AAFAQ ACADEMY – KASUR

Physics Book II **Chapter (15) NEW** **Objective + Subjective**

ELECTROMAGNETIC INDUCTION

Test Session 2014 – Name : _____ Roll No: (in words) _____

OBJECTIVE

Time: 10 Minutes **Marks: 10**

Note: Write your roll No. in space provided. Over-writing, cutting, erasing, using of lead pencils will result into loss of marks.

Q.1: Encircle the correct answers.

i. The magnitude of motional emf is given by:

a) $\varepsilon = -VBL$

b) $\varepsilon = VBL$

c) $\varepsilon = -\dfrac{V}{BL}$

d) $\varepsilon = \dfrac{L}{VB}$

ii. The unit of induced emf is:

a) Ampere
b) Volt
c) Joule/coulomb
d) Both (b) and (c)

iii. The negative sign in the equation $\varepsilon_L = -L\dfrac{\Delta I}{\Delta t}$ can be explained by:

a) Lenz's law
b) Faraday's law
c) Ampere' law
d) None of these

iv. One henry is equal to:

a) 1 ohm $\times$ 1 sec
b) 1 ohm $\times$ 1 hertz
c) 1 ohm $\times$ 1 metre
d) All of above

v. Self inductance of a long solenoid is given by:

a) $L = \dfrac{\mu_0 n^2}{l}$

b) $L = \mu_0 NI^2 A$

c) $L = \mu_0 n^2 Al$

d) None of the above

vi. A.C is converted into D.C by:

a) Dynamo
b) Rectifier
c) Motor
d) Transformer

vii. If the north pole of a magnet moves away from a metallic ring. Then the current flows:

a) Clockwise
b) Anticlockwise
c) First clockwise and then anticlockwise
d) None of above

viii. In case of a motor, if V is the applied emf and ε is the back emf then net emf in the circuit is:

a) $V - \varepsilon$
b) $V + \varepsilon$
c) $V \times \varepsilon$
d) $\dfrac{\varepsilon}{V}$

ix. When the back emf in a current is zero, it draws:

a) Zero current
b) Maximum current
c) Minimum current
d) Steady average current

x. 1 Henry=

a) V S A^{-1}
b) V S^{-1} A^{-1}
c) V^{-1} S A
d) V S A^{-2}

SUBJECTIVE

Time: 30 min. **Marks: 20**

Q.2: Write the short answers. **(2×6)**

i. Does the induced emf in a circuit depend on the resistance of the circuit? Does the induced current depend on the resistance of the circuit?

ii. Does the induced emf always act to decrease the magnetic flux through a circuit?

iii. Show that ε and $\dfrac{\Delta\phi}{\Delta t}$ have same units.

iv. Can a D.C motor be turned into a D.C generator? If so what is the consequence of this?

v. Can an electric motor be used to drive an electric generator with the output from the generator being used to operate the motor?

vi. Four unmarked wires emerge from a transformer, what steps would you take to determine the turn's ratio?

vii. Can a step-up transformer increase the power level?

viii. When the primary of a transformer is connected to A.C. mains the current in it? Is very small if the secondary circuit is open, but increases when secondary circuit is closed.

Note: Long questions:

Q.3 **(a)** Define motional emf. Also derive the expression for the motional emf. (5)

(b) Two coils are placed side by side. An emf of 0.8 V is observed in one coil when the current is changing at the rate of 200 As^{-1} in the other coil. What is the mutual inductance of the coils? (3)