

**PARUL UNIVERSITY**  
**FACULTY OF AGRICULTURE**  
**B.Tech. (Agriculture) Winter 2019 - 20 Examination**

**Semester: 1**  
**Subject Code: 20103106**  
**Subject Name: Basic Electrical Engineering**

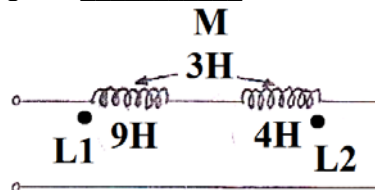
**Date: 07/12/2019**  
**Time: 10:30am to 12:30pm**  
**Total Marks: 50**

**Instructions**

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

**Q.1****A) Fill in the blanks (Each of 0.5 Mark)****(05)**

- i) The unit of magnetic flux density is \_\_\_\_\_
- ii) According to Faraday's second law of electromagnetic induction, self-induced emf,  $e =$  \_\_\_\_\_
- iii) The current flowing through pure inductor will \_\_\_\_\_ the voltage across it.
- iv) The equation of reactive power in single phase A.C. system is  $P =$  \_\_\_\_\_
- v) The current flowing through a pure capacitor will \_\_\_\_\_ voltage across it.
- vi) The rms value of pure sine wave current  $I_{rms} =$  \_\_\_\_\_  $I_m$
- vii) The Coefficient of coupling  $K =$  \_\_\_\_\_, for following circuit.



- viii) An iron core inductor of 10 turns has reluctance of 100 AT/ Wb. The inductance of this coil is \_\_\_\_\_ H.
- ix) If a light bulb is operated from a 110V source, it draws a current of 0.6 Amp, The resistance of bulb filament will be \_\_\_\_\_ Ohm.
- x) With an increase in temperature the resistance of metals will \_\_\_\_\_

**B) Multiple Choice Questions (Each of 0.5 Mark)****(10)**

- i) The emf induced in a coil of 0.08mH carrying 2 amp current is reversed in 0.4 second is  
a) 0.4 V    b) 0.008 V    c) 0.16 V    d) 0.0008 V
- ii) When a coil consisting of single turn rotates at a uniform speed in a Magnetic field, the induced emf is  
a) Steady    b) Changing    c) Alternating    d) None of the above
- iii) Transformer does not operate on  
a) 50 Hz    b) 60 Hz    c) 0 Hz    d) All of above
- iv) Two resistor each of 20 ohm are connected in parallel, the value of equivalent resistance will be  
a) 20 Ohm    b) 40 Ohm    c) 10 Ohm    d) 200 ohm
- v) The resistivity of the conductor depends on  
a) area of the conductor    b) length of the conductor    c) type of material  
d) none of these
- vi) The resistance of a conductor of diameter  $d$  and length  $l$  is  $R \Omega$ . If the diameter of the conductor is halved and its length is doubled, the resistance will be  
a)  $R \Omega$     b)  $2 R \Omega$     c)  $4 R \Omega$     d)  $8 R \Omega$

- vii) A capacitor carries a charge of 0.1 C at 5 V. Its capacitance is  
 a) 0.02 F    b) 0.5 F    c) 0.05 F    d) 0.2 F
- viii) To obtain a high value of capacitance, the permittivity of dielectric medium should be  
 a) Low    b) Zero    c) High    d) Unity
- ix) Four capacitors each of 40  $\mu\text{F}$  are connected in parallel, the equivalent capacitance of the system will be  
 a) 160  $\mu\text{F}$     b) 10  $\mu\text{F}$     c) 40  $\mu\text{F}$     d) 5  $\mu\text{F}$
- x) Direction of rotation of motor is determined by \_\_\_\_\_  
 a) Faraday's law    b) Lenz's law    c) Coulomb's law    d) Fleming's left-hand rule
- xi) In an induction motor, no-load the slip is generally  
 a) Less than 1%    b) 5%    c) 2%    d) 4%
- xii) Which of the following component is usually fabricated out of silicon steel?  
 a) Stator core    b) Bearings    c) Shaft    d) None of the above
- xiii) Slip ring of an induction motor is usually made up of  
 a) Aluminium    b) Copper    c) Phosphorus Bronze    d) Carbon
- xiv) A 3-phase 440 V, 50 Hz induction motor has 4% slip. The frequency of rotor current will be  
 a) 50 Hz    b) 25 Hz    c) 5 Hz    d) 2 Hz
- xv) A 50 Hz, 3-phase induction motor has a full load speed of 1440 r.p.m. The number of poles in the motor is  
 a) 2 Pole    b) 4 Pole    c) 6 Pole    d) 8 Pole
- xvi) Ohm's law is not applicable to  
 a) DC circuits    b) high currents    c) small resistors    d) semi-conductors.
- xvii) Ideal Earthing resistance value will be  
 a) 0 ohm    b) 1000 ohm    c) 1 ohm    d) None of above
- xviii) In a transformer the energy is conveyed from primary to secondary  
 a) through cooling coil    b) through air    c) by the flux    d) none of the above
- xix) No-load on a transformer is carried out to determine  
 a) copper loss    b) magnetising current    c) magnetising current and loss  
 d) efficiency of the transformer
- xx) A transformer transforms  
 a) voltage    b) current    c) power    d) frequency

## Q.2

**A) Define the following (Any five out of seven questions) (05)**

- (1) Reactive Power
- (2) MMF
- (3) Flux
- (4) Peak Value
- (5) Frequency
- (6) Slip in induction motor
- (7) Synchronous speed of motor

**B) Answer the following (Any five out of seven questions) (05)**

- (1) How to reduce the eddy current loss in transformer?
- (2) Define the RMS Value
- (3) Explain the Series resonance in AC Circuit
- (4) Working of MCB
- (5) Types of Earthing
- (6) Efficiency of transformer
- (7) Ideal Voltage sources

**Q.3 Write Short notes (Any five out of six questions) (10)**

- (1) Magnetic flux leakage
- (2) Fringing effect

- (3) Hysteresis Loop
- (4) Transformer Losses
- (5) Thevenin's Theorem
- (6) ELCB

**Q.4 Long Questions (Any three out of four questions)**

**(15)**

- (1) Explain any one method of speed control of Induction Motor.
- (2) Explain about DC – DC buck and boost converter with suitable diagram.
- (3) A resistance of 10 ohm, an inductive reactance of 10 ohm and a capacitive reactance of 10 ohms are connected in series across 100 V, 50 Hz AC supply. Calculate (i) Impedance (ii) current (iii) power factor of the circuit.
- (4) Derive the relation between line voltage and Phase voltage in case of Star connection.