12TH CBSE PHYSICS TEST

12th Standard

Physics

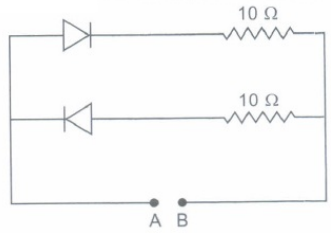Multiple Choice Question   7 x 1 = 7

1) The ratio of the speed of an object to the speed of its real image of magnification m in the case of a convex mirror is

(a) $-\frac{1}{m^2}$ (b) m^2 (c) -xm   (d) $\frac{1}{m}$

2) The formation of rainbow is a natural example of

(a) Interference   (b) Dispersion   (c) Diffraction   (d) Reflection

3) In a npn transisitor circuit,the collector current is 10 mA. If 95 percent of the electrons emitted reach the collector,which of the following statements are true?

(a) The entire current will be 8 mA   (b) The emitter current will be 10.53 mA   (c) The base current will be 2 mA

(d) The base current will be 2 mA

4) A 2V battery is connected across the points A and B as shown in the figure. Assuming that the resistance of each diode is zero in forward bias and infinity in reverse bias, the current supplied by the battery when its positive terminal is connected to A is

(a) 0.2 A   (b) 0.4 A   (c) Zero   (d) 0.1 A

5) The form factor of an a.c. generated is given by

(a) $\frac{I_{av}}{I_0}$ (b) $\frac{I_0}{I_{av}}$ (c) $\frac{I_{av}}{I_v}$ (d) $\frac{I_v}{I_{av}}$

6) The large scale transmission and distribution of electrical energy over long distances is done with the use of

(a) dynamo   (b) transformers   (c) generator   (d) capacitor

7) If in an alternating circuit, the voltage is V and current is I, then the value of power dissipated in the circuit is

(a) VI   (b) VI/2   (c) VI/$\sqrt{2}$ (d) depends upon the angle between V and I

Assertion and reason   4 x 1 = 4

8) **Assertion (A)** : In YDSE bright and dark fringe are equally spaced.
Reason (R) : It only depends upon phase difference.
Codes:
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is NOT the correct explanation of A
(c) A is true but R is false
(d) A is false and R is also false

9) **Assertion (A)** : In a semiconductor diode, the reverse biased current is due to drift of free electrons and holes.
Reason (R) : The drift of electrons and holes is due to thermal excitations.
Codes:
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is NOT the correct explanation of A
(c) A is true but R is false
(d) A is false and R is also false

10) **Assertion (A)** : Capacitor serves as a block for D.C and offers an easy path to A.C

Reason (R) : Capacitive reactance is inversely proportional to frequency.

Codes:

(a) Both A and R are true and R is the correct explanation of A

(b) Both A and R are true but R is NOT the correct explanation of A

(c) A is true but R is false

(d) A is false and R is also false

11) **Assertion (A) :** The core of transformer is made laminated in order to increase the eddy currents.

**Reason (R)** : The sensitivity of transformer increases with increase in the eddy currents.

Codes:

(a) Both A and R are true and R is the correct explanation of A

(b) Both A and R are true but R is NOT the correct explanation of A

(c) A is true but R is false

(d) A is false and R is also false

2 Marks   3 x 2 = 6

12) Two monochromatic rays of light are incident normally on the face AB of an isosceles right-angled prism ABC. The refractive indices of the glass prism for the two rays 'I' and '2' are respectively 1.3 and 1.4 Trace the path of these rays after entering through the prism.
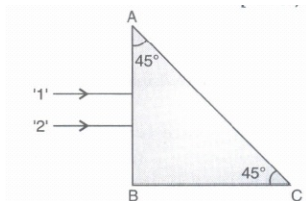
13) What is the function of base region of a transistor? Why is this region made thin and slightly doped?

14) Define the term self-inductance of a coil.Write its SI unit.

3 Marks   5 x 3 = 15

15) At what angle should a ray of light br incident on the face of a prism of refracting angle 60^0, so that it just suffers total internal reflection at the other face? The refractive index of the material of the prism is 1.524.

16) For a CE-transistor amplifier,the audio signal voltage across the collected resistance of $2k\Omega$ is 2V. Suppose the current amplification factor of transistor is 100, find the input signal voltage gain of 10 and base current, if the base resistance is $1k\Omega$.

17) Distinguish between a conductor, a semiconductor and an insulator on the basis of energy band diagrams.

18) A $2\mu F$ capacitor, 100 Ω resistor and 8 H inductor are connected in series with an AC source. What should be the frequency of source for which the current drawn in the circuit is maximum?

If peak value of emf of source is 200 V, find the maximum current, inductive reactance, capacitive reactance, total impedance, peak value of current in the circuit.

19) A source of AC voltage V = V_0 $sin\ \omega t$ is connected to a series combination of a resistor 'R' and a capacitor 'C. Draw the phasor diagram and use it to obtain the expression for (i) impedance of the circuit and (ii) phase angle.

Case Study Questions   2 x 4 = 8

20) While comparing the interference pattern with that seen for a coherently illuminated single slit (usually called single slit diffraction pattern), the interference pattern has a number of equally spaced bright and dark bands. The diffraction pattern has a central bright maximum which is twice as wide as the other maxima. The intensity falls as we go to successive maxima away from the centre, on either side. Now answer the following questions:

(i) Why interference fringes are equispaced whereas that of diffraction are not?

(ii) Why intensity falls as we go to successive maxima away from central bright maximum?

(iii) For a single slit of width a, the first null point of the interference pattern occurs at an angle of λ/a. At the same angle of λ/a, we get a maximum (not a null) for two narrow slits separated by a distance a. Explain why?

21) Let a source of alternating e.m.f $E = E_o sin\omega t$ be connected to a circuit containing a pure inductance L. If I is the value of instantaneous current in the circuit, then $I = I_0 \sin\left(\omega t - \frac{\pi}{2}\right)$. The inductive reactance limits the current in a purely inductive circuit and is given by $X_L = \omega L$
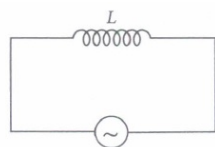
(i) A 100 hertz a.c. is flowing in a 14 mH coil. The reactance is
  (a) 15Ω   (b) 7.5Ω   (c) 8.8Ω   (d) 10Ω

(ii) In a pure inductive circuit, resistance to the flow of current is offered by
(a) resistor   (b) inductor   (c) capacitor   (d) resistor and inductor

(iii) In a inductive circuit, by what value of phase angle does alternating current lags behind e.m.f.?
45°   90°   (c) 120°   75°

(iv) How much inductance should be connected to 200 V, 50 Hz a.c. supply so that a maximum current of 0.9 A flows through it?
(a) 5 H   (b) 1 H   (c) 10 H   (d) 4.5 H

(v) The maximum value of current when inductance of 2 H is connected to 150 volt, 50 Hz supply is
(a) 0.337 A   (b) 0.721 A   (c) 1.521 A   (d) 2.522 A

5 Marks   2 x 5 = 10

22) How is the working of telescope different from that of a microscope?

The focal lengths of the objective and eyepiece o a microscope are 1.25 cm and 5 cm, respectively. Find the position of the object relative to the objective in order to obtain an angular magnification of 30 in normal adjustment.

23) (a) Draw a schematic arrangement for winding of primary and secondary coil in a transformer when the two coils are wound on top of each other.

(b) State the underlying principle of a transformer and obtain the expression for the ratio of secondary to primary voltage in terms of the
(i) number of secondary and primary windings and
(ii) primary and secondary currents.

(c) Write the main assumption involved in deriving the above relations.

(d) Write any two reasons due to which energy losses may occur in actual transformers.

****