U.S.N.

BMS College of Engineering, Bangalore-560019

(Autonomous Institute, Affiliated to VTU, Belgaum)

July / August 2017 Supplementary Semester Examinations

Course: Basic Electrical Engineering   **Duration: 3 Hours**
**Course Code: 14EE1ICBEE / 14EE2ICBEE**   **Max Marks: 100**
                                                   Date: 27.07.2017

Instructions: Answer Any Five Full Question Choosing One From Each Unit

UNIT-1

1	a	State & explain Superposition theorem.	**6**
	b	List out the similarities & dissimilarities between magnetic & electric circuits.	**6**
	c	Estimate the voltage across & the current through 10 ohm resistor for the network shown in Figure 1 c	**8**
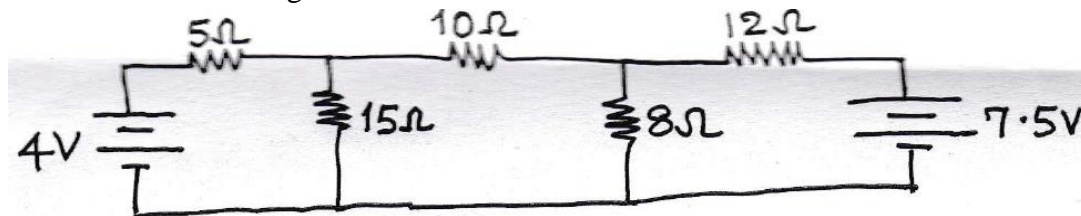
UNIT-2

2	a	Derive the expression for armature torque developed in a dc motor	**6**
	b	With the help of relevant phasor diagram, show that the application of 3 phase balanced voltages to a 3 phase balanced winding of an induction motor produces a rotating magneticfield in the air gap.	**8**
	c	A 500V, dc shunt motor has 4 poles & a wave connected armature winding with 492 conductors. The flux /pole is 0.05wb. The full load line current is 20A. The armature & shunt field resistances are respectively 0.1 ohm & 250 ohm. Calculate the speed & developed torque.	**6**

OR

3	a	Sketch & explain Ta versus Ia characteristics of (i) dc shunt motor & (ii) dc series motor.	**8**
	b	Show that $F_R = S * F$ in 3 phase induction motor.	**6**
	c	A 3 phase, 4 pole, 50 Hz induction motor runs at 1425 rpm. Estimate (i) Synchronous speed (ii) Slip (iii) frequency of rotor current (iv) number of rotor emf cycles per minute	**6**

UNIT-3

4 a Derive expressions for average value & rms value of a sinusoidally varying alternating voltage in terms of its peak value. **6**

   b Prove that current in a purely capacitive circuit leads applied voltage by 90^0. Draw the wave forms of voltage , current & power **7**

   c A coil when connected to 100 V,50 Hz supply takes a current of 5 A & dissipates 300 watts. Estimate resistance, inductance, impedance & power factor of the coil. **7**

UNIT-4

5 a Define self inductance & mutual inductance. Derive the expression for coupling coefficient. **6**

   b Derive emf equation of a single phase transformer. **6**

   c In a 25KVA,2000V/200V,1 phase transformer, the core loss & copper loss at full load are 350W & 400W respectively.
   Estimate (i) the efficiency at 0.8 power factor lag at full load
   (ii) the efficiency at UPF at half full load
   (iii) Maximum efficiency at UPF (iv) copper loss for maximum efficiency **8**

UNIT-5

6 a Deduce the relationship for the line & phase values of voltage & current in a 3 phase balanced star connection. **6**

   b Sketch & explain any one of the method of earthing. **6**

   c Two wattmeters are connected to measure the power input to a 3 phase circuit reads 5KW & 1 KW,the latter reading obtained after reversing the current coil connections.
   Estimate (i) Real power   (ii) Reactive power
   (iii) Apparent power   (iv) Power factor **8**

OR

7 a Sketch & explain the working of a dynamometer wattmeter. **6**

   b With a neat circuit diagram & switching table , explain the two point control of a lamp. **6**

   c A balanced delta connected load of 6+ j8 ohm per phase is connected to a 3 phase , 400 V supply. Find the phase current, line current, real power ,reactive power & power factor. **8**

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