

**GANPAT UNIVERSITY**  
**B.TECH SEM-II (CE/IT/EC/BM & I/MARINE)**  
**REGULAR EXAMINATION MAY-2014**  
**2EE101:-ELEMENTS OF ELECTRICAL ENGINEERING**

Time: 3 Hours

Total Marks:-70

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

**SECTION-I**

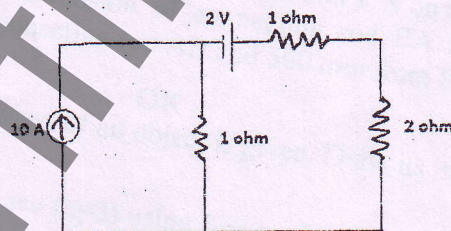
- Q:1 (A) Discuss leakage flux and leakage co-efficient. Compare Magnetic circuit with electric circuit. (6)  
 (B) Derive the equation for the total inductance when two coils are connected in series. (6)

OR

- Q:1 (A) Discuss main parts of Battery and write application of battery. (6)  
 (B) State and describe various types of lighting schemes. (6)  
 Q:2 (A) What is capacitor? why series resistance is connected during charging and discharging? Discuss multiple parallel plate capacitor. (6)  
 (B) Define mutual inductance. Describe a method to measure the mutual inductance between the coils. (5)

OR

- Q:2 (A) State and explain maximum power transfer theorem. (6)  
 (B) A D.C voltage V is applied across a circuit consisting of resistance R ohm in series with a capacitor of capacitance C farads. Derive an expression for variation of voltage across capacitor with time. (5)  
 Q:3 **Attempt any three:** (12)  
 (A) Determine the current through the 2 ohm resistor of fig. Using Norton's theorem



- (B) Two 75 turns coils are wound on an iron core that has closed magnetic path. The core dimension are length of 30 cm and cross section area of  $9 \text{ cm}^2$ . If the core has relative permeability of 900, Calculate the inductance of each coil, mutual inductance and co efficient of coupling.  
 (C) Two heaters A and B are in parallel across supply voltage V. Heater A produces 500 Kcal in 20 minutes and B produces 1000 Kcal in 10 minutes. The resistance of A is 10 ohm. Calculate the resistance of B. If the same heaters are connected in series across same voltage, how much heat will produced in 5 minutes?  
 (D) Explain magnetic hysteresis.



## SECTION-II

- Q:4 (A) Discuss rms value, average value, peak factor and phase difference. (6)  
(B) Derive the relationship between the voltage and current for a purely inductive circuit connected to ac supply. Also show that the average power consumed by circuit is zero (6)

OR

- Q:4 (A) What is impedance triangle? Draw vector, phasor and impedance triangles for (i) R-L series circuit and (ii) R-C series circuit. (6)  
(B) Explain Phasor method to solve parallel ac circuit. (6)  
Q:5 (A) With necessary diagram and equation explain parallel resonance. (6)  
(B) What is the relation between (i) phase voltage and line voltage (ii) phase current and line current for star connection? Derive these relations. (5)

OR

- Q:5 (A) Discuss fuse, MCB and ELCB. (6)  
(B) Explain Construction and working principle of PMMC. (5)  
Q:6 Attempt any three: (12)

- (A) Define Tariff and Explain different types of tariff.  
(B) Two wattmeter are connected to measure power in a three phase circuit. The reading of the one of the meter is 5KW when load power factor is unity. If the power factor of the load is changed to 0.707 lagging without changing the total input power, Calculate the readings of the two wattmeter.  
(C) A resistance of 50 ohm, an inductance of 0.15 H and a capacitance of 100  $\mu$ F are connected in parallel across the 100 V, 50 Hz supply. Calculate (a) the current in each branch (b) the total current (c) power factor of the circuit.  
(D) An a.c circuit consist of a pure resistance of 10 ohms and is connected across a a.c supply of 230 V, 50 Hz. Calculate (i) current (ii) power consumed and (iii) write down the equation of voltage and current.

END OF PAPER

Best of Luck