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**AO—96—2018**

**FACULTY OF SCIENCE**

**B.Sc. (Second Semester) EXAMINATION**

**MARCH/APRIL, 2018**

**(CBCS Pattern)**

**PHYSICS**

**Paper IV**

**(Electricity and Magnetism)**

**(MCQ & Theory)**

**(Tuesday, 3-4-2018)**

**Time : 10.00 a.m. to 12.00 noon**

**Time—2 Hours**

**Maximum Marks—40**

**N.B. :— (i) All questions are compulsory.**

**(ii) Non-programmable calculator and log table is allowed.**

**(iii) Symbols have their usual meanings.**

**MCQ**

1. Choose the *correct* alternative :

10

(i) True power in an a.c. ckt is :

(a)  $\frac{E_0 I_0}{2} \times \cos \phi$

(b)  $\frac{E_0}{\sqrt{2}} \times \frac{I_0}{\sqrt{2}} \times \cos \phi$

(c)  $(E_{\text{rms}} \times I_{\text{rms}}) \cdot \cos \phi$

(d) None of these

(ii) In step-up transformer :

(a)  $N_1 = N_2$

(b)  $N_1 > N_2$

(c)  $N_1 < N_2$

(d) None of these

P.T.O.

- (iii) Work done in establishing current in an inductance is,  $W = \dots\dots\dots$
- (a) LI (b)  $\frac{1}{2} LI^2$
- (c) 2L (d) 4L
- (iv) The unit of self-inductance is :
- (a)  $\frac{\text{volt}}{\text{amp/sec}}$  (b) weber/amp
- (c) henry (d) All of these
- (v) The hysteresis loop gives the value of :
- (a) Coercive force (b) Residual magnetisation
- (c) Both (a) and (b) (d) None of these
- (vi) Principle of B.G. is :
- (a)  $q \propto v$  (b)  $q \propto \theta$
- (c)  $q \propto f$  (d) None of these
- (vii) The Biot and Savart's law  $\vec{dB}$  is directly proportional to :
- (a) distance ( $r$ ) (b) length ( $l$ )
- (c) angle  $\sin \theta$  (d) Both (b) and (c)
- (viii) The magnitude of force on a current carrying conductor is :
- (a)  $F = I/BA$  (b)  $F = I/B \sin \theta$
- (c)  $F = IB \cos \theta$  (d)  $F = IB$
- (ix) The device used to convert a high a.c. voltage into a low a.c. voltage and vice-versa is called :
- (a) Amplifier (b) Oscillator
- (c) Transformer (d) Choke

(x) Self-inductance of a solenoid is :

$$(a) \quad L = \frac{\mu N^2 A}{l}$$

$$(b) \quad L = \frac{\mu N A}{l}$$

$$(c) \quad L = \frac{\mu N^2 A}{2l}$$

$$(d) \quad L = \frac{\mu N^2 A}{l^2}$$

### Theory

2. Attempt any *five* of the following : 10

- Define efficiency of a transformer.
- State the relation between true power and apparent power.
- Define mutual inductance with its unit.
- What do you mean by hysteresis ?
- State Ampere's circuital law.
- Define logarithmic decrement.
- State Faraday's laws of electromagnetic induction.

3. Attempt any *two* of the following : 10

- Describe Owen's bridge with ckt diagram.
- Derive an expression for mutual inductance of a co-axial solenoid.
- Describe construction of moving coil type Ballistic Galvanometer.
- When some charge is circulated through B.G., the first and third throws are 20 cm and 19.8 cm obtained. Calculate the corrected throw.

4. Attempt any *one* of the following : 10

- Explain Biot-Savart's law with its application to straight conductor.
- Describe I-H curve by magnetometer method with neat ckt diagram.