Seat No.: _____ Enrollment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– 1st / 2ndEXAMINATION (NEW SYLLABUS) – SUMMER 2016

Subject Code: 2110005 Date: 08/06/2016

Subject Name: Elements of Electrical Engineering

Time: 2.30 to 5.00 PM Total Marks: 70

Instructions:

1. **Question No. 1 is compulsory. Attempt any four out of remaining Sixquestions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

			Mark
Q.1		**Objective Questions.**	
	(a)		**07**
	1.	The unit of current is_____. (a) Volt/sec (b) coulomb/sec (c) amp/sec (d) none of these	
	2.	Coulomb's second law is called as _____law. (a) Inverse square (b) charge (c) induction	
	3.	If the length of conductor is doubled and its cross sectional area is reduced to 50% then its resistance will be_____. (a) Same (b) doubled (c) increased by 4 times (d) reduced to 1/4th	
	4.	A conductor carries 10A in a direction perpendicular to a magnetic field of density 0.3T. If the length of conductor is 10 cm the force on the conductor F=_____. (a) 3 N (b) 0.3 N (c) 30 N	
	5.	Amount of light produced by a lamp or the amount of heat produced by an iron is proportional to the _____. (a) Square of RMS value (b) RMS value (c) square of average value (d) average value.	
	6.	The three phase voltages are displaced by _____ radians from each other. (a) $\pi/2$ (b) $\pi/3$ (c) $2\pi/3$ (d) π	
	7.	Define Lumens.	
	(b)		**07**
	1.	The resistance of a thin conductor is _____ as compared to that of a thick conductor. (a) Same (b) lower (c) higher	
	2.	The value of relative permittivity for Air is _____.	
	3.	A magnetic circuit has mean length of 20 cm and cross sectional area of 1 cm^2 if the flux density is 2T then Φ=_____. (a) $2*10^{-4}$ mWb (b) $2*10^{-4}$ Wb (c) $2*10^{-2}$ Wb (d) none of these	
	4.	Define RMS value.	
	5.	Draw the phasor diagram of R-C series circuit.	
	6.	For a balanced delta load the_____ of all their line currents is zero. (a) Product (b) difference (c) sum (d) division	
	7.	Define A-H efficiency.	
Q.2	**(a)**	Explain the effect of temperature on different metals.	**03**
	(b)	Explain Current and Voltage divider rule.	**04**
	(c)	Derive expression for delta to star conversion of resistive network.	**07**

Q.3	**(a)**	Derive the expression for the equivalent capacitance of capacitors connected in parallel.	**03**
	(b)	The equivalent capacitance of two capacitors when connected in series is 0.03 μF & when connected in parallel is 0.16 μF. Find the capacitance of both the capacitors.	**04**
	(c)	Three capacitors having capacitances of 10 μF, 20 μF and 40 μF are connected in series to a 400 V d.c. source. Find (i) Total capacitance (ii) Total charge in circuit (iii) Total energy stored.	**07**
Q.4	**(a)**	Explain Magnetic Hysteresis phenomena using hysteresis loop.	**03**
	(b)	State similarities between magnetic circuit and electrical circuit.	**04**
	(c)	Define co-efficient of coupling. Derive the relation between self and mutual inductance.	**07**
Q.5	**(a)**	Three currents are represented by $i_1 = 10\sin wt$, $i_2 = 20\sin(wt-\pi/6)$,$i_3 = 30\sin(wt+\pi/4)$. Find magnitude and phase angle of resultant current of their addition.	**03**
	(b)	An inductive coil draws 10 A current and consume 1 KW power from a 200V, 50Hz, Ac supply determine (1) the impedance in Cartesian and polar form (2) power factor (3) reactive and apparent power.	**04**
	(c)	Prove the condition of resonance for series R-L-C AC circuit. Also analyze the phenomena with the help of graph.	**07**
Q.6	**(a)**	Give advantages of Two Wattmeter Method.	**03**
	(b)	For a balanced delta connected load supplied at 3-phase, 400 V ac supply, the two wattmeter readings are: 7.8kW and 2.55kW. Find out load power factor & line current.	**04**
	(c)	Establish relation between line voltage & phase voltage and current relation in 3-phase star connection. Draw phasor diagram.	**07**
Q.7	**(a)**	Classify various types of Lighting scheme and explain any two.	**03**
	(b)	State types of Fuse and explain any one.	**04**
	(c)	Explain construction of cable in detail.	**07**

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