GUJARAT TECHNOLOGICAL UNIVERSITY
PDDC Sem-I June-July Examination 2011
Subject code: X10901   Subject Name: Element of Electrical Engineering
Date: 18/06/11   **Total Marks: 70**   **Time: 10:30am to 1:00pm**

Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** State & explain Kirchhoff's voltage & current laws with suitable examples **07**

(b) A coil has resistance 18Ω at 20^0C, resistance is 20Ω at 50^0C,then find out **07** (a)Temperature co efficient at 0^0 C (b) it's resistance at 15^0 C (c)Temperature of coil ,when coil resistance is 21Ω (d) The temperature rise in Coil for resistance 18Ω to 21Ω

Q.2 **(a)** Explain the similarity & dissimilarity between magnetic circuit & electrical **07** circuit

(b) Derive the expression for equivalent capacitance for a group of capacitor **07** are connected in series & parallel

OR

(b) Explain the absolute & relative permittivity of the system & also explain **07** the laws of electrostatics

Q.3 **(a)** Explain dynamically & statically induce E.M.F. **07**

(b) Define (a) M.M.F. (b) Relative Permeability (c) Self Inductance (d) Mutual **07** inductance (e)Reluctance (f)Magnetic field Intensity (g) Magnetic Flux Density

OR

Q.3 **(a)** Explain the phenomena Rise in current through inductor & derive the **07** equation $i=Im(1-e^{-t/\lambda})$

(b) A relative soft Iron ring of relative permeability 1000 has mean **07** circumference of 800mm & cross sectional area 500mm square, a radial air gap of 1mm width is cut in the ring which is wound with 1000turns.Calculate the current require to produce an airgap flux of 0.5mwb, if leakage factor is 1.2 & stacking factor is 0.9

Q.4 **(a)** Explain the resonance phenomena in R-L-C Series circuit & derive the **07** equation for resonance frequency

(b) At 60 Hz frequency ,sinusoidal voltage v=141sinwt is applied to R-L **07** series circuit, The values of resistance & Inductance are 3Ω & 0.0106H respectively. Find(a)reactance of the circuit(b) total Impedance of the circuit (c)Current through the circuit in polar form(d) Active power consumed in the circuit & power factor of the circuit

OR

Q.4 **(a)** Explain the phenomena of A.C. through pure inductor with circuit & vector **07** diagram, also prove that active power consumption is zero

Q.4 **(b)** Define the followings (a)phase(b) Frequency (c) form Factor (d) Amplitude **07** (e) derive the equation for R.M.S value using analytical method for sinusoidal quantity

Q.5 **(a)** Explain the two watt meter method to measure the three phase power **07**

(b) Three coils of resistance 20Ω & Inductive reactance 15Ω are connected in **07** star to 400 V, three phase 50Hz supply. Calculate (a)Line current (b)Power supplied (c)Power factor of circuit (d) Impedance of the circuit

OR

Q.5 **(a)** Explain the phenomena for the generation of three phase power & also state **07** it's advantages & die advantages over single phase

(b) Define Phase voltage & line voltage & derive the equation between them **07** for three phase star connection

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