SSLC SECOND TERM EXAMINATION 2023-24

PHYSICS ANSWER KEY

1. b. 60^0

2. d. both the magnitude and direction of current changes

3. Plane mirror

4. b. 50Hz

5. Power

6 a. Glow with maximum brightness- Circuit (ii)

Least Brightness-m Circuit (iii)

b. In circuit 2 the Coil acts as just a resistor and it gives maximum brightness.

In circuit 3 the coil is acting as an inductor, here self induction happens and the voltage is minimised and the brightness reduces. The inserted soft iron core in solenoid also result in self-induction and back emf.

7. a. Refraction

b. Difference in optical density.

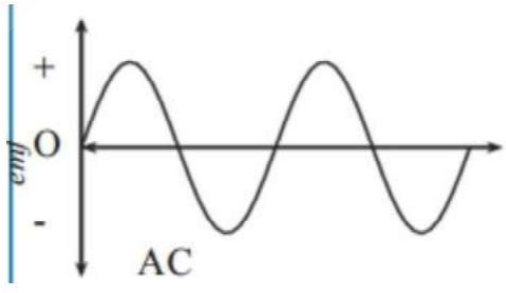
8.

Convex mirror	Concave mirror
Always form diminished images	Can form real and virtual images
Always form images between F and P	Can form a virtual and magnified image than the object

9. a. Flemings right hand rule

Fleming's Right Hand Rule states that if we arrange our thumb, forefinger and middle finger of the right-hand perpendicular to each other, then the thumb points towards the direction of the motion of the conductor relative to the magnetic field, the forefinger points towards the direction of the magnetic field and the middle finger points towards the direction of the induced current.

b.



10. a. Power in primary = power in secondary

Secondary current, Is $= \frac{PS}{VS} = \frac{24}{12} = 2A$

b. Step Down Transformer

11. a. A three-pin plug's pin E makes contact with the earth line. This pin is now connected to the appliance's body. Electricity flows to the ground through the earth wire if the body comes into contact with an electric connection. The current increases when current flows to the ground through a low-resistance circuit. As a result of the increased heat created in the fuse wire, the fuse wire melts and the circuit is broken. This will safeguard both the instrument and the person who will be handling it.

b. If possible, turn off the power source. If this is not possible, move the electric source away from you and the person using a dry, nonconducting object made of cardboard, plastic, or wood.
If the person shows no signs of circulation, such as breathing, coughing, or movement, begin CPR.
Make every effort to keep the injured person warm.

12. V= 200V, I = 0.2 A

R=V/I =200/0.2 =2000/2=1000 Ω

When the wire is cut into two equal pieces

R=1000/2 = 500 Ω

In Parellel connection resistance is R= 500/2 = 250 Ω

Power P $= \frac{V^2}{R} = \frac{200 \times 200}{250} = 160W$

13. a. Vacuum <water<glass <diamond

b. Refractive index of glass with respect to water,

$$\mu = \frac{\text{speed of Light in water}}{\text{speed of Light in glass}} = \frac{2.25 \times 10^8}{2 \times 10^8} = \frac{225}{200} = \frac{9}{8}$$

c. $\mu = \frac{\text{speed of Light in vaccum}}{\text{speed of Light in medium}}$

14. a. Concave mirror

b. Principal focus, in order to produce parallel beams of light rays

c. Convex mirror

15.

A	B	C
Incandescent lamp	tungsten	Ability to emit white light in white hot condition
Safety fuse	Alloy of tin and lead	Low melting point
Electric heater	nichrome	Ability to remain in red hot condition for a long time

16. a. f = 15cm

b. $V = \frac{uf}{u-f} = \frac{-15\times-60}{-60-(-15)} = 900/-45 = -20\,cm$

c. $m = \frac{hi}{ho}\frac{-v}{u} = \frac{-(-20)}{-60} = \frac{-1}{3}$

$hi = m \times ho = \frac{-1}{3} x12 = -4cm$

17. a. P- diaphragm, Q- voice coil

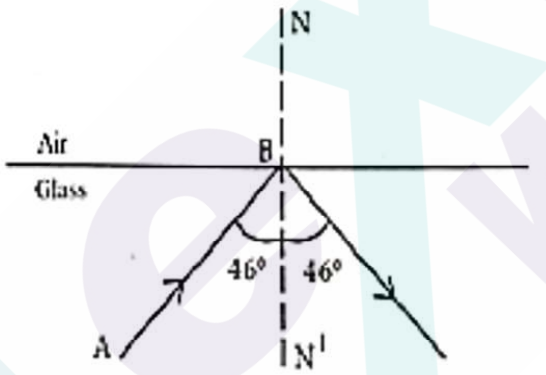
b. Electromagnetic induction

c. The principle used in a simple **microphone** is the movement of a current loop in a changing magnetic field creates an induced **emf.**

A simple microphone works based on the principle of electromagnetic induction. It consists of a **diaphragm** or a membrane attached to a coil of wire, forming a current loop.

When sound waves hit the diaphragm, it vibrates and causes the coil of wire to move in a changing magnetic field. This movement of the current loop in the magnetic field induces an electromotive force (emf) or voltage across the coil. This induced voltage is proportional to the sound wave variations, effectively converting sound energy into electrical signals. These electrical signals can then be amplified and transmitted as audio signals.

18. a.



b. Total internal reflection.

c. optical fibers, used in endoscopes and telecommunications. automotive rain sensors, Optical fingerprinting

19. a. Watt-hour meter

b. $\frac{power \times totalhours}{1000}$

Consumption by LED lamps $= \frac{20\times5\times5}{1000} = \frac{5000}{1000} = 0.5$ unit

Consumption by Laptop $= \frac{1\times50\times2}{1000} = \frac{100}{1000} = 0.1$ unit

Total Energy Consumption per day = 0.5+ 0.1=0.6 units

Total Energy Consumption for one month = 30 × 0.6 = 18 units.

20.	a. Step down transformer b. Mutual induction c. The reason for making the secondary windings thicker is, while working on a transformer, AC current will be passing through both windings. These coils will be having a resistance and due to heating there will be energy loss. This loss can be reduced by using wires with lower resistance for winding. The voltage will be higher in the secondary coil so there is a chance for more loss. So, to reduce the temperature we use thicker wires having low resistivity