



# PHYSICS

## BOOKS - UNITED BOOK HOUSE

### MODEL PAPER SET-10

#### Exercise

1. Three charges each of  $+1\mu C$  are placed at the comers of an equilateral triangle. If the

force between any two charges be  $F$ , then the net force on either charge will be —

A.  $\sqrt{2}F$

B.  $\sqrt{3}F$

C.  $2F$

D.  $3F$

**Answer:**



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2. Three capacitors of capacity  $C$  each are joined first in series and then in parallel. The capacity becomes  $n$  times where  $n$  is—

A. 3

B. 6

C. 9

D. 12

**Answer:**



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3. A carbon resistance reads Red-Red-Black.

What is its resistance?—

A.  $2.2\Omega$

B.  $22\Omega$

C.  $220\Omega$

D.  $0.22k\Omega$

**Answer:**



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4. The vertical component of earth's magnetic field is zero at a place when angle of dip is—

A.  $0^\circ$

B.  $45^\circ$

C.  $60^\circ$

D.  $90^\circ$

**Answer:**



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5. The instantaneous magnetic flux  $\phi$  in a circuit is  $\phi = 4t^2 - 4t + 1$ . The total resistance of the circuit is  $10\Omega$ . At  $t = \frac{1}{2}s$ , the induced current is—

- A. 0
- B. 0.6
- C. 0.4
- D. 0.2

**Answer:**



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6. In L.C.R. series a.c. circuit, the phase angle between current and voltage is—

A. A. any angle between 0 and  $\pm \frac{\pi}{2}$

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

C. C.  $\pi$

D. D. any angle between 0 and  $\frac{\pi}{2}$

**Answer:**



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7. The velocity of electromagnetic wave is parallel to—

A.  $\vec{B} \times \vec{E}$

B.  $\vec{E} \times \vec{B}$

C.  $\vec{E}$

D.  $\vec{B}$

**Answer:**



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8. A plane mirror produces a magnification of

—

A.  $-1$

B.  $+1$

C. zero

D. between 0 and  $\infty$

**Answer:**



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9. A convex glass lens ( $\mu_g = 1.5$ ) has a focal length 8 cm when placed in air. The focal length of the lens when placed in water ( $\mu_w = \frac{4}{3}$ ) is—

A. 32cm

B. 16cm

C. 8cm

D. 4cm

**Answer:**



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10. If ratio of amplitudes of two waves is 4:3 then ratio of maximum and minimum intensities is —

A. 16:18

B. 18:16

C. 49:1

D. 94:1

**Answer:**



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11. When Ge crystals are doped with phosphorous atom, then it becomes —

A. insulaton

B. p-type

C. n-type

D. super-conductor

**Answer:**



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12. A microphone converts—

A. sound signals into electric signals

B. electric signals in sound signals

C. Both (a) and (b)

D. neither (a) nor (b)

**Answer:**



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13. A radio active element  ${}_{90}\text{X}^{238}$  decays into  ${}_{83}\text{X}^{222}$ . The no. of B particles emitted are—

A. 4

B. 6

C. 2

D. 1

**Answer:**



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14. The splitting of white light into several colours on passing through a glass prism is due to—

A. refraction

B. reflection

C. interference

D. diffraction

**Answer:**



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**15.** No two electric field lines can intersect each other. Why?



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**16.** What is the value of an electron-volt?



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**17.** Can there be magnets with single-pole?



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**18.** What is the unit of magnetic flux?



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**19.** Can we cast the image formed by a convex mirror on a screen?



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**20.** What is S.I. unit of power of a lens?





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21. What is the phase difference between any two points on the same wavefront?



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22. Name the phenomenon which illustrates the particle nature of light.



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**23.** A TV tower is 80m tall. Calculate the maximum distance upto which the signal transmitted from the tower can be received (Taking radius of the earth =  $6.4 \times 10^6 m$ ).



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**24.** What is the purpose of modulating a signal in transmission?



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**25.** Write down the binary addition of 101010 and 010101.



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**26.** Give the symbol of NOR gate.



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**27.** An object is placed in front of a convex mirror of radius or curvature 20cm. Its image

is formed 8cm behind the mirror. Find the distance of object from the image.



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**28.** What is Lorentz force? Also write the expression for it?



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**29.** Write down the dimension of magnetic field. Also write its unit in S.I. system.



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**30.** Two electric bulbs A and B are marked 220V, 40W and 220V, 60W respectively. Which one has a higher resistance?



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**31.** How much current does a Geyser rated 2 KW draw when connected to 230V supply?



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**32.** What is electric flux? Write down its S.I. unit?



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**33.** Write down the statement Gauss's theorem.



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**34.** Derive an expression for electric field intensity at a point on the axial line of an electric dipole.



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**35.** Prove that the electric field intensity at a point is equal to the negative gradient of electric potential at that point.



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**36.** The radii of two insulated metal spheres are 5cm and 10cm. 10 e.s.u. and 15 e.s.u. of charges are respectively given to them. Find the amount of energy lost when the spheres are joined together.



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**37.** Write down the dimensional Formula of resistivity.



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**38.** In a circuit with resistance  $R$ , current is supplied with  $n$  identical cells. At what value internal resistance of each cell will the current through  $R$  be the same whether they are connected in series or in parallel?



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**39.** State and write the mathematical form of Biot-Savart's law with concerned figure.



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**40.** Find an expression for force on current carrying conductor in a uniform magnetic field Name and write the rule by which the direction of force is given.



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**41.** State and prove Ampere's circuital law.



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**42.** State Faraday's laws in electromagnetic induction.



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**43.** A coil of area  $0.15m^2$  and 100 turns is placed perpendicular to a magnetic field, The field changes from  $5 \times 10^{-3}Wbm^{-2}$  to  $2 \times 10^{-3}Wbm^{-2}$  in a time interval of 30 millisecond. Find the induced emf in the coil.



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**44.** Show that the current leads the voltage by an angle of  $\frac{\pi}{2}$  in a purely capacitive a.c. circuit.



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**45.** An object is placed in front of a concave mirror of focal length 20cm. The image formed is three times the size of the object. Calculate the two possible distances of the object from the mirror.



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**46.** A convex lens produces a real image double the size of the object, when the object is placed at a distance 18 cm from it. Where should the object be placed to produce a real image three times the size of the object?



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**47.** Show that the de-Broglie wavelength  $\lambda$  of electrons of energy  $E$  is given by the relation,

$$\lambda = \frac{h}{\sqrt{2mE}}$$





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**48.** What is mass defect of a nucleus?



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**49.** What is binding energy?



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**50.** Define nuclear fission with one fission reaction.



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**51.** What is half life of radioactive element?



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**52.** What is short sightedness or myopia?

What are the causes of this defect? By which



lens this defect can be corrected?



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**53.** The magnetic induction at a point 4cm from a long current carrying Wire is  $10^{-3}T$ .

What is the field of induction at a distance 12 cm from the current carrying wire?



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