

**GOVERNMENT ENGINEERING COLLEGE, DAHOD**

**ELECTRICAL ENGINEERING DEPARTMENT**

**Odd-Semester-2015**

**1<sup>st</sup> Semester Division: G (EC Department)**

**Subject: EEE [2110005] Elements of Electrical Engineering**

***Assignment-2\_Module-2\_AC Circuits***

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➤ **Single Phase A.C. Circuits:**

01. Explain how ac sinusoidal emf is generated? Derive its equation of  $e = E_m \sin \omega t$ .
  02. Prove that pure resistive circuit has unity power factor. Draw the wave forms of voltage, current and instantaneous power.
  03. An ac supply voltage of 230 volts, 50 Hz is given to the circuit containing  $10\Omega$  and  $20\Omega$  in series. Find equivalent resistance, total current, and voltage drop across each resistance, active power, reactive power, power factor.
  04. Compare series and parallel resonance.
  05. Compare the following term with respect to ac waveform.  
(a) Power factor, (b) Average value, (c) R.M.S value, (d) Form factor
  06. A Series RLC circuit consists of resistance of  $500\Omega$ , inductance of  $50\text{mH}$  and a capacitance of  $20\text{pF}$ . Find:  
(a) The resonant frequency,  
(b) The Q factor of the circuit of resonance,  
(c) The half power frequency.
  07. Explain magnetic hysteresis.
  08. A resistance of  $20\Omega$ , an inductance of  $0.2\text{H}$  and a capacitance of  $100\mu\text{F}$  are connected in series across  $220\text{V}$ ,  $50\text{Hz}$  supply. Find:  
(a) Impedance, (b) Voltage across R, L & C,  
(c) Power factor & angle of lag, (d) Active & apparent power.
  09. Prove the condition of resonance for R-L-C series AC circuit. Also analyze the phenomena with the help of graph.
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➤ **Three Phase A.C. Circuits:**

01. Explain in brief power measurement using two wattmeter method in 3-phase system with star connected load? Also draw the phasor diagram.
02. Explain in brief the following for 3-phase AC circuit:  
(a) Phase sequence, (b) Line voltage, (c) Phase voltage
03. A  $\Delta$ -connected balanced 3-phase load is supplied from  $400\text{V}$ , 3-phase mains. The line current is  $20\text{A}$  & the power taken by load is  $10\text{MW}$ . Find:  
(a) Impedance in each branch,  
(b) Power factor of the load,  
(c) Line current & power consumed, if same load is connected in star.