



PHYSICS

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

MHTCET 2012

Physics

1. Which of the following is not an electromagnetic wave?

A. Light rays

B. X - rays

C. Alpha rays

D. Gamma rays

Answer: C



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2. Electromagnetic waves of wavelength ranging from 100 \AA to 400 \AA comes under

A. X -rays

B. visible region

C. UV region

D. infrared region

Answer: C



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3. Electromagnetic theory suggests that the light consists of

A. magnetic vector only

B. electric vector only

C. electric and magnetic vectors

perpendicular to each other

D. parallel electric and magnetic vector

Answer: C



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4. The frequency of radio waves corresponding to a wavelength of 10 m is

A. 3×10^7 Hz

B. 3.3×10^8 Hz

C. 3×10^9 Hz

D. 3×10^{-7} Hz

Answer: A



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5. The electromagnetic waves travel in free space with the velocity of

A. sound

B. light

C. greater than that of light

D. greater than that of sound

Answer: B



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6. The existence of electromagnetic waves were experimentally confirmed by

A. Maxwell

B. Faraday

C. Hertz

D. Tesla

Answer: C



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7. The back emf in a DC motor is maximum when,

A. the motor has picked up maximum speed

B. the motor has just started moving

C. the speed of motor is still on increase

D. the motor has just been switched off

Answer: A



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8. AC measuring instruments measures

- A. peak value
- B. Average value
- C. any value
- D. RMS value

Answer: D



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9. The Q - factor of a resonant circuit is equal to

A. $\frac{1}{L} \sqrt{\frac{R}{C}}$

B. $\frac{1}{R} \sqrt{\frac{L}{C}}$

C. $\frac{1}{RL} \sqrt{C}$

D. $\frac{1}{C} \sqrt{\frac{R}{L}}$

Answer: B



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10. In a step - down transformer, the number of turns in

A. secondary are infinite

B. primary are more

C. primary and secondary are equal

D. primary are less

Answer: D



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11. In AC circuits choke is preferred to resistors because

- A. choke coil is cheap
- B. voltage increases
- C. energy is not wasted
- D. current increases

Answer: C



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12. A choke coil used as resistance in

A. AC circuits

B. DC circuits

C. half wave rectifier circuits

D. Both in AC and DC circuits

Answer: A



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13. The frequency of ac mains in India is

A. $110C_s^{-1}$

B. $50C_s^{-1}$

C. $60C_s^{-1}$

D. $120C_s^{-1}$

Answer: B



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14. A transformer works on

A. DC only

B. AC only

C. Both AC and DC

D. high voltage only

Answer: B



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15. Alternating voltage

A. is independent of time

B. varies directly with time

C. varies inversely with time

D. varies sinusoidally with time

Answer: D



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16. The law of electromagnetic induction have been used in the construction of

A. generator

B. electric motor

C. galvanometer

D. None of these

Answer: A



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17. Power consumed in an AC circuit becomes zero if

A. inductance and resistance are both high

B. inductance and resistance are both low

C. inductance very high and resistance negligible

D. inductance low and resistance high

Answer: C



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18. The rms value of current I_{rms} is

A. $\frac{I_0}{2\pi}$

B. $\frac{I_0}{\sqrt{2}}$

C. $\frac{2I_0}{\pi}$

D. $\sqrt{2}I_0$

Answer: B



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19. In a purely inductive circuit, the current is

A. in phase with the voltage

B. out of phase with the voltage

C. leads the voltage by $\pi/2$

D. lags behind the voltage by $\pi / 2$

Answer: D



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20. A lamp is connected in series with a capacitor and an AC source, what happens if the capacity of the capacitor is reduced ?

- A. The lamp shines more brightly
- B. The lamp shines less brightly

C. There is no change in the brightness of
the lamp

D. Brightness may increase or decrease
depending on the frequency of the AC

Answer: B



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21. A transformer is a device which converts

- A. low voltage at low current into high voltage at high current
- B. high voltage at low current into low voltage at high current
- C. high voltage at high current into low voltage at low current
- D. electrical power into mechanical power

Answer: B



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22. The resonant frequency of an L - C circuit is

A. $\frac{1}{2\pi\sqrt{LC}}$

B. $\frac{1}{2\pi}\sqrt{\frac{L}{C}}$

C. $\frac{1}{2\pi}\sqrt{\frac{L}{C}}$

D. $\frac{1}{2\pi}\sqrt{\frac{C}{L}}$

Answer: A



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23. If the conductance and capacitance are both doubled in L-C-R circuit, the resonant frequency of the circuit will.

A. decrease to twice the original value

B. decrease to one - fourth the original value

C. increase to twice the original value

D. decreases to one - half the original value

Answer: D





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24. The power factor is an L - C-R circuit at resonance is

A. zero

B. 1

C. 0.8

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

Answer: B



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25. If the power factor in a circuit is unity, then the impedance of the circuit is

A. inductive

B. capacitive

C. partially inductive and partially capacitive

D. resistive

Answer: D



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26. One complete set of negative and positive values of alternating quantities is called

A. time period

B. amplitude

C. frequency

D. cycle

Answer: D



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27. The instantaneous value of an AC is given by $I = 5 \sin(\omega t + ph)$ amp. The rms value of current is

A. $5A$

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

C. $5\sqrt{2}A$

D. $2.5A$

Answer: B



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28. Inductive reactance of a coil is expressed in

A. ampere

B. ohm

C. volt

D. weber

Answer: B



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29. The average value of alternating current over a complete cycle is

A. zero

B. I_{rms}

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

D. $2I$

Answer: A



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30. An inductor may store energy in

A. its electric field

B. its coil

C. its magnetic field

D. Both electrical and magnetic fields

Answer: C



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31. Two different coils have self inductance 8 mH and 2 mH. The current in both coils are increased at same constant rate. The ratio of the induced emf's in the coil is

A. 4:1

B. 1:4

C. 1:2

D. 2:1

Answer: A



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32. Two coils of self-inductance L_1 and L_2 are placed closed to each other so that total flux in one coil is completely linked with other. If M is mutual inductance between them, then

A. 0.8 J

B. 8 J

C. 16 J

D. 4 J

Answer: B



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33. Two coils of self-inductance L_1 and L_2 are placed closed to each other so that total flux in one coil is completely linked with other. If M is mutual inductance between them, then

A. $M = L_1 / L_2$

B. $M = L_1 L_2$

C. $M = \sqrt{L_1 L_2}$

$$D. M = (L_1 L_2)^2$$

Answer: C



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34. The instrument which works on the principle of mutual inductance is

A. galvanometer

B. ammeter

C. potentiometer

D. transformer

Answer: D



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35. What is the self inductance of a coil in which an induced emf of 2V is set up, when the current is changing at the rate of $4A s^{-1}$

A. 0.5 mH

B. 0.05 H

C. $2H$

D. $0.5H$

Answer: D



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36. Lenz's law is a consequence of law of conservation of

A. energy only

B. charge only

C. momentum only

D. none of these

Answer: A



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37. Two blocks A and B each of 20 kg lying on a frictionless table are connected by a light string. The system is pulled horizontally with an acceleration of $2ms^{-2}$ by a force F on B. The tension in the string will be

A. 10 N

B. 40 N

C. 100 N

D. 120 N

Answer: B



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38. A body of mass 2 kg collides with a wall with speed 100 m / s and rebounds with same

speed. If the time of contact was $1/50$ second, the force exerted on the wall is

A. 8 N

B. 2×10^4 N

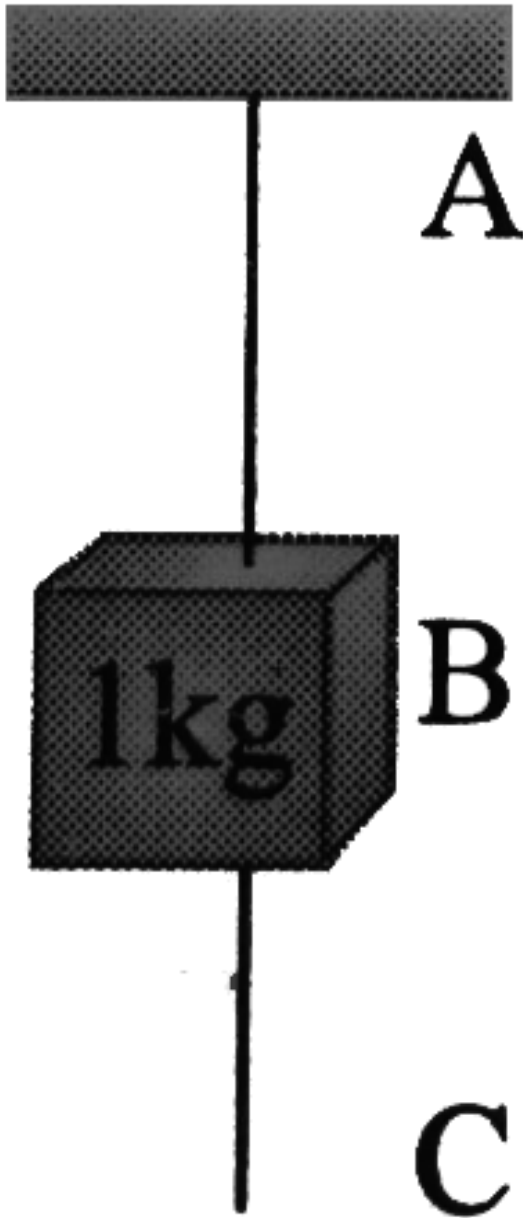
C. 4 N

D. 10^4 N

Answer: B



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39.

A mass of 1 kg is suspended by a string A.

another string C is connected to its lower end (see figure). If the string C is stretched slowly, then

- A. the mass will start rotating
- B. the portion AB of the string will break
- C. the portion BC of the string will break
- D. None of the string will break

Answer: C



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40. The distance x covered in time t by a body having initial velocity v_0 and having a constant acceleration a is given by $x = v_0t + \left(\frac{1}{2}\right)at^2$.

This result follows from:-

- A. Newton's first law
- B. Newton's second law
- C. Newton's third law
- D. None of the above

Answer: D



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41. A plumb bob is hanging from the ceiling of car. If the car move with acceleration a , the angle made by the string with the vertical is

A. $\tan^{-1}\left(\frac{a}{g}\right)$

B. $\tan^{-1}\left(\frac{g}{a}\right)$

C. $\cos^{-1}\left(\frac{g}{a}\right)$

D. $\cos^{-1}\left(\frac{a}{g}\right)$

Answer: A



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42. A weight W can be just supported on a rough inclined plane by a force F either acting along the plane or horizontally. If θ is the angle of friction, then F/W is

A. $\tan \theta$

B. $\sec \theta$

C. $\sin \theta$

D. $\cos \theta$

Answer: A



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43. A body is projected up along a rough inclined plane of inclination 45° . The coefficient of friction is 0.5. Then the retardation of the block is

A. $\frac{g}{2\sqrt{2}}$

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

C. $\frac{3g}{2\sqrt{2}}$

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

Answer: C



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44. A body takes n times as much time to slide down a 45° rough incline as it takes to slide down a smooth 45° incline. The coefficient of friction between the body and the incline will be

A. $\frac{1}{1 - n^2}$

B. $1 - \frac{1}{n^2}$

C. $\sqrt{\frac{1}{1 - n^2}}$

D. $\sqrt{1 - \frac{1}{n^2}}$

Answer: B



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45. The minimum acceleration with which a fireman can slide down a rope of breaking strength two - third of his weight is

A. zero

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

C. $3g$

D. g

Answer: B



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46. An elevator is moving vertically up with a acceleration a the force exerted on the floor by a passenger of mass m is

A. mg

B. ma

C. $mg - ma$

D. $mg + ma$

Answer: D



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47. A ball of mass 0.1 kg strikes a wall normally with a speed of 30 m s^{-1} and rebounds with a

speed of 20ms^{-1} . The impulse of the force exerted by the wall on the ball is

A. $1\text{N} - \text{s}$

B. $5\text{N} - \text{s}$

C. $2\text{N} - \text{s}$

D. $3\text{N} - \text{s}$

Answer: B



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48. A body weighing 20 kg just slides down a rough inclined plane that rises 5 in 12. The coefficient of friction is

A. 0.46

B. 4.6

C. 0.52

D. 0.12

Answer: A



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49. A solid ball of volume V is dropped in a viscous liquid. It experiences a viscous force F . If the solid ball of volume $2V$ of same material is dropped in the same fluid, then the viscous force acting on it will be

A. $nF / 2$

B. $F / 2$

C. $2F$

D. $2nF$

Answer: C



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50. If a ship of mass 4×10^7 kg initially at rest is pulled by a force of 5×10^4 N through a distance of 4 m, then the speed of the ship will be (resistance due to water is negligible)

A. $5ms^{-1}$

B. $1.5ms^{-1}$

C. $60ms^{-1}$

D. $0.1ms^{-1}$

Answer: D



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