



# PHYSICS

## BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

### PRACTICE SET 02

#### Paper 1 Physics

1. A body of mass 2kg is thrown into space with escape velocity 11.2km/s, the escape

velocity for another body of mass 5 kg will be .

A. 38 km/s

B. 22.4 km/s

C. 5.6 km/s

D. 11.2 km/s

**Answer: C**



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2. A body cools from  $70^{\circ}C$  to  $50^{\circ}C$  in 5 minutes. Temperature of surroundings is  $20^{\circ}C$ . Its temperature after next 10 minutes is

A.  $25^{\circ}C$

B.  $30^{\circ}C$

C.  $35^{\circ}$

D.  $45^{\circ}C$

**Answer: B**



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3. Radar waves are sent towards a moving aeroplane and the reflected waves are received by radar . When aero

- A. may increases or decreases
- B. remains same
- C. decreases
- D. increase

**Answer: C**





4. The maximum and minimum magnitude of the resultant of two given vectors are 17 units and 7 unit respectively. If these two vectors are at right angles to each other, the magnitude of their resultant is

A. 14

B. 16

C. 18

D. 13

**Answer: D**



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5. Two satellites of same mass are launched in circular orbits at height of  $2R$  and  $3R$  respectively. The ration of kinetic energies is

A.  $2:3$

B.  $1:1$

C.  $3:2$

D.  $1:3$

**Answer: C**



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6. The radius of hydration for a body of mass 10 kg and MI about an axis of rotation  $0.40 \text{ km}^2$  will be

A. 0.2 m

B. 0.3m

C. 0.4 m

D. None of the above

**Answer: A**



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7. When a torque acting upon a system is zero, which of the following will be constant ?

- A. angular velocity
- B. angular momentum
- C. moment of inertia
- D. All of these



**Answer: B**



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8. A vector  $\vec{A}$  points vertically upward and  $\vec{B}$  points towards north. The vector product  $\vec{A} \times \vec{B}$  is :-

A. zero

B. along west

C. along east

D. vertically downward

**Answer: B**



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9. If a spring of force constant  $k$  is divided into  $n$  equal parts , then force constant of each part is

A.  $k$

B.  $\frac{k}{n}$

C. no force will act

D.  $nk$

**Answer: D**



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**10.  $1\text{Wb}/\text{m}^2$  is equal to**

A.  $10^4$  gauss

B.  $4\pi \times 10^{-3}$  gauss

C.  $10^{-2}$  gauss

D.  $10^{-4}$  gauss

**Answer: A**



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11. When salt is added to pure water , the surface tension

A. increases

B. decreases

C. unchanged

D. becomes zero

**Answer: A**



12. The excess pressure always acts towards

- A. convex surface
- B. liquid surface
- C. concave surface
- D. away from the surface

**Answer: C**



13. The x component of the angular momentum of a particle whose position vector is  $r$  with components  $x, y$  and  $z$  and linear momentum is  $p$  with components  $p_x, p_y$  and  $p_z$  is

A.  $xp_y - yp_x - (x)$

B.  $yp_z - zp_y$

C.  $zp_x - xp_z$

D.  $xp_y + yp_x$

**Answer: B**



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14. In rainy season , the speed of sound increases because density of medium

A. increases

B. decreases

C. no effect of density

D. not known reason

**Answer: B**



**15.** A particle describes a horizontal circle in a conical funnel whose inner surface is smooth with speed of  $0.5\text{ m/s}$ . What is the height of the plane of circle from vertex the funnel?

- A. 0.25cm
- B. 2 cm
- C. 4 cm
- D. 2.5 cm



**Answer: D**



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**16.** Two waves arrive at a point in opposite phase , possible phase differences is

A. zero

B.  $2\pi$

C.  $\pi$

D.  $4\pi$

**Answer: C**



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**17.** The end correction of a resonance column is 2.0 cm. If the shortest length resonating with the tuning fork is 20.0 cm , the next resonating length will be

A. 31 cm

B. 45 cm

C. 50 cm

D. 64 cm

**Answer: D**



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**18.** A physical quantity  $A$  is related to four observable  $a, b, c$  and  $d$  as follows,  $A = \frac{a^2 b^3}{c \sqrt{d}}$ , the percentage errors of measurement in  $a, b, c$  and  $d$ , are  $1\%$ ,  $3\%$ ,  $2\%$  and  $2\%$  respectively. What is the percentage error in the quantity  $A$ ?

A. 12 %

B. 7 %

C. 5 %

D. 14 %

**Answer: D**



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**19.** A constant retarding force of 80 N is applied to a body of mass 50 kg which is moving initially with a speed of 20 m/s. What

would be the time required by the body to come to rest ?

A. 15 s

B. 14 s

C. 12.5 s

D. 18 s

**Answer: C**



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

A. decreases

B. increases

C. becomes zero

D. remains constant

**Answer: A**



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21. A string is hanging from a rigid support. A transverse pulse is excited at its free end. The speed at which the pulse travels a distance  $x$  is proportional to

A.  $x$

B.  $\frac{1}{x}$

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

D.  $\sqrt{x}$

**Answer: D**





22. A coil has an inductance of  $2.5H$  and a resistance of  $0.5\Omega$ . If the coil is suddenly connected across a  $6.0$  volt battery, then the time required for the current to rise  $0.63$  of its final value is

A.  $4.5$  s

B.  $5.0$  s

C.  $4.0$  s

D.  $3.5$  s



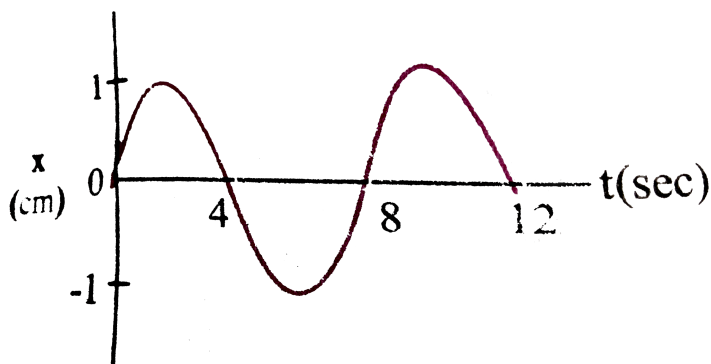
**Answer: B**



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23. The  $x - t$  graph of a particle undergoing simple harmonic motion is shown in figure.

Acceleration of particle at  $t = 4/3$  s is



A.  $\frac{\sqrt{3}}{32} \pi^2 \text{ cm} / \text{s}^2$

B.  $\frac{-\pi^2}{32} \text{ cm} / \text{ s}^2$

C.  $\frac{\pi^2}{32} \text{ cm} / \text{ s}^2$

D.  $\frac{-\sqrt{\pi^3}}{32} \pi^2 \text{ cm} / \text{ s}^2$

**Answer: D**



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**24. Brewster's angle for water is**

A.  $43^\circ$

B.  $57^\circ$

C.  $45^\circ$

D.  $53^\circ$

**Answer: D**



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**25.** A spring is stretched by 3cm when a load of  $5.4 \times 10^6$  dyne is suspended from it. Work done will be-

A.  $8.1 \times 10^6$  erg

B.  $6.1 \times 10^6$  erg

C.  $5.1 \times 10^6$  erg

D.  $4.1 \times 10^6$  erg

**Answer: A**



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**26.** To have maximum intensity the polaroids should be

A. in parallel

B. crossed

C. at  $45^\circ$

D. None of these

**Answer: A**



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27. A cricket ball of mass 250g collides with a bat with velocity  $10m/s$  and returns with the same velocity within 0.01 second. The force acted on bat is

A. 25 N

B. 50 N

C. 250 N

D. 500 N

**Answer: D**



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**28.** In diffraction pattern the fringes are of

A. equal intensity

B. equal width

C. unequal intensity

D. Both (a) and (b)

**Answer: C**



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**29.** A cube of side  $L$  encloses a charge  $Q$  at its centre, electric flux through the cube is

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

B.  $\frac{Q}{6L^2 \epsilon_0}$

C.  $\frac{QL^2}{\epsilon_0}$

D. zero

**Answer: A**



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**30.** The cylindrical tube of a spray pump has a cross-section of  $8\text{cm}^2$ , one end of which has 40 fine holes each of area  $10^{-8}\text{m}^2$ . If the liquid flows inside the tube with a speed of



$0.15m \text{ min}^{-1}$ , the speed with which the liquid is ejected through the holes is.

A.  $50ms^{-1}$

B.  $5ms^{-1}$

C.  $0.05ms^{-1}$

D.  $0.5ms^{-1}$

**Answer: B**



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**31.** The net charge on a capacitor is

A. infinite

B. zero

C. finite

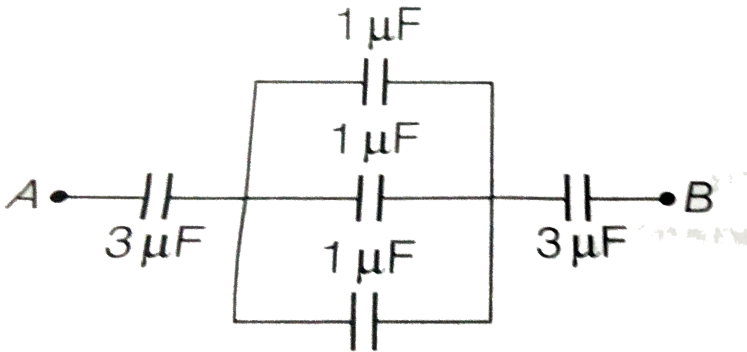
D. depends on size of capacitor

**Answer: B**



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32. The equivalent capacitance for the combination shown in figure will



A.  $1\ \mu\text{F}$

B.  $\frac{19}{3}\ \mu\text{F}$

C.  $\frac{7}{8}\ \mu\text{f}$

D.  $6\ \mu\text{F}$

**Answer: A**



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**33.** If number of turns in moving coil galvanometer becomes half , then the deflection for the same current will become

A. same

B. half

C. double

D. four times

**Answer: B**



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**34.** A sphere of radius  $R$  is gently dropped into liquid of viscosity  $\eta$  in a vertical uniform tube. It attains a terminal velocity  $v$ . Another sphere of radius  $2R$  when dropped into the same liquid, will attain its terminal velocity.

A.  $v$

B.  $2v$

C. 4v

D. 9v

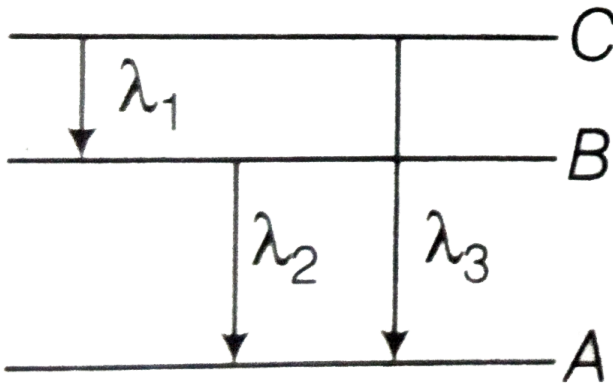
**Answer: C**



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**35.** Energy levels A,B,C of a certain atom correspond to increasing values of energy i.e.,  $E_A < E_B < E_C$ . If  $\lambda_1, \lambda_2,$  and  $\lambda_3$  are the wavelength of radiations corresponding to the transitions C to B , B to A and C to A ,

respectively. Which of the following statement is correct ?



A.  $\lambda_3 = \lambda_1 + \lambda_2$

B.  $\lambda_3 = \frac{\lambda_1 \lambda_2}{\lambda_1 + \lambda_2}$

C.  $\lambda_1 + \lambda_2 + \lambda_3 = 0$

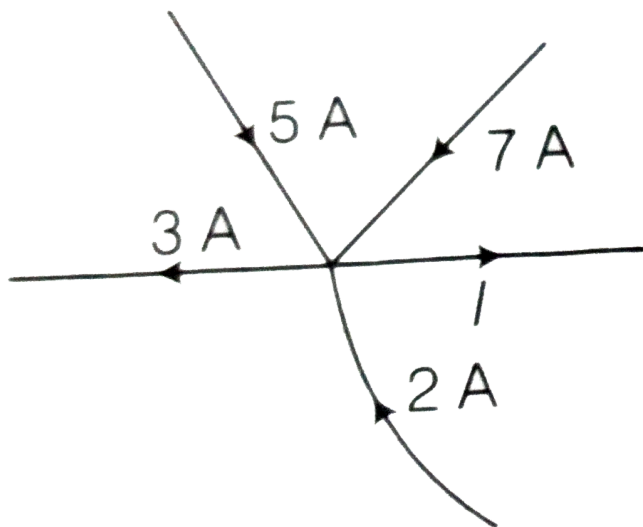
D.  $\lambda_3^2 = \lambda_1^2 + \lambda_2^2$

**Answer: B**



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36. Value of current  $I$  in the adjoin circuit is



A. 17 A

B. 14 A

C. Zero



D. 11A

**Answer: D**



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**37.** Two closed organ pipes have lengths  $L$  and  $L + X$ . When two pipes are sounded together, the beat frequency is

A. 
$$\frac{vx}{4L(L + x)}$$

B. 
$$\frac{vx}{4L(L - x)}$$

C.  $\frac{4L(L + x)}{vx}$

D.  $\frac{2L(L - x)}{vx}$

**Answer: A**



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**38.** A charged particle entering magnetic field obliquely will describe a path

A. circular

B. helical

C. parabolic

D. spiral

**Answer: B**



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**39.** The susceptibility of a magnetic material is  $\chi$  at  $127^{\circ}C$ . At what temperature , its susceptibility will be reduced to half of its original value ?

A.  $327^{\circ} C$

B.  $427^{\circ} C$

C.  $527^{\circ} C$

D.  $627^{\circ} C$

**Answer: C**



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**40.** A parallel beam of monochromatic light of wavelength  $5000\text{\AA}$  is incident normally on a single narrow slit of width  $0.001\text{mm}$ . The light

is focused by a convex lens on a screen placed on the focal plane. The first minimum will be formed for the angle of diffraction equal to

A.  $0^\circ$

B.  $15^\circ$

C.  $30^\circ$

D.  $60^\circ$

**Answer: C**



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41. A piece of iron is heated in a flame. It first becomes dull red then becomes reddish yellow and finally turns to white hot. The correct explanation for the above observation is possible by using.

- A. Kichhoff's law
- B. Newton's law of cooling
- C. Stefan's law
- D. Wien's displacement law

**Answer: D**



42. A copper wire of length  $l$  and radius  $r$  is nickel plated till its final radius is  $2r$ . If the resistivity of the copper and nickel are  $\rho_c$  and  $\rho_n$ , then find the equivalent resistance of the wire.

A. 
$$\frac{l}{\pi r^2 \left[ \frac{1}{\rho_c} + \frac{3}{\rho_n} \right]}$$

B. 
$$\frac{l}{\pi r^2 \left[ \frac{1}{\rho_c} - \frac{3}{\rho_n} \right]}$$

C. 
$$\frac{2l}{\pi r^2 \left[ \frac{1}{\rho_c} - \frac{3}{\rho_n} \right]}$$

D. 
$$\frac{2l}{\pi r^2 \left[ \frac{1}{\rho_c} + \frac{3}{\rho_n} \right]}$$

**Answer: A**

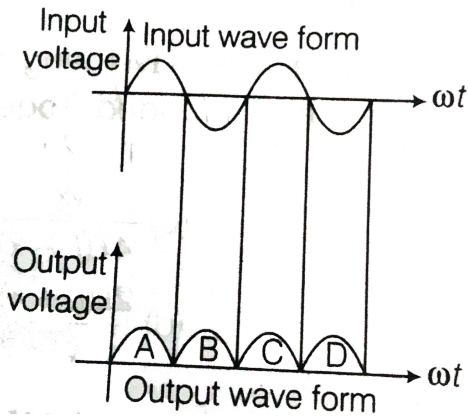
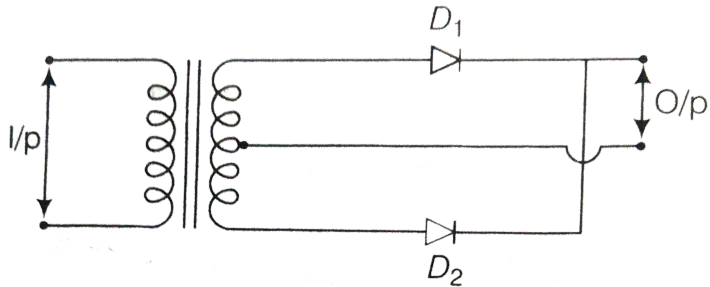


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**43.** In the output graph of a full rectifier shown  
, the contributions from the diode  $D_2$



correspond to



A. A and C

B. B and C

C. A and D

D. B and C

**Answer: B**



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**44.**  $\lambda_e$ ,  $\lambda_p$  and  $\lambda_\alpha$  are the de-Broglie wavelength of electron, proton and  $\alpha$  particle.

If all the accelerated by same potential, then

A.  $\lambda_e < \lambda_p < \lambda_\alpha$

B.  $\lambda_e < \lambda_p > \lambda_\alpha$

C.  $\lambda_e > \lambda_p < \lambda_\alpha$

D.  $\lambda_e > \lambda_p > \lambda_\alpha$

**Answer: D**



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**45.** If  $\lambda$  is the wavelength of hydrogen atom from the transition  $n = 3 \rightarrow n = 1$ , then what is the wavelength for doubly ionised lithium ion for same transition?

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

B.  $3\lambda$

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

D.  $9\lambda$

**Answer: C**



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**46.** Two waves are passing through a region in the same direction at the same time . If the equation of these waves are

$$y_1 = a \frac{\sin(2\pi)}{\lambda} (vt - x)$$

$$\text{and } y_2 = b \frac{\sin(2\pi)}{\lambda} [(vt - x) + x_0]$$

then the amplitude of the resulting wave for

$$x_0 = (\lambda/2) \text{ is}$$

A.  $|a - b|$

B.  $a + b$

C.  $\sqrt{a^2 + b^2}$

D.  $\sqrt{a^2 + b^2 + 2ab \cos x}$

**Answer: A**



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47. Where should a person stand straight from the pole of a convex mirror of focal length 2.0 m on its axis, so that the image formed become half of his original height?

A.  $-2.60m$

B.  $-4.0m$

C.  $-5.0m$

D.  $-2.0$

**Answer: D**



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48. If sound travelling at  $340\text{ms}^{-1}$  enters water where its speed becomes  $1480\text{ms}^{-1}$ , then critical angle for total internal reflection is

A.  $13.3^\circ$

B.  $89.7^\circ$

C.  $86.7^\circ$

D.  $10.3^\circ$

**Answer: A**



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**49.** The e.m.f. induced in a coil of wire, which is rotating in a magnetic field, does not depend on

- A. number of turns in coil
- B. resistance of coil
- C. rate of change of flux
- D. All of these



**Answer: B**



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50. The average power dissipation in a pure capacitance in  $AC$  circuit is

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

B.  $CV^2$

C.  $\frac{1}{4}CV^2$

D. zero

**Answer: D**



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