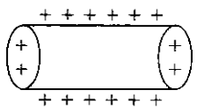
# PRACTICE PAPER
## SUBJECT – PHYSICS
## CLASS – XII

**1.** Sketch the electric field lines for a uniformly charged hollow cylinder as shown in the figure.



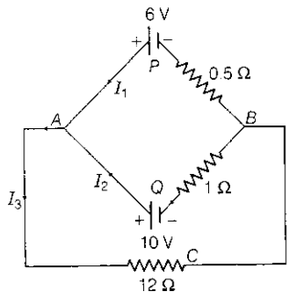
**2.** Magnetic field lines can be entirely confined within the core of a toroid but not within a straight solenoid, why?

**3.** What is the resistance offered by the capacitance to DC?

**4.** A concave mirror is held in water. What should be the change in focal length of the mirror?

**5.** A 3 cm wire carrying a current of 10 A is placed inside a solenoid perpendicular to its axis. The magnetic field inside the solenoid is given to be 0.27 T. What is the magnetic force on the wire?

**6.** Apply Kirchhoff's laws to the loops *ACBPA* and *ACBQA* to write the expressions for the currents $I_1$, $I_2$ and $I_3$ in the network.



Circuit diagram of loops

**7.** A carrier wave of peak voltage 12 V is used to transmit a message signal. What should be the peak voltage of the modulating signal, in order to have a modulation index 75%?

**8.** Physics teacher, Mr. Sharma conducts viva-voce for board practical and asks the following two questions from every student.

I. Why a potentiometer be preferred over a voltmeter for measurement of emf of a cell?

II. Why should a six wire potentiometer be preferred over a three wire potentiometer?

The student *A* who could not answer many questions was from teacher ward. However another student *B* answered following questions correctly does not belong to teacher ward. Mr. Sharma awarded full marks to student *B*.

Answer the following questions on the basis of given informations:

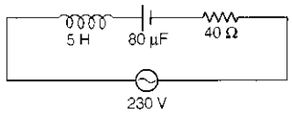
(i) Which values are displayed by Mr. Sharma?

(ii) Write the answer of the questions asked by Mr. Sharma.

**9.** Explain with the help of a neat and labelled diagram, the principle, construction and working of a transformer.

*or*

The given circuit diagram shows a series *L-C-R* circuit connected to a variable frequency 230 V source.




(i) Determine the source frequency which derives the circuit in resonance.

(ii) Obtain the impedance of the circuit and the amplitude of current at the resonating frequency.

(iii) Determine the rms potential drop across the three elements of the circuit.

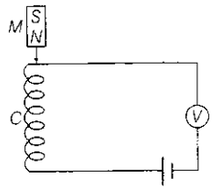
**10.** (i) An electrostatic field line is a continuous curve, i.e. a field line cannot have sudden break. Why not?

(ii) Explain why two field lines never cross each other at any point?

(iii) A proton is placed in a uniform electric field directed along the positive *X*-axis. In which direction will it tend to move?

**11.** (i) A current is set up in a long copper pipe. Is there magnetic field (a) inside, (b) outside the pipe?

(ii) Figure shown below shows a bar magnet *M* falling under the gravity through an air cored coil *C*.




(a) Plot a graph showing variation of induced emf (*E*) with time (*t*).

(b) What does the area enclosed by the *E-t* curve depict?

*or*

On a smooth plane inclined at 30° with the horizontal, a thin current carrying metallic rod is placed parallel to the horizontal ground. The plane is located in a uniform magnetic field of 0.15 T in the vertical direction. For what value of current can the rod be stationary? The mass per unit length of the rod is 0.03 kg $m^{-1}$.

**12.** Does the current in an AC circuit lag, lead or remain in phase with the voltage of frequency ($f$) applied to the circuit, when

(i) $f = f_r$ (ii) $f < f_r$ (iii) $f > f_r$

where, $f_r$ is the resonant frequency?

**13.** Find an expression for the torque acting on an electric dipole placed in uniform electric field. A system of two charges, $q_A = 2.5 \times 10^{-7}$ C and $q_B = 2.5 \times 10^{-7}$ C located at points $A(0, 0, -15\text{ cm})$ and $B(0, 0, +15\text{ cm})$, respectively. Find the electric dipole moment of the system and the magnitude of the torque acting on it, when it is placed in a uniform electric field $5 \times 10^4$ $NC^{-1}$, making an angle 30°.

*or*

A capacitor of capacitance *C* is charged fully by connecting it to a battery of emf *E*. It is then disconnected from the battery. If the separation between the plates of the capacitor is now doubled, what will happen to

(i) charge stored by the capacitor?

(ii) potential difference across it?

(iii) field strength between the plates?

(iv) energy stored by the capacitor?

(v) capacitance of the capacitor?