



# PHYSICS

## BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

### MHTCET 2007

#### Physics

1. A 500 kg car takes a round turn of radius 50 m with a velocity of 36 km/hr . The centripetal

force is

A. 250N

B. 750N

C. 1000N

D. 1200N

**Answer: C**



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2. The acceleration due to gravity on the planet  $A$  is 9 times the acceleration due to gravity on planet  $B$ . A man jumps to a height of  $2m$  on the surface of  $A$ . What is the height of jump by the same person on the planet  $B$  ?

A. 6m

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

C.  $2/9m$

D. 18m

**Answer: D**



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3. A rubber ball is dropped from a height of  $5m$  on a plane, where the acceleration due to gravity is not shown. On bouncing it rises to  $1.8m$ . The ball loses its velocity on bouncing by a factor of

A.  $\frac{16}{25}$

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

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

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

**Answer: B**



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4. The potential energy of a simple harmonic oscillator when the particle is half way to its end point is

(where,  $E$  is the total energy)

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

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

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

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

**Answer: A**



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5. The moment of inertia of a uniform circular disc of radius  $R$  and mass  $M$  about an axis passing from the edge of the disc and normal to the disc is.

A.  $MR^2$

B.  $\frac{2}{5}MR^2$

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

D.  $\frac{1}{2}MR^2$

**Answer: C**



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6. In SHM restoring force is  $F = -kx$ , where  $k$  is force constant,  $x$  is displacement and  $a$  is

amplitude of motion, then total energy depends upon

A.  $K, A$  and  $M$

B.  $k, x, M$

C.  $k, A$

D.  $k, x$

**Answer: C**



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7. A couple produces.

A. no motion

B. linear and rotational motion

C. purely rotational motion

D. purely linear motion

**Answer: C**



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8. According to Hooke's law of elasticity, if stress is increased, the ratio of stress to strain

A. becomes zero

B. remains constant

C. decreases

D. increases

**Answer: B**



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9. If in a wire of Young's modulus  $Y$ , longitudinal strain  $X$  is produced then the potential energy stored in its unit volume will be:

A.  $0.5YX^2$

B.  $0.5Y^2X$

C.  $2YX^2$

D.  $YX^2$

**Answer: A**



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10. Two drops of equal radius coalesce to form a bigger drop. What is ratio of surface energy of bigger drop to smaller one?

A.  $2^{1/2} : 1$

B.  $1 : 1$

C.  $2^{2/3} : 1$

D. None of these

**Answer: C**



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11. The gases carbon-monoxide (CO) and nitrogen at the same temperature have kinetic energies  $E_1$  and  $E_2$  respectively. Then

A.  $E_1 = E_2$

B.  $E_1 > E_2$

C.  $E_1 < E_2$

D.  $E_1$  and  $E_2$  cannot be compared

**Answer: A**



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12. We consider a thermodynamic system. If  $\Delta U$  represents the increase in its internal energy and  $W$  the work done by the system, which of the following statements is true?

A.  $\Delta U = -W$  is an adiabatic process

B.  $\Delta U = W$  in an isothermal process

C.  $\Delta U = -W$  in an isothermal process

D.  $\Delta U = W$  in an adiabatic process

**Answer: A**



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**13.** The sound waves after being converted into electrical waves are not transmitted as such because-

A. they are absorbed by the atmosphere

B. they have constant frequency

C. the height of antenna required should be very high

D. velocity of sound waves is very less

**Answer: A**



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**14.** An open U-tube contains mercury. When 11.2 cm of water is poured into one of the arms of the tube, how high does the mercury rise in the other arm from its initial level?

A. 0.56 cm



B. 1.35 cm

C. 0.41 cm

D. 2.32 cm

**Answer: C**



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**15.** The displacement equation of a simple harmonic oscillator is given by

$$y = A \sin \omega t - B \cos \omega t$$

The amplitude of the oscillator will be

A.  $A-B$

B.  $A+B$

C.  $\sqrt{A^2 + B^2}$

D.  $(A^2 + B^2)$

**Answer: C**



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**16.** The gas having average speed four times as that of  $SO_2$  (molecular mass 64) is

A. He (molecular mass 4)

B.  $O_2$  (molecular mass 32)

C.  $H_2$  (molecular mass 2)

D.  $CH_4$  (molecular mass 16)

**Answer: A**



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17. If a source emitting waves of frequency  $f$  moves towards an observer with a velocity  $\frac{v}{4}$  and the observer moves away from the source

with a velocity  $\frac{v}{6}$ , the apparent frequency as heard by the observer will be ( $v$ =velocity of sound)

A.  $\frac{14}{15} f$

B.  $\frac{14}{9} f$

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

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

**Answer: C**



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18. If young's double slit experiment is performed in water

- A. the fringe width will decrease
- B. the fringe width will increase
- C. the fringe width will remain unchanged
- D. there will be no change

**Answer: A**



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19. At a point on the right bisector of a magnetic dipole the magnetic

A. potential varies as  $\frac{1}{r^2}$

B. potential is zero at all points on the right bisector

C. field varies as  $r^2$

D. field is perpendicular to the axis of dipole

**Answer: A**



20. In an adiabatic change, the pressure and temperature of a monoatomic gas are related with relation as  $P \propto T^C$ , Where  $C$  is equal to:

A.  $\frac{5}{4}$

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

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

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

**Answer: C**



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21. A pulse of a wave train travels along a stretched string and reaches the fixed end of the string. It will be reflected back with

A. a phase change of  $180^\circ$  with velocity reversed

B. the same phase as the incident pulse with no reversal of velocity



C. a phase change of  $180^\circ$  with no reversal  
of velocity

D. the same phase as the incident pulse  
but with velocity reversed

**Answer: C**



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**22.** The thermal conductivity of a rod is 2.  
What is its thermal-resistivity ?

A. 0.5

B. 1

C. 0.25

D. 2

**Answer: A**



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**23.** Two plane mirrors are perpendicular to each other. A ray after suffering reflection from the two mirror will be

A. perpendicular to the original ray

B. parallel to the original ray

C. parallel to the first mirror

D. at  $45^\circ$  to the original ray

**Answer: B**



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**24.** In diode, when there is saturation current, the plate resistance ( $r_p$ ) is

A. data insufficient

B. zero

C. some finite quantity

D. infinite quantity

**Answer: D**



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**25.** We consider the radiation emitted by the human body which of the following statements is true?

A. The radiation is emitted during the summers and absorbed during the winters

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

C. The radiation emitted is in the infrared region

D. The radiation is emitted only during the day

**Answer: C**



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**26.** A boat at anchor is rocked by waves whose crests are  $100m$  apart and whose speed is  $25m/s$ . These waves reach the boat once every :

A. 2500s

B. 75s

C. 4s

D. 0.25s

**Answer: C**



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**27.** In a double slit experiment, the distance between slits is increased 10 times whereas their distance from screen is halved, then what is the fringe width?

A. It remains same

B. Becomes  $\frac{1}{20}$

C. Becomes  $\frac{1}{10}$

D. Becomes  $\frac{1}{90}$

**Answer: C**



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**28.** Which one of the following processes depends

A. Conduction



B. Convection

C. Radiation

D. None of these

**Answer: B**



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**29.** If a magnetic substance is kept in a magnetic field, then which of the following is thrown out?

A. Paramagnetic

B. Ferromagnetic

C. Diamagnetic

D. Antiferromagnetic

**Answer: C**



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**30.** Which of the following phenomena exhibits particle nature of light ?

A. Interference

B. Diffraction

C. Polarisation

D. Photoelectric effect

**Answer: D**



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**31.** A standing wave having 3 nodes and 2 antinodes is formed between two atoms

having a distance  $1.21\text{\AA}$  between them. The wavelength of the standing wave is

A.  $1.21\text{\AA}$

B.  $1.42\text{\AA}$

C.  $6.05\text{\AA}$

D.  $3.63\text{\AA}$

**Answer: A**



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32. Fleming 's left and right hand rule are used

in

A. DC motor and AC generator

B. DC generator and AC motor

C. DC motor and DC generator

D. both rules are same, any one can be

used

**Answer: C**



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**33.** A charge  $Q$  is situated at the corner of a cube the electric flux passed through all the six faces of the cube is :

A.  $\frac{q}{\epsilon_0}$

B.  $\frac{q}{(3\epsilon_0)}$

C.  $\frac{q}{(6\epsilon_0)}$

D.  $\frac{q}{8\epsilon_0}$

**Answer: D**



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34. Potentiometer measures the potential difference more accurately than a voltmeter, because

A. it has a wire of high resistance

B. it has a wire of low resistance

C. it does not draw current from external  
circuit

D. it draws a heavy current from external  
circuit

**Answer: C**



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**35. Tangent Galvanometer**

A. capacitance

B. current

C. resistance

D. potential difference

**Answer: B**





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36. In bringing an electron towards another electron, the electrostatic potential energy of the system

- A. decreases
- B. increases
- C. remains same
- D. becomes zero

**Answer: B**



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37. A parallel plate condenser with oil (dielectric constant 2) between the plates has capacitance  $C$ . If oil is removed, the capacitance of capacitor becomes

A.  $\sqrt{2}C$

B.  $2C$

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

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

**Answer: D**



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**38.** As the intensity of incident light increases

A. photo-current increases

B. photo-current decreases

C. kinetic energy of emitted photoelectrons  
increases

D. kinetic energy of emitted photoelectrons

decreases

**Answer: A**



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**39.** The cell has an emf of 2 V and the internal resistance of this cell is  $0.1\Omega$ , it is connected to resistance of  $3.9\Omega$ , the voltage across the cell will be

A. 1.95V

B. 1.5V

C. 2V

D. 1.8V

**Answer: A**



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**40.** If a full wave rectifier circuit is operating from 50 Hz mains, the fundamental frequency in the ripple will be

A. 70.7 Hz

B. 100Hz

C. 25 Hz

D. 59Hz

**Answer: B**



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**41.** When exposed to sunlight, thin films of oil on water often exhibit brilliant colours due to the phenomenon of

A. interference

B. diffraction

C. dispersion

D. polarisation

**Answer: A**



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**42.** An electron is travelling along the  $x$ -direction. It encounters magnetic field in the  $y$ -direction. Its subsequent motion will be

A. straight line along the  $xz$ -direction

B. a circle in the  $xz$ -plane

C. a circle in the  $yz$ -plane

D. a circle in the  $xy$ -plane

**Answer: D**



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**43.** If coil is open then  $L$  and  $R$  become

A.  $\infty, 0$



B. 0,  $\infty$

C.  $\infty$ ,  $\infty$

D. 0, 0

**Answer: B**



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**44.** In a circuit, the current lags behind the voltage by a phase difference of  $\pi/2$ , the circuit will contain which of the following ?

A. Only R

B. Only C

C. R and C

D. Only L

**Answer: D**



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**45.** The momentum of a photon of energy 1 MeV in kg-m/s, will be

A.  $0.33 \times 10^6$

B.  $7 \times 10^{-24}$

C.  $10^{-22}$

D.  $5 \times 10^{-22}$

**Answer: D**



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**46.** A photoelectric cell is illuminated by a point source of light 1 m away. When the source is shifted to 2 m then

A. each emitted electron carries half the initial energy

B. number of electrons emitted is a quarter of the initial number

C. each emitted electron carries one quarter of the initial energy

D. number of electrons emitted is half the initial number

**Answer: B**



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47.  $m_p$  and  $m_n$  are masses of proton and neutron respectively. An element of mass  $M$  has  $Z$  protons and  $N$  neutrons then

A.  $M > Zm_p + Nm_n$

B.  $M = Zm_p + Nm_n$

C.  $M < Zm_p + Nm_n$

D.  $M$  may be greater than less than or equal to  $Zm_p + Nm_n$  depending on nature of

**Answer: C**



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**48.** Barrier potential of a p-n junction diode does not depend on

- A. forward bias
- B. doping density
- C. diode design
- D. temperature

**Answer: C**



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**49.** In a radioactive material the activity at time  $t_1$  is  $R_1$  and at a later time  $t_2$ , it is  $R_2$ . If the decay constant of the material is  $\lambda$ , then

A.  $R_1 = R_2 e^{-\lambda(t_1 - t_2)}$

B.  $R_1 = R_2 e^{\lambda(t_1 - t_2)}$

C.  $R_1 = R_2(t_2/t_1)$

D.  $R_1 = R_2$

**Answer: A**



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50. Ionization potential of hydrogen atom is 13.6 eV. Hydrogen atoms in the ground state are excited by monochromatic radiation of photon energy 12.1 eV. According to Bohr's theory, the spectral lines emitted by hydrogen will be

A. two



B. three

C. four

D. one

**Answer: B**



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