

SIR .CV .RAMAN COACHING CENTRE – IDAPPADI, SALEM- 2025

XII- PHYSICS UNIT – 4 ,-PROBLEM SLIP TEST QUESTION PAPER – 2025

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SECTION – A (10 X 3 = 30 M)

ANSWER ALL QUESTIONS;

1. A circular antenna of area 3 m^2 is installed at a place in Madurai. The plane of the area of antenna is inclined at 47° with the direction of Earth's magnetic field. If the magnitude of Earth's field at that place is $4.1 \times 10^{-5} \text{ T}$ find the magnetic flux linked with the antenna.
2. A cylindrical bar magnet is kept along the axis of a circular solenoid. If the magnet is rotated about its axis, find out whether an electric current is induced in the coil.
3. A closed coil of 40 turns and of area 200 cm^2 , is rotated in a magnetic field of flux density 2 Wb m^{-2} . It rotates from a position where its plane makes an angle of 30° with the field to a position perpendicular to the field in a time 0.2 s . Find the magnitude of the emf induced in the coil due to its rotation.
4. The current flowing in the first coil changes from 2 A to 10 A in 0.4 s . Find the mutual inductance between two coils if an emf of 60 mV is induced in the second coil. Also determine the magnitude of induced emf in the second coil if the current in the first coil is changed from 4 A to 16 A in 0.03 s . Consider only the magnitude of induced emf
5. A circular metal of area 0.03 m^2 rotates in a uniform magnetic field of 0.4 T . The axis of rotation passes through the centre and perpendicular to its plane and is also parallel to the field. If the disc completes 20 revolutions in one second and the resistance of the disc is 4Ω , calculate the induced emf between the axis and the rim and induced current flowing in the disc
6. An ideal transformer has 460 and 40,000 turns in the primary and secondary coils respectively. Find the voltage developed per turn of the secondary if the transformer is connected to a 230 V AC mains. The secondary is given to a load of resistance 104Ω . Calculate the power delivered to the load
7. An inverter is common electrical device which we use in our homes. When there is no power in our house, inverter gives AC power to run a few electronic appliances like fan or light. An inverter has inbuilt step-up transformer which converts 12 V AC to 240 V AC . The primary coil has

- 100 turns and the inverter delivers 50 mA to the external circuit. Find the number of turns in the secondary and the primary current
8. An electric power of 2 MW is transmitted to a place through transmission lines of total resistance $R = 40 \Omega$, at two different voltages. One is lower voltage (10 kV) and the other is higher (100 kV). Let us now calculate and compare power losses in these two cases.
 9. Write down the equation for a sinusoidal voltage of 50 Hz and its peak value is 20 V. Draw the corresponding voltage versus time graph.
 10. The equation for an alternating current is given by $i = 77 \sin 314t$. Find the peak current, frequency, time period and instantaneous value of current at $t = 2$ ms.

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