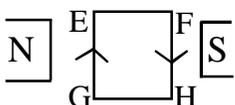


- The capacitance of an air cored capacitor is 4 mF.
 - What do you mean by this ?
 - Discuss the effect of introducing a dielectric in between the plates of the capacitor { 1 + 2 = 3 }
- Two equal and opposite charges are separated by a small distance.
 - Name the arrangement.
 - Find the electric field at a point on the axial line of the above arrangement. { $\frac{1}{2} + 3\frac{1}{2} = 4$ }

3. A rectangular current carrying loop EFGH is kept in a uniform magnetic field as shown in fig.

- What is the direction of the magnetic moment of the current loop?
- When is the torque acting on the loop (i) maximum (ii) zero?  { 1 + 2 = 3 }

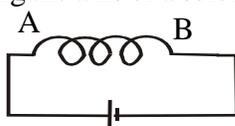
4. Electrical lines of force are the pictorial representation of electric field in a region.

- Draw the field lines from an isolated point positive charge.
- Assuming a Gaussian surface around the charge, find an expression for the electric flux through the surface. { 1 + 3 = 4 }

5. Potentiometer measures emf accurately.

- State the principle of potentiometer.
- Explain comparison of emf of two cells with the help of a figure.
- Why do we prefer a potentiometer over a voltmeter? { 1 + 2 + 1 = 4 }

6. A solenoid is equivalent to a bar magnet.

- Obtain an expression for intensity of magnetic field at a point along the axis of a solenoid and thus the magnetic moment of the solenoid.
- A potential difference is applied across a solenoid as shown in fig. Identify the magnetic poles developed at A and B.  { 2 + 2 = 4 }

7. Faradays laws of electromagnetic induction gives the magnitude of emf in a coil cutting magnetic flux.

- State the law which gives the direction of induced emf in the coil.
- Arrive at an expression for self inductance of a solenoid. { 1 + 2 = 3 }

8. (a) With the help of a phasor diagram derive the expression for impedance of an LCR circuit.

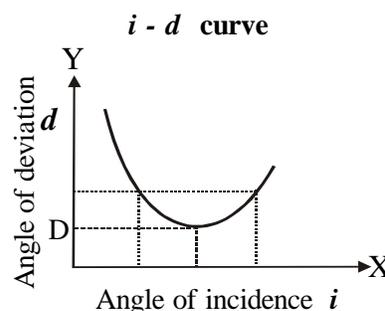
- Prove that in a circuit containing inductor only the current lags behind the voltage. { $1\frac{1}{2} + 1\frac{1}{2} = 3$ }

9. Match the following { $\frac{1}{2} \times 4 = 2$ }

A	B
gray	Sun Burn
X ray	Remote Sensing.
microwaves	diagnosis
u v rays	radioactivity.
	refrigerant

10. The i - d curve of an optical device is as shown.

- Name the device which gives the above curve.
- Obtain an expression for deviation produced by the device.
- If the device is in minimum deviation position, arrive at an expression for refractive index.



(d) What happens to the deviation if the above arrangement is immersed in a liquid of refractive index less than that of the device. { 1 + 2 + 2 + 1 = 6 }

11. A ray undergoes reflection from a transparent surface.

- (a) Name the angle of incidence for which the reflected light is completely plane polarised.
 (b) Explain the law relating refractive index and the angle of incidence. { 1 + 2 = 3 }

12. Electrons are the constituents of all matter. On receiving energy from the radiations, electrons get excited. These electrons will come out of the metals depending upon the nature of the metal and frequency of incident radiation. This effect was studied with the help of photodiode.

- (a) What is this effect called?
 (b) What is meant by work function of a metal?
 (c) Why alkali metals are most suitable for emitting electrons when radiation of suitable frequency is incident. { ½ + 1 + 1 ½ = 3 }

13. The rest mass of a nucleus is always less than total mass of the constituent particles.

- (a) Is the statement true or false.
 (b) Justify your answer. { ½ + 1 ½ = 2 }

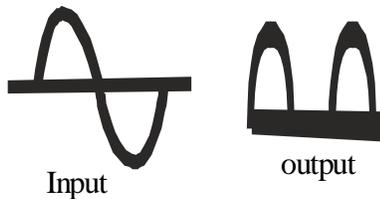
14. The total energy of an electron in the first excited state of hydrogen atom is about - 3.4 eV.

- (a) What is the kinetic energy of the electron in the state.
 (b) What is the potential energy in this state. { 1 ½ 1 ½ = 3 }



15. (a) Identify the logic gates X and Y in the figure
 (b) Write down the output of Y when (i) A = 1, B = 1 and (ii) A = 0 and B = 0 { 1 + 2 = 3 }

16.



- (a) What type of rectification is this.
 (b) Explain the above rectification with a circuit diagram. { 1 + 2 = 3 }

17. Write whether the following statement is true or false.

STATEMENT: Holes are the current carriers through a pnp transistor, but in the external circuit, current is carried by electrons. { 1 }

18. Optical fibre communication is better than other three modes of communication.

- (a) What is the principle behind optical fibre communication.
 (b) Explain different parts of an optical fibre.
 (c) Give any two advantages of optical fibre communication. { ½ + 1½ + 1 = 3 }

19. For very long range communication, ground waves are not suited.

- (a) What is meant by ground wave propagation.
 (b) Why is it not suited for long range communication. { 1 + 2 = 3 }