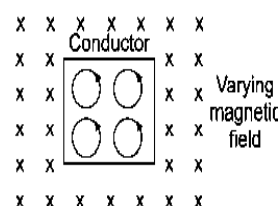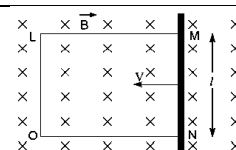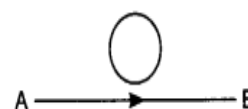# KENDRIYA VIDYALAYA SANGATHAN
ZIET CHANDIGARH
SUB:-PHYSICS CLASS XII 2022-23
PRACTICE PAPER UNIT- VI–ELECTROMAGNETIC INDUCTION

Note: Q. No. 1-4 is of 01 mark each, Q. 5-6 is of 02 marks each, Q.No.7 is of 03 marks, Q. No. 8 is a case study based and is of 04 marks, Q. No. 11 is of 05 marks.

S. N.	Question	marks
1	Two coils are placed closed to each other. The mutual inductance of the pair of coils depends upon (a) the rate at which currents are changing in the two coils. (b) relative position and orientation of two coils. (c) the material of the wires of the coils. (d) the currents in the two coils.	1
2	**Assertion (A):** Induced emf will always occur whenever there is change in magnetic flux. **Reason (R):** Current always induces whenever there is change in magnetic flux. a- Both assertion and reason are correct and the reason is the correct explanation of assertion. b- Both assertion and reason are correct and reason is not a correct explanation of assertion. c- Assertion is correct but the reason is incorrect d- Assertion is incorrect but the reason is correct.	1
3	The current flows from A to B is as shown in the figure. The direction of the induced current in the loop is (a) clockwise. (b) anticlockwise. (c) straight line. (d) no induced e.m.f. produced.	1
4	Direction of current induced in a wire moving in a magnetic field is found using (a) Fleming's left-hand rule (b) Fleming's right-hand rule (c) Ampere's rule (d) Right hand clasp rule	1
5	State Lenz's Law. A metallic rod held horizontally along east-west direction, is allowed to fall under gravity. Will there be an emf induced at its ends? Justify your answer.	2
6	A rectangular conductor LMNO is placed in a uniform magnetic field of 0.5 T. 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 10 m/s. Calculate the emf induced in the arm. Given the resistance of the arm to be 5 Ω (assuming that other arms are of negligible resistance), find the value of the current in the arm.	2
7	Show that Lenz's law is in accordance with the law of conservation of energy.	3
	Case study-based questions (questions no 8- 11) When a thick piece of a conductor is placed in a varying magnetic field the magnetic flux linked with the conductor changes, so currents are induced in the body of conductor, which causes heating of conductor. The currents induced in the conductor are called the eddy currents. In varying magnetic field, the free electrons of conductor experience Lorentz force and traverse closed paths; which are equivalent to small current loops. These currents are the eddy currents; they cause heating effect and sometimes the conductor becomes red-hot. Eddy current losses may be reduced by using laminated soft iron cores in galvanometers, transformers, etc., and making holes in the core. Few of the application of eddy currents is in induction furnace, induction motor and many more.	4

	8. What are eddy currents?	1
	9. What is the cause of generation of eddy currents?	1
	10. How can we reduce eddy currents?	2
	OR	
	10. Enlist some applications of eddy currents.	2
11	(a) What is induced emf? Write Faraday's law of electromagnetic induction. Express it mathematically. (b) A conducting rod of length 'l', with one end pivoted, is rotated with a uniform angular speed 'ω' in a vertical plane, normal to a uniform magnetic field 'B'. Deduce an expression for the emf induced in this rod. If resistance of rod is R, what is the current induced in it?	5