

## 2. OPTICS

### Section A

#### Fill in the blanks:

1. One dioptrre is the power of a lens of one metre ..... [Dec' 11]
2. The ratio of the size of the image to the size of the object is called..... [May'11]
3. In compound microscope, the objective is of ..... focal length. [May'10]
4. The thin lenses of powers  $P_1$  and  $P_2$  are in mutual contact. The combined power is ..... [May'08]
5. The least distance of distinct vision of normal eye is ..... [May'08]
6. A light wave has frequency  $4 \times 10^{14}$  Hz and wavelength  $5 \times 10^{-7}$  m in a medium. The refractive index of the medium is..... [Dec' 08]
7. When a ray of light travels from glass to water separated by sharp boundary, then it bends..... [June 15]
8. Signal is transmitted through optical fibre in the form of ..... [May 15]
9. The final image formed by ..... microscope is virtual and erect. [Dec 13]
10. Speed of light in glass is  $2 \times 10^8$  m/s, the refractive index of glass will be....[May 13]
11. Driver's mirror is always a ..... Mirror. [May 12]
12. Total internal reflection takes place when the angle of incidence is ..... than the critical angle. [May 12]
13. The field of view of a .....mirror is maximum. [Nov 17]
14. A convex lens has a focal length of 10cm ,then its magnifying power is ..... [Nov 17]
15. Focal length of a telescope is ..... [May 17]
16. Focal length of a plane Mirror is ..... [May 16]
17. Velocity of light is maximum in ..... [Nov 15]
18. For sustained interference two sources must be ..... sources [Nov 15]

19. ..... mirror is used as a rear view mirror in vehicles [May 18]  
20. Reflectors used in solar cookers are.....mirrors [Nov 18]

**Choose the correct one:**

$$d. 9 \times 10^8 \text{ ms}^{-1}$$

[Dec' 08]

7. Two lenses of powers +4D and -2D are combined. The effective power of combination is
- +4D
  - 2D
  - +6D
  - +2D
- [May'08]
8. Two lenses of powers +5D and +2D are combined. The effective power of combination is
- +5D
  - +7D
  - +3D
  - +2D
- [Dec' 07]
9. The magnifying power of a telescope can be increased by using
- Objective of large focal length
  - Objective of small focal length
  - Eye piece of large focal length
  - All the above
- [Dec' 06]
10. When light is refracted from one medium to the other, the quantity which does not change is
- b. Velocity    b. Wavelength    c. Frequency    d. All of the above
- [Dec' 06]
11. A lens is formed by combining two thin lenses in contact having power +12 D and -8D. The focal length of the combination is
- (a) 25 cm (b) -25 cm (c) 5 cm (d) -5 cm
- [June 15]
12. Optical fibres are based on the principle of
- (a) Refraction (b) transmission (c) total internal reflection (d) none of these
- [May 15]
13. An optician prescribes to a patient with a combination of a convex lens of focal length 40 cm and a concave lens of 25 cm. The power of spectacles is
- (a) 6.0 D (b) 1.5 D (c) -6.0 D (d) -1.5 D
- [Dec 13]
14. Total internal reflection will take place when light waves travel from
- (a) Air to water (b) water to glass (c) glass to air (d) diamond to glass
- [Nov 14]
15. The focal length of a convex lens is 50 cm. What is its power?

(a) +2 D (b) -2 D (c) -50 D (d) +50 D [ May 13]

16. A telescope has focal length of objective and eye piece as 200 cm and 5 cm respectively. What is magnification of telescope? [May 12]

(a) 40 (b) 80 (c) 50 (d) 0.01

15. The focal length of a concave lens is 20 cm . what is its power?

a.+20 D

c. -5 D

b.-20 D

d. +5 D [Nov17]

16. Magnification produced by a plane mirror is [May16,17]

a. +1

c. +1/2

b.+2

d.-1

17. The refractive index of glass with respect to air is 3/2. The refractive index of air with respect to glass is [Nov 15]

a. 1

c.1/3 b. 3/2

d.None of these

18. A well cut diamond appears bright due to. [May 18]

a. It emits bright light

c. Total internal reflection

b. Scattering of light

d. It emits luminous particles

19. A lens is formed by combining two thin lenses in contact having power + 12 D and -8 D. The focal length of the combination is [June 15]

a. 25 cm

c. 5cm

b. -25 cm

d. -5cm

20. Optical fibers are based on the principle of [May 15]

a. Refraction

c. Total internal Reflection

b. Transmission

d. None of these

### **State True or False:**

1. Convex lens is thin at the middle and thick at the edge. [May'11]

2. The focal length of a convex lens is always negative. [Dec' 09]

3. When light passes from one medium to the other, its wavelength remains constant. [May'08]

4. The magnifying power of a telescope can be increased by using objective lens of large focal length. [May'08]

5. Total internal reflection can occur only when a ray of light enters from a denser to rarer medium. [Dec' 08]
6. The focal length of objective should be small for an astronomical telescope. [May'07]
7. The least distance of distinct vision for a normal eye is 20 cm.[Dec' 06]
8. In a compound microscope, focal length of objective lens is larger than eyepiece. [June 15]
  
9. Convex lens is thick at middle and thin at the edges. [May 15]
10. As an object is brought closer to the focal point of a convex lens from infinity, its image gets farther from lens. [Dec 13]
11. Signal is transmitted through optical fibers in the form of light. [May 13]
12. Refraction of light does not take place in concave and convex mirror. [May 13]
13. Total Internal reflection will not take place, when light ray travels from denser to rarer medium. [Nov 17]
14. A concave mirror always produces a real image. [May 17]
15. Magnification of concave lens is always constant. [May 16]
16. In a Microscope, focal length of objective lens is greater than eyepiece.[May 18]

### **Section B (5 marks)**

1. Discuss the laws of refraction and reflection. [Dec' 11]
  
2. A reflecting type telescope has a large mirror of its objective of focal length 100 cm. What is the magnifying power of the telescope, if the eye piece has a focal length of 10 cm? [Dec' 11]
3. A lens is formed by combining two thin lenses of powers +12 D and -8D in contact with each other. What will be the focal length of the combination?
  
4. Define the terms pole, principal axis, principal focus and focal length for a spherical mirror. [May'11]
5. Velocity of light in a liquid is  $1.5 \times 10^8$  m/s and in air is  $3 \times 10^8$  m/s. If a ray of light passes from this liquid to air, calculate the value of critical angle. [May'10]

6. An object one cm high is placed at a distance of 0.1 m from a convex mirror of focal length 0.05 m . Determine the nature, position and size of the image. [Dec' 09]
7. What is total internal reflection? What are the conditions under which this takes place? Discuss two important applications of this phenomenon. [May'08]
8. With a neat ray diagram show the formation of image in a microscope.  
[Dec' 08]
9. What is total internal reflection? Write the conditions required for it. Write the expression for critical angle.[May'07][Dec' 07]
10. What is magnifying power of an instrument? Give mathematical expressions for magnifying powers of Simple and Compound microscope.  
[June 15]
- 11.The eye-piece of a telescope has a focal length of 10 cm. The distance between objective and eye-piece is 2.1 m. What is magnification of telescope?  
[June 15][May 12]
12. What type of mirror will you use for the following applications- 1) To see your face 2)for shaving 3) in cars to back view 4)in torches and head lights of vehicles 5) ENT doctors.  
[May 15][May 13]
- 13.Discuss the phenomenon of refraction though a compound medium with suitable diagram.  
[Dec 13]
- 14.What is a simple microscope? Find expression for its magnifying power.  
[Nov 14]
- 15.What is a lens? Give its types.  
[May 12]
- 16.A needle placed 45cm from a lens, forms an images on a screen placed 90cm on the other side of the lens. Identify the type of lens and determine its focal length. what will be the size of the image, if the size of needle is 5.0cm ?  
[Nov 17]
- 17.Define refraction and give its laws  
[May17]
- 18.What is meant by power of a lens ? Give units of power of lens [May 16,17]
- 19.What is total internal reflection ? Explain with diagram [Nov15]
- 20.An astronomical telescope having magnifying power of 5 and length 24 cm consists of two lenses. find the focal length of lenses [Nov 15]
21. An Object is placed at 35 cm from a concave mirror of focal length 70cm. Determine the position and nature of image formed . [May18]

22. An astronomical telescope of magnifying power 12 is adjusted to normal position. The focal length of the objective lens is 1.08 metre. Calculate the length of eyepiece. [Nov 18]

### Section C (10 marks)

1. a. Show that when a plane mirror is rotated through an angle, the reflected rays turn through twice the angle.  
b. Calculate the magnifying power of a simple microscope of focal length 5 cm. Distance of distinct vision is 25 cm. [Dec' 11]
2. With the help of ray diagram, illustrate the formation of final image of an object in compound microscope. Derive an expression for its magnifying power. [May'10]
3. With the help of a labeled diagram, explain the construction and working of a compound microscope and find its magnifying power. [Dec' 09]
4. Draw a labeled diagram of compound microscope and derive expression for its magnifying power. [May'08][Dec' 06]
5. What is lens formula? Derive the lens formula in case of a convex lens. Define power of the lens and write its relation with focal length of the lens. [May'08]
6. Derive lens formula for the thin convex lens when the image formed by it is real. Explain the relation of power with focal length of lens. [May'07]
7. (a) A convex lens of small focal length can be used as a microscope. Explain how?  
(b) What is meant by power of a lens? Give units of power of a lens.  
[June 15]
8. (a) What is total internal reflection of light? What are the necessary conditions for it? Derive relationship for refractive index and critical angle.  
(c) A convex lens of focal length 20 cm is placed in contact with another convex lens of focal length 10 cm. What is total focal length and total power of the combination? [May 15]
9. (a) Discuss the image formation by a convex lens at different positions of object in front of lens.  
(b) Refractive index of water is  $4/3$  and that of glass is  $3/2$ . What will be the refractive index of glass w.r.t water? [Dec 13]
10. (a) Derive lens formula for convex lens when real image is formed, with suitable ray diagram.

(c) A convex lens of power +4D and a concave lens of power -3D are placed in contact. What is equivalent power of the combination?

[Nov 14]

11. (a) A convex lens of small focal length can be used as a microscope. Explain how?

(b) An object is placed at a distance of 15 cm from a convex lens of focal length 30 cm. What will be the size of image formed in comparison to the size of the object? [May 13]

12. What is a simple microscope? Find expression for its magnifying power.

[May 12]

13. A telescope has lenses of focal length 25 cm and 2.50 cm. Calculate the magnifying power and length of the tube of telescope. [May 12]

14. What is astronomical telescope ? Explain its construction and working. Find an expression for its magnifying power [Nov 17]

15. With the help of ray diagrams, explain the different types of image formation by convex lens. [May 17]

16. With the help of labelled diagram explain the construction and working of simple microscope and find its magnifying power [May 16]

17. With help of labelled diagram, explain the construction and working of compound microscope and find its magnifying power [Nov 15]

18. You are given four lens of focal lengths 30cm, 20cm, 8cm and 2cm. Which two would you prefer for compound microscope and why ? [Nov 15]

19. Derive lens formula for thin convex lens in case of real image . [May 18]

20. What is simple microscope ? Find expression for its magnifying power . [Nov 18]

## ELECTROSTATICS

### SECTION A

#### Fill in the blanks:

1. .... is the unit of capacitance. [Dec' 11]

2. The unit of capacitance is ..... [May' 11]

3. The value of absolute permittivity of free space is ..... [May' 2010]

4. The formula for capacity of a parallel plate capacitor is ..... [May' 08]

5. SI unit of electric flux is..... [May' 08][May'17]

6. The electric field intensity inside a hollow charge spherical conductor is..... [Dec' 08]
7. Electron volt is the unit of ..... [May' 07]
8. An electric dipole placed in uniform electric field experiences a ..... [Dec' 07]
9. A ..... charge produces an electric field only. [June 15]
10. SI unit of capacitance is..... [May 15]
11. .... is a non-conducting material which separates the plates of a capacitor. [May'16][Dec 13][Nov '18]
12. ..... is the unit of capacitance. [Nov 14]
13. Electric charge is a ..... quantity. [May 13]
14. Electric lines of force originate from ..... charge. [ May 12]
15. Relative permittivity of air is ..... [May'18]
16. Field inside a spherical shell of uniform charge density is..... [Nov'17]
17. The unit of electric charge is ..... [May'16]
18. Value of absolute permittivity of air is ..... [Nov'15]

**Choose the correct one:**

1. One coulomb is the point charge which when placed at one metre from an equal and similar point charge in vacuum repels it with a force  
 a.  $9 \times 10^9$  dyne  
 b.  $9 \times 10^9$  N  
 c. 1 dyne  
 d. 1 N [Dec' 11]
2. A body can be negatively charged by  
 a. Giving excess of electrons to it  
 b. Removing some electrons from it  
 c. Giving some protons to it  
 d. Removing some neutrons from it. [ May'11]
3. Units of electric flux are  
 a.  $NC^{-1}m^2$   
 b.  $JC^{-1}$   
 c. Volt  
 d.  $NC^1m^{-2}$  [ May'10]

4. A parallel plate air capacitor is connected to a battery. The whole space between the plate is filled with a dielectric, resulting an increase in
- Charge and pd
  - pd and electric field
  - Electric field and capacitance
  - Charge and capacitance

[ May'08]

5. Two point charges placed at distance  $r$  exert force  $F$  on each other. Then the distance  $r'$  at which these charges will experience same force in a medium of dielectric constant  $K$  is
- $r$
  - $r/K$
  - $r/\sqrt{K}$
  - $r\sqrt{K}$

[ Dec' 08]

6. Two capacitors of  $5 \mu F$  and  $8 \mu F$  are joined in parallel. The effective capacitance will be
- $13 \mu F$
  - $1/13 \mu F$
  - $13/40 \mu F$
  - $40/13 \mu F$

[ May'07]

7. According to Gauss's law the electric flux passing through a closed surface is
- $1/\epsilon_0$  times the total area of the surface
  - $1/\epsilon_0$  times the total charge in the surface
  - $\epsilon_0$  times the total charge in the surface
  - $\epsilon_0$  times the total area of the surface

[ May'07]

8. Two capacitors of capacitances  $2 \mu F$  and  $6 \mu F$  are connected in series. The effective capacitance of the system will be
- $8 \mu F$
  - $4 \mu F$
  - $3/2 \mu F$
  - $2/3 \mu F$

[ Dec'07]

9. Two capacitors of capacity  $2 \mu F$  and  $6 \mu F$  are connected in parallel. The effective capacitance of the system in  $\mu F$  will be

(a) 8      (b) 2      (c)  $3/2$       (d)  $2/3$       [June 15]

10. Two capacitors each of capacitance  $9 \mu F$  are joined in parallel. The capacitance of the combination is

- (a)  $9 \mu\text{F}$       (b)  $18 \mu\text{F}$     (c)  $4.5 \mu\text{F}$     (d)  $27 \mu\text{F}$                           [May 15]
11. The capacitance of a conductor in vacuum is  $10 \text{ F}$ . It is put in a medium of relative permittivity 5. The capacitance will be  
(a)  $2 \text{ F}$     (b)  $20 \text{ F}$     (c)  $50 \text{ F}$     (d)  $10 \text{ F}$                                   [Dec 13]
12. Electric lines of force about a negative point charge are  
(a) Circular, anticlockwise    (b) circular, clockwise    (c) radial inward    (d) radial outwards    [May 13]
13. In a charged capacitor, the energy resides  
(a) On the positive plate  
(b) On both the positive and negative charged plate  
(c) In the field between the plates  
(d) Around the edge of the capacitor plates                                  [May 12]
14. Electric lines of force at positive point charge are  
(a) Circular anticlockwise  
(b) Radial outward  
(c) Circular clockwise  
(d) Radial inward    [May'18]
15. The law that governs the force between electric charges is called  
(a) Gauss's Law  
(b) Coulomb's Law  
(c) Faraday's Law  
(d) Ohm's Law    [May'17]
16. The capacitance of a parallel plate capacitor does not depend upon the  
(a) Material of the plates  
(b) Medium between the plates  
(c) Area of the plates  
(d) Distance between the plates    [Nov'17]
17. The law that governs the force between electric charges is called  
(a) Ampere's law  
(b) Coulomb's Law  
(c) Faraday's Law  
(d) Ohm's law    [May'16]
18. Electric lines of force at negative point charge are  
(a) Radial inwards  
(b) Radial outwards  
(c) Circular

(d) All of these

[Nov'15]

**State True or False:**

1. The value of  $4\pi \epsilon_0$  in MKS system is 1. [May' 11]
2. Minimum value of dielectric constant is zero. [May' 10]
3. Newton per coulomb is the unit of electric field intensity. [Dec'09]
4. Electric field and potential inside a charged conducting sphere is zero. [May' 08]
5. The dielectric constant of a conductor is infinite [May' 08]
6. In a region of constant potential, the electric field is zero. [Dec'08]
7. Electric field lines cannot intersect each other. [May' 07]
8. A capacitor can store an infinite amount of charge. [Dec'07]
9. Maximum capacitance can be obtained from three capacitors by joining them in series. [Dec'06]
- 10.1 picofarad is bigger than 1 nanofarad. [June 15]
- OR
- Picofarad is bigger unit than nanofarad. [Nov 14]
11. SI unit of charge is ampere. [May 15]
12. When a number of capacitors are joined in series, the resultant capacitance of the combination is always zero. [Dec 13]
13. The permittivity of vacuum is more than one. [May 13]
14. To decrease the capacity of parallel plate capacitor, a sheet of mica should be introduced between the plates. [Nov'15]
15. Electric potential is a vector quantity. [Nov'17]
16. The capacitance of a parallel plate capacitor increases by the introduction of a dielectric slab between its plates. [Nov'17]
17. A dielectric is a non conducting material which separates the plates of a capacitor. [May'17]
18. Metals can be used as dielectric in capacitor. [Nov'18]

19. Dielectrics decrease the capacity of parallel plate capacitor. [ May'18]

**SECTION B**

1. What are the functions of dielectric? [Dec' 11]

2.  $10^6$  electrons are added to a body. Find the total charge on the body.

[May' 11]

3. State and prove Gauss theorem. [May' 11]

**OR**

State and prove Gauss law of electrostatics. [Nov'15]

4. What are dielectric materials? What is their effect on the capacitance of capacitors?

[May' 10]

5. Derive an expression for electric field intensity due to a straight, infinite charged conductor. [Dec'09]

**OR**

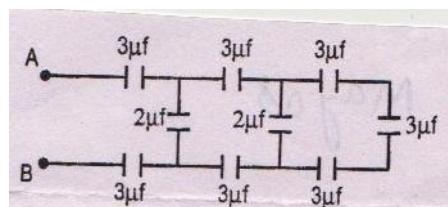
Derive an expression for electric field intensity due to a charged straight conductor. [Nov'17]

6. State and explain Coulomb's law in electrostatics. Express the same in SI units. Mention two similarities and two dissimilarities between electrostatic and gravitational interactions.

[May' 08]

7. Find the equivalent capacitance between A and B in the given circuit.

[May' 08]



8. Three capacitors of 10, 15, 30  $\mu\text{F}$  are connected in series and on this combination a potential difference of 60 V is applied. Calculate the charge, potential difference and energy stored on each capacitor.

[May' 08]

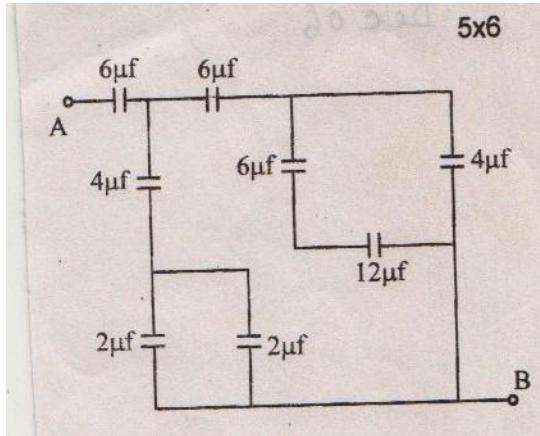
9. State Gauss's law. Write its mathematical form. Prove Gauss's law using Coulomb's law.

[May' 08]

10. Two equal charges are placed at a separation of 1m. What should be the magnitude of these charges so that the force between them equals the weight of a 50 kg person? [Dec'08]

11. Determine the equivalent capacitance of  $n$  parallel plate capacitors in parallel combination. [Dec'08]

12. Find the equivalent capacitance between A and B in the following diagram. [Dec'06]



13. Derive an expression for electric intensity at a point due to plane sheet of charge. [Dec'06]

**OR**

Derive an expression for electric field due to infinite plane charged sheet. [May'16]

14. What are the factors affecting the capacity of a capacitor? [June 15]

15. A charge of  $4 \mu C$  is placed in an electric field of intensity  $50 \times 10^5 N/C$ . What is the magnitude of the force acting on the charge? [June 15]

16. Find the force between two electrons separated by distance of  $0.01 m$ . Charge on electron is  $1.6 \times 10^{-19} C$ . [May 15]

17. State Coulomb's law. What are the SI and CGS units of charge? [May 15]

18. Calculate the force of attraction between a proton and electron separated by a distance of 0.8 fermi. [Dec 13]

19. Write short note on the following

(a) Potential    (b) Potential Difference    (c) Potential Breakdown

[Dec 13]

20. Find expression for capacity of parallel plate capacitor.

[Nov 14][Nov'18]

21. Two equal but opposite charges experience a force of  $25 \times 10^5 N$  when they are placed 2 cm apart in air. Determine the charge. [Nov 14]

22. Find the force between two x-particles separated by a distance of 3.2 fermi in air. [May 13]
23. Three identical capacitors each of capacitance  $C$  farad are connected in series. This combination is connected with one more similar capacitor. Find the capacitance of whole combination. [May 13]
24. Discuss different charge distributions. [May 12]
25. What are properties of electric lines of force? [May'18]

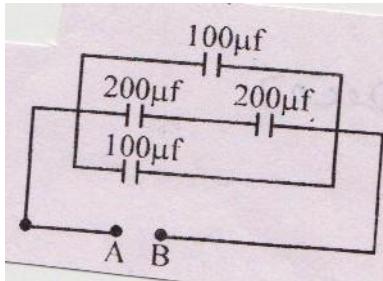
**OR**

- Give some properties of electric lines of force. [Nov'18]
26. Find electric field due to a point charge of  $2 \mu C$  at a distance of 9 m in vacuum. [May'17]
27. The radius of earth is 6400 km. What is its capacitance? [May'16]
28. Capacitors of 4, 5 and  $6 \mu F$  are connected in series and parallel. Compare the effective capacitances in two cases. [Nov'15]

## SECTION C

1.
  - a. Find the equivalent capacitance when three capacitors are connected in parallel.
  - b. What must be the capacitance of a capacitor which is to store a charge of 0.01 coulomb when a potential difference is 500 volts? [Dec' 11]
2. State and prove Coulomb's law in electrostatics. [May' 11]
3. Define capacitance of a capacitor. Explain its principle. Derive an expression for capacitance of a parallel plate capacitor. [May' 10]
4. a. Find the electric field intensity due to a Plane Sheet of charge.  
c. Two infinite parallel plates have uniform charge densities  $\pm \sigma$ . What is the electric field in (i) the region between the plates and (ii) outside? [Dec'08]
5. Define capacitance of a capacitor. Write its S.I. unit. Derive an expression for the capacity of a parallel plate capacitor with air as medium between the plates. What happens if the air is replaced by another medium of dielectric constant ' $K$ '? [May' 07]

6. a. Define capacitance of a parallel plate capacitor. Write its S.I. unit. Three capacitors  $C_1$ ,  $C_2$ ,  $C_3$  are joined in series. Find the capacitance of equivalent capacitor.  
 d. Find the equivalent capacitance between A and B.



[Dec'07]

7. (a) Find expression for capacity of parallel plate capacitor.  
 (b) Give some properties of electric lines of force. [June 15]
8. (a) Find equivalent capacitance when 3 capacitors are connected in parallel.  
 (c) What is the capacitance of capacitor which is to store a charge of 0.1 coulomb when potential difference is 500 volts? [May 15]
9. Find equivalent capacitance when three capacitors are connected in series. [Dec 13]
10. Derive Coulomb's law from Gauss's law. [Nov 14]
11. (a) State and explain Coulomb's law of electrostatics. Define one coulomb as unit of electric charge.  
 (b) What are the factors affecting the capacity of a capacitor.
12. Starting from Gauss's law, prove Coulomb's law. [May 12]
13. One coulomb point charge is placed at distance of one metre from an equal and similar point charge. Find the repulsive force acting on the charge. [May 12]
14. (a) Derive an expression for electric field intensity due to long charged straight conductor.  
 (b) A charge of  $4 \mu C$  is placed in an electric field of intensity  $50 \times 10^5 N/C$ . What is the magnitude of the force acting on the charge? [Nov'15]
15. Find the equivalent capacitance when three capacitors are connected in series and parallel. [May'16]
16. What is principle of a parallel plate capacitor? Describe the various factors affecting the capacity of a capacitor. Explain. [Nov '17]

17. (a) State and explain Gauss's theorem.  
 (b) Calculate the electrostatic force between a proton and an electron separated by a distance of 10 nm in vacuum. [May'17]
18. (a) Derive an expression for electric field intensity due to infinite plane charged sheet.  
 (b) Discuss different charge distributions. [Nov'18]
19. State and prove Gauss's law. [May'18]

## 4. CURRENT ELECTRICITY

### SECTION A

#### **Fill in the blanks:**

1. When the temperature of a metallic conductor is increased, its resistance always..... [ Dec' 11][May 13]
2. Unit of conductance is ..... [May'11]
3. The resistance of an ideal voltmeter is ..... [May'08]
4. A wire is stretched to thrice its original value of length. Its new resistivity will be ..... [May'08]
5. A wire of resistance R is cut into n equal pieces. They are joined in parallel. The equivalent resistance of the combination is ..... [May'08]
6. An ammeter is used to measure ..... [Dec'08]
7. Electrical resistance of metals..... with increase in temperature. [May'07]
8. A wire is stretched to twice its initial length. Its new resistivity will be ..... [Dec'08]
9. S.I unit of potential difference is same as the unit of .....[June 15]
10. Kilowatt is the unit of ..... [Nov 14]
11. Slide wire bridge is an application of ..... [Dec13]  
 [Nov'18]
12. Heat produced in a ..... directly proportional to the resistance. [ May 12]
13. Frequency of direct current is ..... [ May'18]
14. The conductors which obey Ohm's law are called.....[May'16]
15. 1 volt is numerically equal to..... [Nov'15]

#### **Choose the correct one:**

1. Conductance is the reciprocal of
  - a. Current
  - b. Current density
  - c. Resistance
  - d. Resistivity[Dec'11]
  
2. Four resistances  $R_1, R_2, R_3, R_4$  are connected in parallel.  
The resultant resistance  $R$ 
  - a. Equal to the sum of the four resistances
  - b. Greater than the sum of the four resistances
  - c. Less than the sum of the four resistances
  - d. Less than the any of the four resistances.[May' 11]
  
3. Kilowatt hour is the unit of
  - b. Energy
  - c. Power
  - d. Current
  - e. Charge[Dec'09]
  
4. A conductor of resistance  $8 \Omega$  is bent in the form of a circle. What will be the resistance between two points on any diameter of the circle?
  - a.  $1 \Omega$
  - b.  $2 \Omega$
  - c.  $8 \Omega$
  - d.  $16 \Omega$[Dec'09]
  
5. The resistance of a straight conductor does not depend on its
  - a. temperature
  - b. length
  - c. material
  - d. shape of cross section[May '08]
  
6. On applying a potential difference of  $V$  volts across a conductor, a current  $I$  flow through it for time  $t$ . The heat produced in the conductor will be

a.  $Q = VI$

b.  $A = V/I$

c.  $Q = V I t$

d.  $Q = (V/I) t$

[May '07]

7. The specific resistance of a wire depends upon its

a. length

b. Diameter

c. Mass

d. Material

[Dec'07]

8. Kirchhoff's second law is in agreement with conservation of

a. Charge

b. Energy

c. Momentum

d. Mass

[Dec'07]

9. Specific resistance of a conductor increases with

a. increase in cross sectional area

b. increase in temperature

c. decrease in cross section

d. decrease in temperature.

[Dec'06]

10. B.O.T. (Board of trade) unit is the unit for measuring

(a) Electric power

(b) Electric current

(c) Electric energy consumed

(d) Electric potential

[May 12][May 13][June 15]

11. A 100 W bulb remains on for 6 hours every day. The amount of electric energy consumed for 30 days will be :

- (a) 0.5 kWh    (b) 0.5 kJ    (c) 18 kWh    (d) 30 kWh    [Dec 13]

12. Slide wire bridge is an application of

- (a) Wheatstone bridge                (b) Ohm's law  
© Thermometer                        (d) Lenz's law                [Nov 14]

13. One kWh is equal to

- (a)  $36 \times 10^5$  J    (b)  $0.36 \times 10^5$  J    (c)  $3.6 \times 10^6$  J    (d)  $36 \times 10^6$  J    [May 15]

14. Two resistances of  $9\ \Omega$  and  $18\ \Omega$  are connected in series. Equivalent resistance is

- a.  $20\ \Omega$                         b.  $27\ \Omega$                         c.  $9\ \Omega$                         d.  $2\ \Omega$     [May '18]

15. Slide wire bridge is an application of:

- (a) Wheatstone bridge                (b) Potentiometer                (c) Neither (a) nor (b)  
(d) None of these                        [May'17]

16. Kilowatt hour is the unit used for measuring

- (a) Electric current    (b) Electric power    (b) Electric potential    (d) Electric energy  
[Nov'17]

17. Slide wire bridge is an application of:

- (a) Wheatstone bridge                (b) Potentiometer                (c) Kirchhoff's law (d)  
None of these                                [May'16]

18. Kirchhoff's second law is based on conservation of

- (a) Charge (b) mass (c) energy (d) none of these                        [Nov'15]

**State True or False:**

1. The time rate of flow of charge is called electric current.

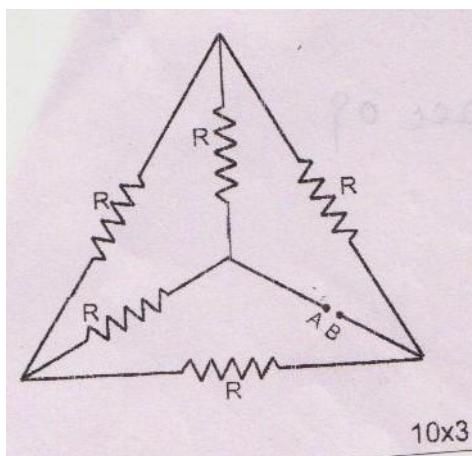
[ May'11]

2. The resistance of an ohmic conductor depends upon the applied voltage.                        [May'10]

3. Units of resistivity are ohm metre. [May'08]
4. An ideal ammeter has zero resistance. [Dec'07]
5. Reciprocal of resistance is called resistivity. [Dec'97]
6. In parallel combination resistance decreases. [Dec'07]
7. The formula  $V=IR$  is true for non-ohmic resistance also.  
[Dec'08]
8. When Wheat stone bridge is balanced, no current flows through the galvanometer. [ Dec'06]
9. Heat produced in a conductor depends directly on time. [ June 15]
10. Resistance of thick wire is greater than that of thin wire. [ May 15]
11. To determine e.m.f. Wheatstone bridge is to be used. [Nov 14]
12. Specific resistance of a wire depends upon its length only. [ Dec 13]
13. Pencil cell used in torch is a source of A.C. current. [May 13]
14. EMF is the difference of potential between two electrodes in open circuit. [May'18]
15. Reciprocal of resistance is called conductance. [Nov'18]
16. Post office box works on principle of wheat stone bridge. [Nov'18]
17. Electric current is vector quantity. [Nov'15]

## SECTION B

1. State Ohm's law and give its mathematical form.[Dec/11]
2. Find the equivalent resistance when three resistances are connected in series.[May'11]
3. A parallel combination of three resistors takes a current of 7.5 A from 30V supply. If two resistors are 10 \$ and 12 \$, calculate the third one.[May '10]
4. Find the effective resistance between points A and B[Dec '09]

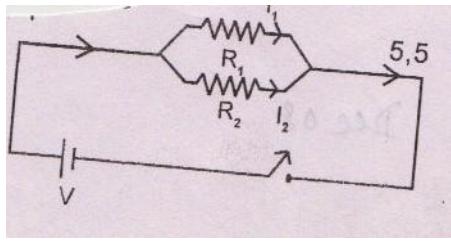


5. Two bulbs are marked 60 W-220 V, 100 W-220 V. They are connected in
- Series
  - Parallel

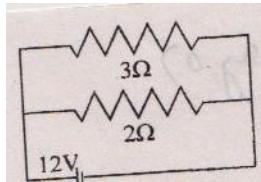
Which bulb will glow brighter? [Dec '09]

6. State and explain Kirchhoff's laws for electrical network. What are conservation laws implied in each law? [May '08]  
 7. In the circuit shown below determine  $I_1$  and  $I_2$  in terms of  $I$ ,  $R_1$  and  $R_2$ .

[Dec'08]

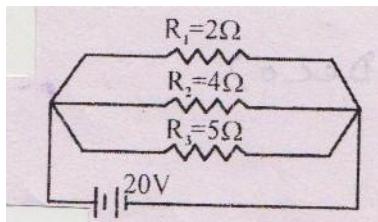


8. Two resistances of 3 ohm and 2 ohm are connected as shown across a potential difference of 12 V



Find:

- Equivalent resistance
  - Total Current
  - Current through 3 ohm and 2 ohm resistances. [May'07]
9. In the given circuit calculate the total resistance and current through each resistor [Dec'07]



10. Find the total resistance when the various resistors are connected in series and parallel. [Dec'06]
11. Differentiate between e.m.f. and potential difference for a cell. [ May 12]
12. The length of a wire of radius 0.007 cm is 1000 cm. If the resistance of the wire is 30 ohm, what is the specific resistance of its material? [ May 13]
13. What is Wheatstone bridge? Explain with proper diagram. [ May 13]
14. Discuss the advantages of electrical energy over other forms of energy. [Dec 13]
15. Give experimental verification of Ohm's law. [Nov 14]
16. What is Wheatstone bridge? Derive expression with the help of circuit diagram. [ May 15]
17. Write a short note on Kirchhoff's laws and their applications. [ June 15]
18. An incandescent lamp draws a current of 0.3 A at 240 volt. Find the resistance of lamp.
19. Differentiate between e.m.f. and potential difference. [May 12][Nov'18]

**OR**

What are the differences between EMF and potential difference of a cell? [May'18]

20. If length and area of cross-section of a conductor are doubled, find the new resistance of conductor. [Nov'18]
21. Convert 1 kWh into joule. [May'17]
22. Define current. What is AC and DC? [May'17]
23. Differentiate between alternating and direct current. [May'16]
24. Derive an expression for the heat produced by electric current in a conductor. [May'16]
25. What is Wheatstone bridge? Derive the condition for balanced Wheatstone bridge. [Nov'15]
26. Three resistances are connected in series. Derive the formula for total resistance. [May'15]

**SECTION C**

- 1.a. Find equivalent resistance when three resistances are connected in parallel.
- b. An incandescent lamp draws a current of 0.3 A at 240 V. Find the resistance of the lamp.[Dec'11]
- 2.a. A current of 20 A flows into a circuit consisting of 2,4 ,5 and 20 ohm resistances respectively in parallel. Determine the current in each branch.
- b. Force between two parallel current carrying conductors is  $F_1$ . If the current in each conductor is doubled, find the force between them. [May'11]
3. State Kirchhoff's laws of electrical network. Use these laws to derive condition for balanced Wheatstone bridge.[May'08]
4. a) 3 equal resistances are arranged in series and then they are arranged in parallel. Find out the ratio of  $R_s/R_p$  where  $R_s$  is equivalent resistance in series and  $R_p$  is equivalent resistance in parallel.
- b) State Ohm's law. What is the effect of temperature on resistance of conductor? [May'18]
5. a) Find equivalent resistance when three resistances are connected in series.
- b) State and explain Kirchhoff's laws for DC circuit. [Nov'18]
6. Differentiate between E.M.F. and potential difference. [May'17]
7. What is Wheatstone bridge principle? Explain with diagram how it is used to calculate unknown resistance? [Nov'17]
- 8 (a) What is Kirchhoff's 1<sup>st</sup> and 2<sup>nd</sup> law.
- (b) Convert 1kWh into joule. [May'16]
9. (a) State and explain Ohm's law. What do you understand by voltage drop? Explain the difference between emf and voltage of a cell.
- (b) If the length of wire is stretched to double its length, what would be change in resistance and resistivity of conductor? [May'15]

## 5. ELECTROMAGNETISM

### SECTION A

**Fill in the blanks:**

1. The permeability of ..... material is less than one. [Dec'11]
2. Tesla is the unit of..... [May'11]
3. For making core of a transformer..... materials are used. [May'10]
4. The permeability of a specimen has value less than one. The specimen is ..... [May'08][Dec'06]
5. The material strongly attracted by magnetic field is called.....[Dec'08]
6. Galvanometer can be changed into ammeter by connecting a shunt in .....to it. [May'07]
7. Galvanometer can be changed into a voltmeter by connecting high resistance in .....with it. [Dec'07]
  
8. The permeability of ..... material is less than one. [ Dec '11]
9. A .....is used to detect and measure small current or voltage. [May '12]
10. 1 Tesla = .....Gauss [May '13,16,17]
11. Weber is unit of measuring.....[Dec '13]
12. A ..... is used to measure potential difference between two points of conductor.[June '15]
13. The materials which are weakly repelled by a magnet are called ....[May 17]
14. A Magnetic field exerts no force on... charge[Nov 18]

**Choose the correct one:**

1. A charge is moving parallel to a magnetic field. Force acting on it is
  - a.  $q v /B$
  - b.  $q B /v$
  - c.  $q/ B v$
  - d. zero [Dec'11]
2. The force experienced by a particle of charge q moving with velocity v in a magnetic field B is given by
  - a.  $F = q(v \times B)$
  - b.  $F = q ( B \times v)$
  - c.  $F = ( v \times B)$
  - d.  $F = q ( v \times B)$  [May'11]
3. A current is passed through a straight wire. The magnetic field established around it has its lines of force

- a. Elliptical
  - b. Circular
  - c. Oval
  - d. Parabolic
- [May'10]
4. Which of the following cannot be deflected while in motion by magnetic fields
- a. Protons
  - b. Cathode rays
  - c. Alpha particles
  - d. Neutrons
- [Dec'09]
5. The force on a charged particle moving in a magnetic field is maximum when angle between direction of motion and field is
- a. Zero
  - b.  $90^\circ$
  - c.  $180^\circ$
  - d.  $45^\circ$
- [May'08]
6. When a ferromagnetic substance is heated above its curie temperature, then
- a. It is demagnetized
  - b. Becomes diamagnetic
  - c. Becomes paramagnetic
  - d. It remains unaffected
- [May'08]
7. The path of a charged particle moving perpendicular to the uniform magnetic field is
- a. Circular
  - b. Parabolic
  - c. Straight
  - d. Helical
- [May'08]
8. The magnetic field at a point distance 'a' from a long straight wire carrying current  $i$  is
- a.  $\mu_0 I / 2 \pi a$
  - b.  $\mu_0 I / 4 \pi a$
  - c.  $\mu_0 I / 2 a$
  - d.  $\mu_0 I / 4 a$
- [Dec'08]
9. When a charged particle enters in a uniform magnetic field, its kinetic energy
- a. Remains constant
  - b. Increases

- c. Decrease
- d. Becomes zero

[ Dec'06]

10. To increase the range of a voltmeter, we needed to connect a suitable

- (a) Low resistance in parallel
- (b) Low resistance in series
- (c) High resistance in parallel
- (d) High resistance in series

[June '15][May'18]

11. CGS unit of magnetic field is

- (a) Tesla
- (b) Gauss
- (c) TmA<sup>2</sup>
- (d) Am<sup>2</sup>

[May '15,16]

12. To increase the range of an ammeter, we connect a suitable

- (e) Low resistance in parallel
- (f) Low resistance in series
- (g) High resistance in parallel
- (h) High resistance in series

[May 12][Nov 14][May 13]

13. Force between the two parallel current carrying conductors is F<sub>1</sub>. If the current in each conductor is doubled, the force between them will be

- (a) 0.25 F<sub>1</sub>
- (b) 0.5 F<sub>1</sub>
- (c) 2 F<sub>1</sub>
- (d) 4 F<sub>1</sub>

[ Dec '13]

## TRUE OR FALSE

1. A solenoid acts as a bar magnet. [June 15]
2. Tesla is the unit of electric field. [Nov 14]
3. The sensitivity of moving coil galvanometer increases with the decrease in number of turns. [Dec '13]
4. A device in which mechanical energy is used to produce electrical energy is called inverter. [May 13]
5. Susceptibility is small and positive for paramagnetic materials. [May 11]
6. Susceptibility is positive and large for ferromagnetic substances. [Nov'15]
7. Iron is a ferromagnetic material. [May 16]
8. AC generator works on the principal of electromagnetic induction. [May 17]

## SECTION B

1. What are magnetic lines of force? State their properties.

[Dec'11]

2. A conductor 100 cm long carries a current of 100 A at right angles to a uniform magnetic field of 1 wb/m<sup>2</sup>. Calculate the force and power required to move the conductor at speed of 10 m/s in a plane at right angles to the magnetic field. [Dec'11]
3. Show how you will change a galvanometer into an ammeter. [May'11]
4. Derive an expression for force acting on a current carrying conductor placed in external magnetic field. [Dec '13][May 13][May'08]
5. Explain how a moving coil galvanometer can be converted into an ammeter of range 0-I? [May'08]
6. Explain how a uniform magnetic field can be produced in a given region of space. Also determine the value of the field. [Dec'08]
7. To increase the current sensitivity of a moving coil galvanometer by 50 %, its resistance is increased so that new resistance becomes twice its initial resistance. By what factor does its voltage sensitivity change? [Dec'06]
8. Derive an expression of torque acting on a rectangular current carrying coil placed in the magnetic field. [May 12]
9. A galvanometer has a resistance of 25 ohm and it shows full scale deflection for a current of 4 mA. How will it be converted into an ammeter of range 0 to 5 A? [May 12]
10. What is electric motor? Explain its principle. [June 15]
11. Define magnetic flux. Give its units and mathematical expression. [Nov '14]
12. The resistance of a moving coil galvanometer is 10 ohm and current required for full scale deflection is 0.01 A. How will you convert it into a voltmeter reading 10 volt on full deflection. [Dec '13]
13. Write down Faraday's Law of electromagnetic Induction. [May 16]
14. Explain how will you convert a galvanometer into a voltmeter. [Nov 17]
15. A galvanometer of resistance 100 ohm gives full scale deflection when a current of 1mA is passed through it. Find the value of shunt resistance needed to convert this galvanometer into an ammeter of range 10 A. [Nov 18]
16. State Lenz's law in electromagnetic induction. [May'18]

## Section C

1. Explain how a galvanometer can be converted into a voltmeter of a given range? Why it is always connected in parallel? [ May 12]

2. (a) What is solenoid? Give its basic diagram, working and the uses.

(b) Force between the two parallel current carrying conductors is  $F_1$ . If the current in each conductor is doubled, find the force between them.

[May 13]

3. (a) Show how you will change a galvanometer into an ammeter.

(b) Obtain an expression for the force acting on current carrying conductor placed in magnetic field. [Dec '13]

4. (a) Show how will you change a galvanometer into voltmeter.

(b) Write in brief the working principle of an electric motor. [Nov 14]

5. (a) Show how will you change a galvanometer into ammeter.

(b) Force between the two parallel current carrying conductors is  $F_1$ . If the current in each conductor is doubled, find the force between them.

[June 15][May 13]

6. (a) Derive an expression for the force acting on a current carrying conductor placed in magnetic field .

(b) A current carrying conductor is placed in magnetic field. Find the angle between current and magnetic field when force acting on the conductor is maximum and minimum. [Nov 15]

7. (a) Derive an expression for the force between two parallel conductors carrying current.

(b) What are magnetic lines of force ? Give properties of magnetic lines of force. [May 16]

8. Differentiate between paramagnetic, diamagnetic and ferromagnetic materials. [Nov 17]

9. Define magnetic flux. Write down its properties. [May 17]

10. (a) Explain how a galvanometer can be converted into a voltmeter of given range ? [Nov 18]

- (b) Find the force acting on an electron moving with velocity  $10^7$  m/sec in magnetic field of  $10^{-4}$  tesla perpendicular to it.
11. Explain principle, construction and working of moving coil galvanometer. [May'18]

## 6. SEMICONDUCTOR PHYSICS

### Section A

#### Fill in the blanks:

1. An extremely pure semiconductor is called ----- semiconductor. [May '11][May 15]
2. To obtain a p-type semiconductor germanium is doped with an impurity atom of valency ----- [Dec '09]
3. ..... are the majority charge carriers in p-type semiconductor. [May '07][June'15]
4. ----- are the minority carriers in p-type semi-conductors. [Dec '07]
5. Metals are good conductors of electricity due to the presence of .... [ May 13]
6. Region in between P-type and N-type semiconductors in a P-N diode is called ..... [Dec 13]
7. Forbidden energy band gap of Ge is ..... [ Nov 14]
8. ..... are the majority carriers in P-type semiconductor. [June'15][May'18]
9. Forbidden energy band gap of Silicon (Si) is ..... [Nov'15]

#### State True or False:

1. The conductivity of a semiconductor is zero at absolute zero. [ May '11][May 15]
2. Energy gap of semiconductors is more than insulators. [May '10]
3. Germanium and silicon have a valency of 4. [May '08]
4. An ideal diode conducts only when forward biased. [May '07]
5. A single diode cannot be used as full wave rectifier. [Dec '07]
6. No of diodes used in bridge rectifier is 3. [Dec13][May 15]
7. Zener diode is used in stabilizing the circuits. [May'18]

8. Depletion layer of PN junction contains electrons only. [ Nov'18]
9. In a transistor, the collector-base junction must be reverse biased. [Nov'17]
10. Holes are majority carriers in N type semiconductor. [Nov'15]

**Choose the correct one:**

1. The region near the junction of P-N diode where there are no charge carriers is called -----
  - a. P-region
  - b. N region
  - c. Depletion region
  - d. Ionic region[ Dec '07]
2. In a full wave rectifier the number of diodes used are
  - a. One
  - b. Two
  - c. Three
  - d. Five[ May '07]
3. An N-type semiconductor is
  - a. -ve charged
  - b. +ve charged
  - c. Neutral
  - d. -ve or + ve depending applied voltage[ May '10]
4. A small impurity is added to GE to get N-type semiconductor. The impurity is
  - (a) Trivalent substance
  - (b) Pentavalent substance
  - (c) Both a and b
  - (d) Bivalent substance[Nov 14]
5. The forbidden energy gap in a semiconductor is of the order of
  - (a) 1 MeV
  - (b) 0.1 MeV
  - (c) 1 eV
  - (d) 5 eV[ May 15]
6. If the forward voltage in a diode is increased the length of depletion layer will
  - (a) Decrease
  - (b) Increase
  - (c) Not change
  - (d) Increase proportional to applied voltage.[June 15]

7. When the conductivity of semiconductor is only due to breaking of covalent bonds then semiconductor is called
  - (a) Extrinsic
  - (b) acceptor
  - (c) intrinsic
  - (d) none of these[Nov'15]

### **SECTION B**

1. Explain how P-N junction is formed? [Dec 07]
2. Explain the working of P-N diode as full wave rectifier. [Dec '09]
3. Explain the working of P-N junction diode as full wave rectifier. [May 2010]
4. Differentiate between intrinsic and extrinsic semiconductors.  
[Dec13] [May '11][May 13][May 15][May'17][Nov'15]
5. Discuss the atomic structure of germanium. [Dec '11]
6. What are intrinsic and extrinsic semiconductors? [May 12]
7. Explain P-type and N-type semiconductor. [Nov 14]
8. What is depletion layer in p-n junction? [May'18]
9. How will you differentiate between insulators, good conductors and semiconductors on the basis of band theory of solids? [Nov' 18]
10. Explain the working of p-n junction diode in detail with diagram. [May'17]
11. Define the following: (a) Knee voltage (b) depletion Region (c) Potential barrier [Nov'17]
12. Explain the effect of temperature on the conductivity of intrinsic semiconductors. [Nov'17]
13. Differentiate between N-type and P-type semiconductors. [May'16][June '15]

### **SECTION C**

1. Explain with the help of diagram full wave bridge rectifier in detail. [Dec'11]  
**OR** Explain full wave bridge rectifier in detail. [Dec 13]
2. Differentiate between N-type and P-type semi conductors.  
[May '11][May'18][Nov'18]

3. With the help of neat and labeled diagram discuss the characteristics of P-N junction diode in forward and reverse bias. [May '08]
4. Explain half wave rectifier in detail. [Nov 14][May 12]
5. What is depletion region? Explain what happens to depletion region when it is 1) forward biased 2) reverse biased. [May 13]
6. What is doping? How extrinsic semiconductors are made with doping? [Nov'17]
7. What is Rectifier? Explain half wave rectifier with diagram. [May'16]
8. What is Rectifier? Explain full wave bridge rectifier with diagram. [Nov'15]
9. Explain working of PN junction diode as half wave rectifier.[June'15]

## 7. MODERN PHYSICS

### SECTION A

#### Fill in the blanks:

1. In optical fibres light travels due to the phenomenon of ----- [Dec '09]
2. Wave length of He-Ne laser is ----- [ May 10]
3. Signal is transmitted through optical fibre in the form of ----- [Dec '11]
4. Total internal reflection takes place when the angle of incidence is .... Than the critical angle. [ May 12]
5. Output of ruby laser is a ..... wave. [Nov 14]
6. Output of a ruby laser is ..... [ May 15]
7. Output of He-Ne laser is a .....wave. [May'18]

#### State True or False

1. LASER is a monochromatic beam of light . [ May '08]
2. Total internal reflection is used in optical fibers. [ June 15]
3. Signal is transmitted through optical fibres in the form of light. [ May 13]
4. Total internal reflection (TIR) is used in optical fibers. [May'18]

5. A laser is a coherent source because it contains many wavelengths.  
[May'17][May'16]

**Choose the correct one:**

1. In a He-Ne laser, the helium atoms
  - (a) Emit laser light
  - (b) Impart energy to Ne atoms
  - (c) Act as catalytic agent
  - (d) Act as quenching agent [ May 08]
2. The term population inversion means
  - (a) Population of ionized state is maximum
  - (b) Population of excited state is maximum
  - (c) Population of lower level is more than higher one
  - (d) Population of lower level is less than higher one [ May 08]
3. A Ruby laser is a
  - (a) Two level laser
  - (b) Three level laser
  - (c) Four level laser
  - (d) Five level laser [May '11][May 13][May'16]
4. Population inversion in helium-neon laser is produced by
  - (a) Photon excitation
  - (b) Electron excitation
  - (c) In elastic atomic collisions
  - (d) Chemical reactions [ Dec ' 11 ]
5. Some lasers are referred to as being ‘CW’. What does CW mean?
  - (a) Circular wave
  - (b) Constant white
  - (c) Continuous wave
  - (d) Compression wave [May 12]
6. A laser is a coherent source because it contains
  - (a) Many wavelengths
  - (b) Uncoordinated wave of a particular wave length
  - (c) Coordinated wave of many wavelengths
  - (d) Coordinated waves of a particular wavelength [ Dec 13]
7. Laser is based on the principle of
  - (a) Total internal reflection
  - (b) Refraction
  - (c) Population inversion

- (d) Spontaneous emission [ Nov 14][May'18]
8. Optical fibres are based on the principle of  
 (a) Refraction (b) transmission (c) total internal reflection (d) none of these [ May 15]
9. He-Ne Laser is a  
 (a) Two level laser  
 (b) Three level laser  
 (c) Four level laser  
 (d) Five level laser [May'17]
10. Laser is based on the principle of  
 (a) Stimulated absorption  
 (b) Spontaneous emission  
 (c) Stimulated emission  
 (d) All of above [Nov'17]

## **SECTION B**

1. What is the principle of laser? Write the basic atomic concepts involved in the production of laser light.  
 [ Dec '07]
2. What is an optical fibre? On what principle does it work? Write a few advantages of optical communication.  
 [Dec 07]
3. Explain the construction of optical fibre.  
 [May 07]
4. Why ultra pure silica is used for making optical fibres.  
 [ May 07]
5. Explain the terms absorption, spontaneous emission and stimulated emission of radiation.[May 07]OR

Discuss the terms absorption, spontaneous and stimulated emission.  
 [May 15]

6. Find the energy associated with He- Ne laser beam if the wavelength of laser beam is  $632.8 \times 10^{-9}$  m.  
 [ May 08]
7. Write short notes on type -I and type -II superconductors.  
 [May 2010]
8. Give some properties of laser light. [May '11][Dec 13][June 15][Nov'18]

9. What do you mean by three level laser? Explain.

[Dec 11]

10. Explain how laser can be used for drilling and cutting of materials.

[ May 12]

11. Find the distance of an unknown object from the earth, if laser beam takes 5 seconds to return after reflection from it. [ May '13]

12. Give five application of LASER. [Nov 14]

13. What is population inversion? [May'18]

14. What is optical fibre? Write down a short note on optical fiber communication. [Nov'18]

15. Write down the properties of LASER. [May'17]

16. What are single-mode and multi-mode optical fibers? Explain with diagrams. [Nov'17]

17. What is three level laser and four level laser? Explain with diagrams. [Nov'17]

### SECTION C

1. Find the distance of an unknown object from the earth, if laser beam takes 5 seconds to return after reflection from it. [ Dec '11]
2. What is He- Ne laser? Explain with diagram. [May '11][May 15]
3. What are different types of Laser? Explain the construction and working of Ruby laser with the help of energy level diagram. [ May 2010]
4. What is laser? Describe the basic principle involved in working of a laser. Mention some of the applications of lasers. [ Dec 09]
5. What is Ruby laser? Explain its working with diagram. [May'18]
6. What is an optical fibre? Explain its construction. How does light propagate in an optical fibre? [ Dec 09]
7. What does LASER stand for? Write the characteristics of LASER. Give its applications in the field of industry, medicine and communication. [ May 08]
8. Discuss the construction and working of helium neon laser. Write its applications also. [ May 08]
9. Give important characteristics of a laser beam. Also describe its important applications. [Dec 08]
10. Write the characteristics of LASER. Give its applications in the field of industry, medicine and communication. [ Dec 06]

11. An object is  $6.4 \times 10^{10}$  m from the surface of earth. How much time will the laser beam take to return after reflection from it. [ May 12]
12. Discuss the terms absorption, spontaneous and stimulated emission. [May 15]
13. What is a Ruby Laser? Explain its working with proper diagram. [ Dec 13]
14. Find the distance of an unknown object from the earth, if LASER beam takes 10 seconds to return after reflection from it. [ Nov 14]
15. Write a short note on Optical Fiber Communication. [June 15]
16. Write down the applications of optical fibers in detail. [May'17]
17. What is optical fiber? Explain various applications of optical fibers. [Nov'17]
18. What is Ruby and He-Ne laser? Explain both with diagrams. [May'16]
19. What is Laser? Explain He-Ne laser with diagram. [Nov '15]

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