

MHT-CET Practice Question Paper

Subject : Physics

Time: 45 minutes

Test no : 04

Marks : 100

All the questions are compulsory and contain two marks for each

- The angle between velocity and acceleration of a particle describing uniform circular motion is
a) 180° b) 90°
c) 45° d) 60°
- In vertical circular motion, the ratio of kinetic energy of a particle at highest point to that at lowest point is
a) 2 b) 5
c) 0.2 d) 0.5
- The M.I of a uniform disc about the diameter is I . Its M.I about an axis perpendicular to its plane and passing through a point on its rim is
a) $4I$ b) $5I$
c) $6I$ d) I
- If a hollow cylinder and a solid cylinder are allowed to roll down an inclined plane, which will take more time to reach the bottom?
a) Hollow cylinder
b) Solid cylinder
c) Same for both
d) One whose density is more
- Work done in increasing the size of a soap bubble from a radius of 3 cm to 5 cm is nearly. (surface tension of soap solution = 0.03 Nm^{-1})
a) $4\pi \text{ mJ}$ b) $0.2\pi \text{ mJ}$
c) $2\pi \text{ mJ}$ d) $0.4\pi \text{ mJ}$
- In a capillary tube having area of cross-section 'A', water rises to a height 'h'. If cross-sectional area is reduced to 'A'/9, the rise of water in the capillary tube is
a) $4h$ b) $3h$
c) $2h$ d) h
- Two solid spheres of same metal but of mass M and $8M$ fall simultaneously on a viscous liquid and their terminal velocities are v and nv , then value of n is
a) 16 b) 8
c) 4 d) 2
- Temperature of an ideal gas, initially at 27°C , is raised by 6°C . The rms velocity of the gas molecules will,
a) increase by nearly 2%
b) decrease by nearly 2%
c) increase by nearly 1%
d) decrease by nearly 1%
- The mean energy of a molecule of an ideal gas is
a) $1/2KT$ b) $2KT$
c) KT d) $3/2KT$
- The colour of a star depends upon its
a) density
b) distance from the sun
c) radius
d) surface temperature
- An ideal gas A and a real gas B have their volumes increased from V to $2V$ under isothermal conditions. The increase in internal energy
a) will be same in both A and B
b) will be zero in both the cases
c) of B will be more than that of A
d) of A will be more than that of B
- A carnot engine takes 300 calories of heat from a source at 500 K and rejects 150 calories of heat to the sink. The temperature of the sink is
a) 125 K b) 250 K
c) 750 K d) 1000 K
- A diatomic gas undergoes same change of temperature by two different processes
(i) at constant volume and
(ii) at constant pressure.

The heat supplied in the two cases will be in the ratio of

- a) 1 : 1 b) 3 : 5
c) 5 : 7 d) 7 : 5
14. A particle vibrating simple harmonically has an acceleration of 16 cms^{-2} when it is at a distance of 4 cm from the mean position. Its time period is
a) 1s b) 2.572s
c) 3.142s d) 6.028s
15. If the displacement (x) and velocity (v) of a particle executing simple harmonic motion are related through the expression $4v^2 = 25 - x^2$, then its time period is given by
a) π b) 2π
c) 4π d) 6π
16. A particle moves in x – y plane according to rule, $x = a \sin \omega t$. The particle follows
a) an elliptical path
b) a circular path
c) a parabolic path
d) a straight line path inclined equally to x and y – axis.
17. A simple harmonic progressive wave is represented by $y = A \sin (100 \pi t + 3x)$. The distance between two points on the wave at a phase difference of $\pi/3$ radian is
a) $\pi/18\text{m}$ b) $\pi/9\text{m}$
c) $\pi/3\text{m}$ d) $\pi/6\text{m}$
18. An open and closed organ pipe have the same length. The ratio of 'p'th mode of frequency of vibration of air in two pipes is
a) $p(2p + 1)$ b) $2p/2p-1$
c) p d) 1
19. If the end correction of an open pipe is 0.8 cm, then which of the following statements is not true?
a) Open end will be antinode
b) Odd harmonics of the fundamental frequency will be generated.
c) All harmonics of the fundamental frequency will be generated
d) Pressure change will be maximum at both ends.
20. If Young's double slit experiment is done with white light, which of the following statements will be true?
a) All the bright fringes will be coloured

- b) All the bright fringes will be white
c) The central fringe will be white
d) No stable interference pattern will be visible.

21. Light is incident at an angle i on glass slab. The reflected rays completely polarised. The angle of refraction is
a) $90 - i$ b) $180 - i$
c) $90 + i$ d) i
22. For the same angle of incidence, the angles of refraction in media 'P', 'Q', 'R', and 'S' are 50° , 40° , 30° , 20° respectively. The speed of light is minimum in medium
a) P b) Q c) R d) S
23. A system of two charges separated by a certain distance apart stores electrical potential energy. If the distance between them is increased, the potential energy of the system,
a) may increase or decrease
b) increase in any case
c) remains the same
d) decreases in any case
24. The unit of intensity of polarization is _____.
a) m^2/C b) C^2/m
c) C^2/m^2 d) C/m^2
25. The difference in the effective capacity of two similar capacitors when joined in series and then in parallel is $6 \mu\text{F}$. The capacity of each capacitor is
a) $2 \mu\text{F}$ b) $4 \mu\text{F}$
c) $8 \mu\text{F}$ d) $16 \mu\text{F}$
26. Eight drops of mercury of equal radii and possessing equal charges combine to form a big drop. The capacitance of bigger drop as compared to capacitance of each individual drop is
a) 16 times b) 8 times
c) 2 times d) 32 times
27. In a metre bridge experiment, when a nichrome wire is in the right gap, the balancing length is 60 cm. When the nichrome wire is uniformly stretched to increase its length by 20% and again connected in the right gap balancing length

- is nearly
 a) 61 cm b) 31 cm
 c) 51 cm d) 41 cm
28. Voltmeter cannot be used to measure emf of a cell but potentiometer can be used to measure emf of a cell because
 a) potentiometer does not draw current from a cell.
 b) potentiometer draws current from a cell.
 c) voltmeter does not draw current from a cell.
 d) voltmeter is portable and compact.
29. A galvanometer of resistance $50\ \Omega$ giving full scale deflection for a current of 10 milliampere is to be changed into a voltmeter of range 100 V.
 A resistance of $_____\Omega$ has to be connected in series with the galvanometer.
 a) 9950 b) 10025
 c) 10000 d) 9975
30. In a cyclotron of charged particle
 a) speeds up in dee.
 b) undergoes acceleration all the time.
 c) slows down within a dee and speeds up between dees.
 d) speeds up between the dees because of the magnetic field.
31. It in a moving coil galvanometer, current I produces a deflection θ , then
 a) $I \propto \tan \theta$ b) $I \propto \theta$
 c) $I \propto \theta^2$ d) $I \propto \sqrt{\theta}$
32. A current loop in a magnetic field
 a) experiences of torque whether the field is uniform or non uniform in all orientations
 b) can be in equilibrium in one orientation
 c) can be in equilibrium in two orientations, both the equilibrium states are unstable.
 d) can be in equilibrium in two orientations one state while the other is unstable.
33. The period of oscillation of a thin magnet at a place is T . When it is stretched to double its length and its pole strength is reduced to $\frac{1}{4}$ of its initial value, then its period of oscillation is
 a) $2T$ b) $\sqrt{2}T$
 c) $T/2\sqrt{2}$ d) $2\sqrt{2}T$
34. Relative permeability of iron is 5500, then its magnetic susceptibility will be
 a) 5500×10^7 b) 5500×10^{-7}
 c) 5501 d) 5499
35. Of the following, paramagnetic substance is
 a) Iron b) Aluminium
 c) Nickel d) Copper
36. In which of the following devices, the eddy current effect is not used?
 a) electromagnet
 b) electric heater
 c) induction furnace
 d) magnetic braking in train
37. Consider of solenoid carrying supplied by a source with a constant emf containing iron core inside it. When the core is pulled out of the solenoid, the change in current will
 a) remain same b) decrease
 c) increase d) modulate
38. The output power in set up transformer used in practice is _____.
 a) greater than the input power
 b) equal to the input power
 c) less than the input power
 d) none of these
39. The average power dissipated in pure inductor is
 a) $VI^2/4$ b) $\frac{1}{2} VI$
 c) zero d) VI^2
40. In an AC circuit, current is 3A and voltage 210 V and power is 63 W. The power factor is
 a) 0.11 b) 0.09
 c) 0.08 d) 0.10
41. The yellow C parallel resonant circuit
 a) has a very high impedance
 b) has a very high current
 c) act as resistance of very low value
 d) has a zero impedance
42. In photoelectric experiment, if both the intensity and frequency of the incident light are doubled, then the saturation photoelectric current
 a) remains constant.
 b) is halved.
 c) is doubled.

- d) becomes four times.
43. The energy of the em waves is of the order of 50 keV. To which part of the spectrum does it belong?
- a) γ - rays b) X - rays
c) Infra – red rays d) Ultraviolet rays
44. Find the de-Broglie wavelength of an electron with kinetic energy of 120 eV.
- a) 112 pm b) 95 pm
c) 124 pm d) 102 pm
45. Which particles were used in Geiger-Marsden experiment?
- a) β - particles b) α - particles
c) γ - particles d) positrons
46. According to the classical theory, the Rutherford atom was
- a) stable b) unstable
c) semistable d) meta-stable
47. The number of de-Broglie wavelength contained in the second Bohr orbit of Hydrogen atom is
- a) 1 b) 2
c) 3 d) 4
48. To obtain full wave rectification, we require
- a) only one diode
b) triode
c) two diodes
d) transistor
49. Which gate can be obtained by shorting both the input terminals of a NOR gate.
- a) OR b) AND
c) NOT d) NAND
50. Which of the following is NOT an application of photodiode?
- a) Detection of optical signal
b) Object counters
c) Optocouplers
d) Data profiling