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| **STANDARD 12** | **PHYSICS** | **ELECTROMAGNETIC INDUCTION** | **WORK SHEET 6** |

1. **A pair of adjacent coils has a mutual inductance of 1.5H. If the current in one coil changes from 0 to 20A in 0.5s, what is the change of magnetic flux linkage with the other coil?**
2. **A circular copper disc 10cm in radius rotates at 20π rad/s about an axis through its centre perpendicular to the disc. A uniform magnetic field of 0.2T acts perpendicular to the disc.**
3. **Calculate the potential difference developed between the axis of the disc and the rim.**
4. **What is the induced current in the circuit whose terminals are connected between centre of disc and point of rim and the resistance of the circuit is 2Ω.**
5. **A jet plane is travelling westward at a speed of 1800km/h. What is the potential difference developed between the ends of a wing 25m long, its earth’s magnetic field at the location has a magnitude of 5x10-4T and the dip angle is 30ᵒ.**
6. **A wheel with 8 metallic spokes each 50cm long is rotated with a speed of 120rev/min in a plane normal to the horizontal component of the earth’s magnetic field. The earth’s magnetic field at the plane is 0.4G and the angle of dip is 60ᵒ. Calculate the emf induced between the axle and the rim of the wheel. How will the value of emf be affected if the number of spokes were increased?**
7. **A toroidal solenoid with air core has an average radius of 15 cm, area of cross-section 12cm2 and has 1200 turns. Calculate the self-inductance of the solenoid. Assume the field to be uniform across the cross-section of the solenoid.**
8. **A rectangular loop of sides 8cm x2cm with a small cut is stationary in a uniform magnetic field produced by an electromagnet. If the current feeding the electromagnet is gradually reduced so that the magnetic field decreases from its initial value of 0.3T at the rate of 0.02T/s. If the cut is joined and the loop has a resistance of 1.6Ω, how much power is dissipated by the loop as heat?**
9. **The currents flowing in the two coils of self-inductance L1 = 16mH and L2 = 12mH are increasing at the same rate. If the power supplied to the two coils are equal, find the ratio of (i) induced voltages, (ii) the currents and (iii) the energies stored in the two coils at a given instant.**
10. **A long solenoid with 15 turns per cm has a small loop of area 2cm2 placed inside normal to the axis of the solenoid. The current carried by the solenoid changes steadily from 2A to 4A in 0.1s, what is the induced emf in the loop while the current is changing?**
11. **A rectangular conductor LMNO is placed in a uniform magnetic field of 0.5T. The field is directed perpendicular to the plane of the conductor. When the arm MN of length of 20 cm is moved towards left with a velocity of 10m/s. calculate the induced emf in the arm. Given the resistance of the arm to be 5Ω, find the value of the current in the arm.**
12. **An air cored solenoid with length 30cm, area of cross section 25cm2 and number of turns 500 carries a current of 2.5A. The current is suddenly switched off in a brief time of 10-3s. How much is the average back emf induced across the ends of the open switch in the circuit?**