OPEN STUDENT FOUNDATION
Physics (Class 12)
PRACTICE SHEET DAY 6

CHAPTER 06 | Date : 22/02/24

Section A

● **Write the answer of the following questions. [Each carries 1 Mark]** **[10]**

1. (a) Obtain the expression for the magnetic energy stored in a solenoid in terms of magnetic field B, area A and length l of the solenoid.
   (b) Derive the equation for magnetic energy density.
2. Derive $W = \frac{1}{2}LI^2$ as the energy required to build up the current I in the coil having self-inductance L.
3. A circular coil of radius 8 cm and 20 turns is rotated about its vertical diameter with an angular speed of 50 rad s^{-1} in a uniform horizontal magnetic field of magnitude 3×10^{-2} T. Obtain the maximum and average emf induced in the coil. If the coil forms a closed loop of resistance 10 Ω calculate the maximum value of current in the coil.
4. Explain motional emf and derive $\varepsilon = Blv$
5. There are two coils A and B separated by some distance. If a current of 2 A flows through A, a magnetic flux of 10^{-2} Wb passes through B (no current through B). If no current passes through A and a current of 1 A passes through B, what is the flux through A ?
6. State and explain Faraday's law of electromagnetic induction.
7. Define unit of self-inductance. On which factors self-inductance depends.
8. Two concentric circular coils, one of small radius r_1 and the other of large radius r_2, such that $r_1 << r_2$, are placed co-axially with centres coinciding. Obtain the mutual inductance of the arrangement.
9. A square loop of side 10 cm and resistance 0.5 Ω is placed vertically in the east-west plane. A uniform magnetic field of 0.10 T is set up across the plane in the north-east direction. The magnetic field is decreased to zero in 0.70 s at a steady rate. Determine the magnitudes of induced emf and current during this time-interval.
10. A rectangular wire loop of sides 8 cm and 2 cm with a small cut is moving out of a region of uniform magnetic field of magnitude 0.3 T directed normal to the loop. What is the emf developed across the cut if the velocity of the loop is 1 cm s^{-1} in a direction normal to the (a) longer side, (b) shorter side of the loop ? For how long does the induced voltage last in each case ?

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Section [A] : 1 Marks Questions					
No	Ans	Chap	Sec	Que	Universal_QueId
1.	-	Chap 6	S8	3	QP23P11B1211_P1C6S8Q3
2.	-	Chap 6	S8	4	QP23P11B1211_P1C6S8Q4
3.	-	Chap 6	S8	6	QP23P11B1211_P1C6S8Q6
4.	-	Chap 6	S8	7	QP23P11B1211_P1C6S8Q7
5.	-	Chap 6	S9	12	QP23P11B1211_P1C6S9Q12
6.	-	Chap 6	S9	14	QP23P11B1211_P1C6S9Q14
7.	-	Chap 6	S9	16	QP23P11B1211_P1C6S9Q16
8.	-	Chap 6	S9	18	QP23P11B1211_P1C6S9Q18
9.	-	Chap 6	S10	18	QP23P11B1211_P1C6S10Q18
10.	-	Chap 6	S9	21	QP23P11B1211_P1C6S9Q21

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➠ Try Yourself

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