

NAME:		ROLL NO:		TIME:	50: MIN
SUB:	Physics	Date:		CLASS:	1 st Year
SYLLABUS	Chp. 10 (Electromagnetism)	T. MARKS	30	OBT. M	

Q. 1 Choose the Correct Answer. Cutting, Erasing, Double Selection is Strictly Prohibited. (1x10=10)

1. Mathematically form of Faraday's law is:

(A) $\epsilon_s = -N \frac{\Delta \phi}{\Delta t}$

(B) $\sum_{i=1}^{i=N} \vec{B} \cdot \Delta \vec{L} = \mu_0 I$

(C) $\epsilon_s = -M \frac{\Delta I_p}{\Delta t}$

(D) $B = \mu_0 n I$

2. A metal rod of length 25 cm is moving at a speed of 0.5 ms⁻¹ in a direction perpendicular to a 0.25T magnetic field, the e.m.f produced in the rod is:

(A) 0.031 V

(B) 0.31 V

(C) 3.1 V

(D) 31 Volt

3. The ratio of average induced emf to the rate of change of current in the coil is:

(A) Self inductance

(B) Mutual inductance

(C) Self induction

(D) Mutual induction

4. The charges moving perpendicular to $\vec{B}$ experience:

(A) Maximum force

(B) Minimum force

(C) Zero force

(D) Moderate force

5. When a charged particle moves through a magnetic field the effect of the field changes the particles:

(A) Speed

(B) Mass

(C) Energy

(D) Direction of motion

6. When a particle of charge q and mass m enters a region of constant magnetic induction B, travelling with the velocity v perpendicular to the direction of the field, the describes a circular orbit of radius:

(A) $r = m q / v B$

(B) $r = m q v / B$

(C) $r = m v / B q$

(D) $r = B q / m v$

7. The SI unit of magnetic induction tesla is equal to:

(A) $N A^{-1} m^{-1}$

(B) $N A m^{-1}$

(C) $N A^{-1} m$

(D) $N A^{-2} m^{-1}$

8. If 0.5 T field over an area of 2m³ which lies at a angle of 60° with field. Then the resultant flux will be:

(A) 0.50T

(B) 0.50Wb

(C) 0.25Wb

(D) 0.25 T

9. Magnetic field $\vec{B} = (4) Wb^{-2}$ passes through (5) m² area. Net flux through the area is:

(A) 20Wb

(B) $90 \times 10^{-4} Wb$

(C) 90Wb

(D) Zero

10. The value of permeability of free space μ_0 is given by:

(A) $4\pi \times 10^{-7} Wb A^{-3} m^{-1}$

(B) $4\pi \times 10^7 Wb A^{-1} m^{-1}$

(C) $4\pi \times 10^{-7} Wb A m$

(D) $4\pi \times 10^{-9} Wb A^{-1} m^{-1}$

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PART-I

Q. 2 Write Short Answers of the Following Questions

(2x6=12)

- Suppose that a charge q is moving in a uniform magnetic field with a velocity v . Why is there no work done by the magnetic force that acts on the charge q ?
- 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?
- In a certain region the earth's magnetic field points vertically down. When plane field due north, which wingtip is positively charged?
- At a given z -direction. What is the direction of magnetic force? Will the proton continue to move in positive z -direction? Explain.
- 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?
- In a certain the earth's magnetic field points vertically down. When plane field due north, Which wingtip is positively charged?

PART-II

Write Answers of the Following Questions in Detail.

- Q. 3 (a) State and explain Faraday's law of electromagnetic induction. 5
- (b) A proton enters a uniform magnetic field $B = 0.300 \text{ Weber m}^{-2}$ in a direction making an angle 45° with the magnetic field. What will be the radius of the circular path if the velocity of proton is 10^4 ms^{-1} . 3

Answer Key

1	A	2	A	3	A	4	A
5	D	6	C	7	A	8	B
9	A	10	A				