Second terminal examination Physics 2023
ANSWER KEY BY Arun
PHYSICS 1006 EM

Question 1 to 5 each carry 1 mark.

1. (b) 60^0
2. (d) Both the magnitude and direction changes
3. Plane mirror
4. 50HZ
5. Power

Question 6 to 10 each carry 2 mark.

(a) The bulb in the circuit (ii) will give more or maximum brightness and bulb in the circuit

(iii) will give less or least brightness

(b) In circuit (ii) the source is DC so no self-induction takes place without changing intensity of current. But in the circuit (i) and (ii) self-induction takes place and the induction will be maximum in circuit inserted with soft iron rod so there the brightness will be least. Or reduced.

7.

(a) Refraction of light

(b) Difference in optical densities/ refractive index

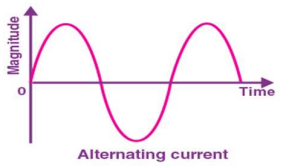
8

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 , the forefinger points towards the direction of the magnetic field then the middle finger represents the direction of current.

(b)



10.

Power of the transformer is 24W

Secondary voltage, V_S = 12V

Current in primary, I_P= 0.1A

(a) Power in primary = power in secondary

$P_S=V_SI_S$ $I_S=P_S / V_S$ = 24/12 =2A

(B) Step down transformer

Question 11 to 15 each carry 3 mark.

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 handling it.

b) Turn off the source of electricity, if possible. If not, use a dry, nonconducting object made of cardboard, plastic, or wood to move the source away from you and the injured person. Begin CPR if the person shows no signs of circulation, such as breathing, coughing or movement

12.a)

The voltage, V = 200V

Current, I = 0.2A

So the resistance of the wire, R=V/I = 200/ 0.2 =1000 Ω

Now the wire is cut into two equal pieces so each resistance of the wire is 500Ω. When they connected in parallel their equivalent resistance,1/ R = 1/500 + 1/500 ,

R=500/2= 250Ω

So the power of the circuit, P = V2/R = 40000/250= 160W

13.

a. Ascending order of medium by its optical density

(a) Vacuum <water<glass <diamond

(b) Refractive index of glass with respect to water,

(c)

c) μ= speed of light in water/speed of light in glass

$$2.25 \times 10^8 / 2 \times 10^8 = 9/8$$

d).Absolute refractive index is defined as the ratio of speed of light in vacuum to speed of light in a given medium

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(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	An alloy of tin and lead	Low melting point
Electric heater	Nichrome	Ability to remain in red-hot condition for a long time

Question 16 to 20 each carry 4 mark.

16. (a) Focal length, f = -15cm

(b) Distance of image, V = uf / u-f =900/ -45 =-20 cm

© m= -v/u = -(-20)/ -60 = -1/3

Height of image, hi = $m \times ho = (-1/3) \times 12 = -4cm$

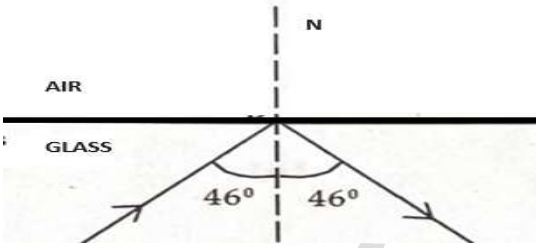
17

(a) P- diaphragm, Q- voice coil

(b) Electromagnetic induction

The voice coil is situated in a magnetic field. The diaphragm is connected to voice coil vibrates in accordance with the sound waves falling on it. As a result, electric signals corresponding to the sound waves are generated in the voice coil. In the microphone mechanical energy is converted into electrical energy

18a)



b) Total internal reflection

c) Practical applications of optics are found in a variety of technologies and everyday objects, including **mirrors, lenses, telescopes, microscopes, lasers, and fibre optics**.

19

(a) Watt-hour meter/ energy meter/ KWh meter

(b) Electrical energy consumed by 5 LED lamps =5x20x5 / 1000 =0.5 unit

Electrical energy consumed by laptop =1x50x2 /1000 =0.1 unit

Total energy consumption per day = 0.5+ 0.1=0.6 units

(c) For one month 30× 0.6= 18 units

20 Step down transformer

(a) Mutual induction

In a step-down transformer, the wire in the secondary coil is thicker than in the primary coil. The use of thicker wire reduces its resistance and therefore reduces the loss of energy as heat in the coil.

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