16. What kind of laser is used in the experiment?

Semiconductor diode laser is used in the experiment.

17. What are the characteristics of a laser?

High intense,directionality,highly coherent and monochromaticity.

18. What happens to the fringe pattern if monochromatic light is replaced by

composite source?

Colored fringes are obtained with white fringe at the centre of the pattern.

19. Why ordinary glass plates do not produce diffraction bands when exposed to

light?

Because size of the object is very large compared to wavelength of light.

20. Distinguish between interference and diffraction.

Interference is due to the superposition of two or more waves traveling from two coherent

sources. Whereas diffraction is due to the superposition of infinite number of waves traveling

from same wave front.

An interference band consists of alternate bright and dark bands of equal width. All bright

bands are of same intensity. All dark bands are of equal width and completely dark. Whereas

diffraction bands consists of central bright band followed by dark and bright bands with

decreasing intensity.

21. Mention the applications of laser.

Lasers are used in drilling, welding, cutting, measurement of atmospheric pollutants in

communication etc.

22. Explain how laser diode works.

When the required forward bias voltage is applied, the electrons in the conduction

bands get de-excited and recombine with the holes in the valence band. As a result

the energy liberated is converted and emitted in the form of visible light.

23. Can this experiment be done with the use of sodium instead of laser light?

Yes. Spots would not be so bright, since sodium is less intense than sodium.

2. DIELECTRIC CONSTANT

1. What are dielectrics? Give examples

They are insulators. They conduct electricity only when they are kept in between the

Plates of a capacitor. Ex. Paper, mica, rubber, water etc.

2. What is a capacitor?

It is a device used to store energy. It consists of two parallel metal plates kept separated by

small distance with or without dielectric medium.

3. Define capacitance of a capacitor?

It is the ability of a capacitor to store the charge and is defined as the ratio of charge

stored on either plate of the capacitor to the potential difference between the plates.

4. Mention the formula for capacitance of a capacitor.

With diectric medium; capacitance of a parallel plate capacitor is C

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Q1;what is P-N junction?

ANS; P-N junction is a semiconductor device in which a P type semiconductor is joined with N type semiconductor

Q2;. What is depletion layer?

ANS: It is a thin region around the junction which is free from holes and electrons

Q3: can you explain me how we can join two semiconductor, is there any specific way?

ANS: Yes sir we have various ways by which we can join P type semiconductor with N type such as grown junction diode ,fuse junction diode.

Q4.What is ideal junction diode?

ANS; Ideal junction diode is that which conduct only in forward bias

Q5 why it is so that current is flowing so easily in forward bias where as not so easily in reverse bias?

ANS; in forward bias depletion region is thin so resistance is low hence current flow due to majority carrier where as in reverse bias depletion region is thick so resistance is so high hence no current flow due to majority carrier current only flow due to minority carrier

Q6; Is P-N junction is ohmic device?

ANS; No it is non ohmic devices; current is not vary linearly with potential.

Q8. What is knee voltage?

ANS; Sir knee voltage is that below which graph in forward bias is non –linear or non ohmic and above which it is linear or ohmic.

Q9.Which elements are used as intrinsic semiconductor?

ANS; Si and Ge are used as semiconductor. It is because it has four electrons in its valance shell and form covalent bond

Q10; carbon also has four electrons in valance shell then why it is not used as semiconductor?

ANS: Electricity can conduct through carbon, but carbon does have a significant resistance, and much of the electrical energy will be lost as heat energy when it passes through carbon and it forms diamond crystal structure so when we add impurity atoms it will not make any significant change...+

Carbon is not used as semiconductor it has 4 valence electrons in it valence shell but the energy gap is very small it will conduct electricity even at room temperature ,the size of carbon is very small . It depends upon the structure of carbon. In case of germanium and silicon they have d orbits in the outer shell and they have greater mobility.

Q11. Tell me various types of P-N junctions?

ANS; P-N junction is also called diode, such as photo diode, light emitting diode, tunnel diode, Zener diode, varactor diode etc

Q12.What is value of the potential barrier of a silicon and germanium?

ANS; 0.7V and 0.3 V

Q13. What is difference between P-N diode and Zener Diode?

AN S: Zener is highly dopped and work in reverse bias

Q14. What is Zener breakdown?

S; When a very high reverse voltage is applied across a semiconductor diode, a large amount of current flows through it. This effect is called Zener breakdown.

15.What is charge on P type or N type semiconductor?

AN S: it is charge less

16. What is donor impurity?

ANS: The pentavalent impurity atoms like Sb, As

17. What is acceptor impurity?

ANS: The trivalent impurity like B, Al

18. What is dopping?

ANS: Addition of impurity to pure semiconductor

19.How does conductivity of semiconductor varies with temperature?

ANS; The conductivity of the semiconductor increases with time

20.Why a large electric current flows, the semiconductor gets damaged?

ANS: It is because it gets heated

21. What are two important process involved in the formation of a P-N junction?

ANS; Diffusion and Drift , when a PN junction is formed due to concentration gradient , the holes diffuse from P side to N side and electron diffuse from N side to P side . the drift of charge carriers occurs due to electric field due to built in potential barrier an electric field directed from n region to p region is developed across the junction. This field causes motion of electron on p side to n side and motion of holes on n side to p side thus a drift current start which is opposite to diffusion current.

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Electricity

1.What is value of resistance for ideal voltmeter and ammeter?

ANS; It is infinity for voltmeter and 0 for ammeter

2.Define electric potential?

ANS;Amount of work done to move a unit charge from infinity to any point in the electric field of given charge

3.Why is an ammeter connected in series in a circuit?

ANS;Ammeter has very low resistance, hence to measure the amount of current flowing through the circuit; it must pass through the ammeter hence it is connected in series

4.Why is a voltmeter connected in parallel in a circuit?

ANS;-Voltmeter posse’s very high resistance, to find potential across given resistance, minimum current must pass through the voltmeter and maximum through the resistance

5.State the law that governs the strength of the current passing through a metallic conductor when a p.d is applied across its end. Illustrate this law graphically?

ANS; Ohm’s law is the law. It provide linear relation between current and voltage

6.State the law which governs the amount of heat produced in a metallic conductor when current is passed through it for a given time. Express this law mathematically?

AJoules heating effect is the law which provide heat produced according to it

H=I2Rt

7.Define resistance. What are the factors on which it depends? Obstruction posses by the conductor in the flow of current is called resistance, it depends on length, area, temperature, nature of material

8.A copper wire of resistivity P is stretched to reduce its diameter to half its previous value. What is the new resistivity?

Resistivity is independent of dimension so it will remain P (no change)

9.Define the S I unit of electric current and potential difference?

ANS;-Current =Ampere, Potential difference = Volt

10.What is expression for equivalent resistance when we connect them in series?

ANS;-R= R+R+R...

B. in parallel combination

11. What is an electric fuse? Explain its function?

ANS;To prevent circuit from excess current, we have electric fuse which consist of high resistance and low melting point it will melt when high current flows through it.

12. What do you mean by a shunt?

ANS;It is a small value of resistance which is connected in parallel with the galvanometer

13. Can we increase or decrease range of ammeter?

ANS; We can increase by the range by connecting suitable resistance in parallel

14. Write the advantages of connecting electrical appliances in parallel and disadvantages of connecting them in series in a household circuit?

15. Why is tungsten used almost exclusively for making the filaments of electric lamps?

16. A piece of wire is redrawn by pulling it until its length is doubled .Compare the new resistance with the original value.

17. An electric geyser has rating 2000 w, 220 v marked on it. What should be the minimum rating in whole number of a fuse wire that may be required for safe use with the geyser?

18. Three resistors each of resistance 10 ohm are connected, in turn, to obtain a. minimum resistance b. Maximum resistance. Compute? a) The effective resistance in each case

b) The ratio of minimum to maximum resistance so obtained.

19. Two resistors of resistance 2 ohms and 4 ohms are, in turn connected? a) In series

b) In parallel to a given battery for same interval.

20.Compute the ratio of the total quantity of heat produced in the combination in the two cases.

Extra Questions----

19. Two metallic wires A and B are connected in parallel. Wire A has length L and radius R wire B has a length 2L and radius 2r. Compute the ratio of the total resistance of parallel combination and resistance of wire A.

20. In a house three bulb of 100w each are lighted for 4 hours daily and six tube lights of 20w each are lighted for 5 hours daily and a refrigerator of 400w is worked for 10 hours daily for a month of 30 days. Calculate the electricity bill if the cost of one unit is Rs 4.00.

21. Three resistors of 4ohms, 6ohms and 12 ohms are connected in parallel. The combination of above resistors is connected in series to a resistance of 2 ohms and then to a battery of 6 volts. Draw a circuit diagram and calculate a) Current in main circuit

b) Current flowing through each of the resistors in parallel

c) P.d and the power used by the 2 ohm resistor.

22. Two lamps, one rated 100 W at 220 V and the other 60W at 220 V, are connected in Parallel to a 220 volt supply. What current is drawn from the supply line?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Viva help for Optics Experiments

1. Define refractive index?

It is defined as ratio of velocity of light in rarer medium to velocity in denser medium

2. What is the least value of refractive index possible? One

3. What can you infer if someone says that he has a medium of refractive index less than one? Through that medium light travel faster than its speed through vacuum

4. Define focus? The point on the principal axis at which the parallel rays after reflection/refraction converge or appear to converge

5. Define pole of a spherical mirror?

The center of curved and reflecting surface of a spherical mirror

6. Define optic centre? It is the geometrical center of the lens.A ray of light passing through this point does not suffer any deviation.

7. What is the type of lens in an air bubble formed inside water? Convex lens

8. Is your eye is a lens? It is convex lens

9. What is the focal length of a lens?

The distance between the principal focus and the optical center of a lens is called as the focal length of the lens

10How will you distinguish between a plane mirror, concave mirror and a convex mirror without feeling its surface with your hand?

11.What is linear magnification of plane mirror,concave mirror,and convex mirror? It is 1 for plane more than 1 for concave and less than 1 for convex

12What are the differences between convex lens and concave lens?

Concave lens has diverging property and convex converging

Concave is thin at the middle whereas convex thick

13.What is dispersion?

The phenomenon of splitting of white light into its constituent colours on passing through a glass prism is called dispersion of light.

14.Why a glass slab does not produce dispersion whereas a prism does?

Since a rectangular glass slab is equivalent to two similar prisms placed with their base inverted.the dispersion and deviation produced by the two prisms are equal but in opposite direction so net deviation and dispersion are zero+`

15.Define refractive angle of the prism?

ANS;It is angle between two refracting surfaces

16.What is parallax? It may be defined as the relative shift between the two objects placed at different distances from the eye when eye is moved to and fro. 27.Define angle of deviation?

ANS;It is angle between incident ray and emergent ray

28.What are the factors on which the lateral displacement produced by a glass slab depends?

29.Which type of lens has negative power?

Concave

30.which lens is called as diverging lens?

ANS;-Concave

31.What are the applications of total internal reflection?

32.What is angle of minimum deviation?

ANS:It is the angle at which angle of incidence becomes equal to angle of emergence so that the ray of light will be parallel to the base of the prism

33.What are the factors on which the deviation produced by a prism depends ?

34.What is the cause of dispersion? Different color travel with different velocity when passes through the prism

35.Does refractive index depends on wavelength?

ANS:Yes the refractive index depends on the wavelength of light inversely proportional

36.What happens to prism if it is placed in water?

A: It will remain unchanged

36 Why travelling microscope is called so?

ANS:Travelling microscope is called so because it can be moved in horizontal and vertical directions to take measurements while seeing the magnified image of the object under study. It can be used to determine the diameter of capillary tube, to determine the refractive index of the material of a glass slab by measuring real depth and apparent depth etc.

37. When water is filled on the concave mirror ,then how will it behave ? It will behave as a plano-convex lens

38.What type of eye-piece is used in a travelling microscope? Ramsden’s eye piece

39. What is role of lycopodium powder on the upper surface of glass slab while determine refractive index by travelling microscope?

ANS:So that we can focus over the surface of glass slab

40.What is SI unit of refractive index ?

ANS: It has no unit

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