermocouple is lowered, then the neutral temperature

A. increases

B. decreases

C. remains same

D. may increases of may decreases

Answer: C

Watch Video Solution

35. What is the maximum power output than can be obtained from a cell of emf E and internal resistance r?

A. $2E^2/r$

B. $E^2/2r$

C. $E^2/4r$

D. None of these

Answer: C

Watch Video Solution

36. A voltmeter of range 3 V and resistance 200Ω connot be converted to an ammeter of range

A. 10 mA

B. 100 mA

C. $1A$

D. $10A$

Answer: B

Watch Video Solution

37. Two circular coils P and Q are made from similar wire but radius of Q is twice that of P. Relation between the values of potential difference across them so that the magnetic induction at their centers may be the same is

A. $V_q - 2V_p$

B. $V_q = 3V_p$

C. $V_q = 4V_p$

D. $V_q = \frac{1}{4}V_p$

Answer: C

Watch Video Solution

38. A current passing through a circular coil of two turns produces a magnetic field B as its centr. The coil is then rewound so as to have four turns and the same current is passed through it. The magnetic field at its centre now is

A. 2B

B. $B/2$

C. $B/4$

D. 4B

Answer: A

Watch Video Solution

39. A long stratight conductor is bent into shape as shown. If it carries 1 A and its radius is R, then magnetic field B at the centre of

circular coil

A. ∞

B. Zero

C. $\frac{\mu_0(\pi-1)}{2\pi R}$

D. $\frac{\mu_0 i(\pi-1)}{2\pi R}$

Answer: D

View Text Solution

40. What will be the self inductance of a coid of 100 turns if a current of 5 A produces a magnetic flux 5×10^{-5} Wb?

A. 1 mH

B. 10 mH

C. $1\mu H$

D. $10\mu H$

Answer: A

Watch Video Solution

41. In `L-C-R circuit powr factor at resonance is

A. less than one

B. greater than one

C. unity

D. Can't predicted

Answer: C

 Watch Video Solution

42. In a LR circuit of 3 mH dinductance and 4Ω resistance, emf $E = 4\cos 1000t$ volt is applied. The amplitude of current is

A. $0.8Å$

B. $\frac{4}{7}Å$

C. $1.0Å$

D. $\frac{4}{\sqrt{7}}Å$

Answer: A

Watch Video Solution

43. The ratio of moment of an electron and an α-particle which are accelerated from rest by a potential difference of $100V$ is

A. 1

B. $\sqrt{\frac{2m_2}{m\alpha}}$

C. $\sqrt{\frac{m_e}{m\alpha}}$

D. $\sqrt{\frac{m_e}{2m_\alpha}}$

Answer: D

Watch Video Solution

44. When the kinetic energy of an electron is increased , the wavelength of the associated wave will

A. increase

B. decrease

C. wavelength does not depends upon kinetic energy

D. None of the above

Answer: B

Watch Video Solution

45. Orbital acceleration of electron is

A. $\frac{n^2h^2}{4\pi^2m^2r^2}$

B. $\frac{n^2h^2}{2n^2r^3}$

C. $\frac{4n^2h^2}{\pi^2m^2r^3}$

D. $\frac{4n^2h^2}{4\pi^2m^2r^3}$

Answer: A

Watch Video Solution

46. As par Bohr model, the minimum energy (in eV) required to remove an electron from the ground state of doubly ionized Li atom $(Z = 3)$ is

A. 1.51

B. 13.6

C. 40.8

D. 122.4

Answer: D

Watch Video Solution

47. An electron moves in Bohr's orbit. The magnetic field at the centre is proportional to

A. n^{-5}

B. n^{-3}

C. n^{-4}

D. n^{-2}

Answer: A

View Text Solution

48. In revers bias pn-junction diode depletion layer width

A. decreases

B. increases

C. remain same

D. Cnt't predicted

Answer: B

Watch Video Solution

49. To use a transistor as an amplifier

A. the emitter base junction is forward based and the base collector junction is reverse biased

B. no bias voltage are required

C. both junctions are forward biased

D. both junctions are reverse biased

Answer: A

 Watch Video Solution

50. Which of the following is the communication channel in case of radio communication ?

A. Transmission lines

B. Reception lines

C. Free space

D. None of the above

Answer: C

Watch Video Solution