

GANPAT UNIVERSITY

B. TECH SEM-I (ALL BRANCHES)

~~REGULAR/REMIDIAL~~ (CBCS NEW) EXAMINATION- NOV-DEC 2015

2EE101: ELEMENTS OF ELECTRICAL ENGINEERING

TIME: 3 HRS

TOTAL MARKS: 60

- Instructions:** (1) This Question paper has two sections. Attempt each section in separate answer book.
 (2) Figures on right indicate marks.
 (3) Be precise and to the point in answering the descriptive questions
 (4) Assume suitable data whenever required.

SECTION: I

- Q.1 [A] Discuss Permittivity, Electrical Potential and Electric field strength. [3]
 [B] Derive expression for the capacitance of a parallel plate capacitor with uniform dielectric medium. [4]
 [C] Define Time constant and explain in detail. [3]

OR

- Q.1 [A] A capacitor is charged through a resistance of $500\text{k}\Omega$ connected in series with it across a dc supply. The potential difference across the capacitor is 80% of its final value after 1 second during charging. Find the value of the capacitance. [5]
 [B] State and explain ohm's law for magnetic circuit. Define MMF, Reluctance, and Permeability. [5]

- Q.2 [A] Compare magnetic circuit with electric circuit. [5]
 [B] What is the coefficient of coupling? Derive an expression for the same. [5]

OR

- Q.2 [A] Two coils are connected in series and derive the expression for net inductance of the coil in i) series aiding connection and ii) series opposing connection. [5]
 [B] A coil is wound uniformly with 300 turns over a steel ring of relative permeability 900 having a mean diameter of 20cm and flux of 3mwb . The steel ring is made of bar having cross section of diameter 2cm. Find mmf. Neglect magnetic leakage. [5]

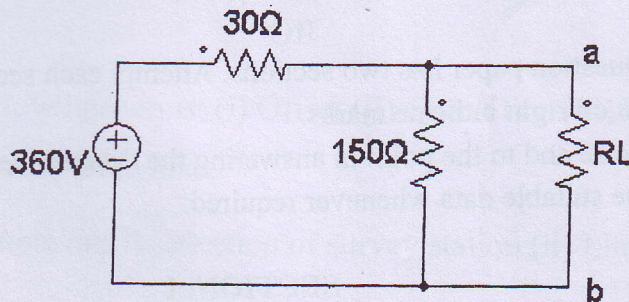
Q.3 Attempt the following questions.

- [A] Explain joule's law of electric heating and discuss thermal efficiency. [03]
 [B] Describe in brief the requirements of good lighting. [02]
 [C] Discuss self inductance. [02]
 [D] The total inductance of two coils, A and B when connected in series is 0.5H or 0.2H , depending on the relative directions of the current in coils. Coil A, when isolated from coil B has a self inductance 0.2H . Calculate (1) The mutual inductance between two coils, (2) The self inductance of coil B, (3) Coupling factor between two coils [03]

SECTION: II

- Q.4 [A] Derive the equation of transforming star connected network into delta connected network and vice versa. [5]

- [B] Fig. shows a circuit feeding a load Resistance R_L . (1) Find the value of R_L so that it draws maximum power. Calculate this power. (2) When R_L is adjusted for maximum power transfer, what percentage of power delivered by the battery reaches R_L ? [5]



OR

- Q.4 [A] Discuss Laws of Resistance. [2]
- [B] Compare Series resistance with parallel resistance. [3]
- [C] State Superposition theorem and explain with necessary diagram and equation. [5]

- Q.5 [A] Define Time period and Peak factor. [2]
- [B] Explain phasor methods to solve parallel circuit with necessary diagram. [4]
- [C] State the condition for parallel resonance and obtain equation for resonant frequency. [4]

OR

- Q.5 [A] Draw circuit diagram, phasor diagram and wave diagram for series R-L circuit. [3]
- [B] Obtain r.m.s value, average value, form factor and peak factor for full wave rectified circuit. [4]
- [C] A non-inductive resistance of $10\ \Omega$ is connected in series with an inductive coil across 200V, 50Hz ac supply. The current drawn by the series combination is 10A. The resistance of the coil is $2\ \Omega$. Determine (1) Inductance of the coil (2) Power Factor (3) Voltage across the coil. [3]

- Q.6 Attempt the following questions.

- [A] Explain Two wattmeter method for measurement of 3-phase power and prove that $W_1 + W_2 = \sqrt{3} V_L I_L \cos\phi$. [03]
- [B] A balanced 3-phase star connected load of 18kw takes a leading current of 60A when connected across 3-phase, 440V, 50 Hz supply. Determine impedance, resistance, and capacitance and power factor of the load. [02]
- [C] What do you mean by tariff? And Discuss important types of tariff. [03]
- [D] An impedance of $(7+j5)\ \Omega$ is connected in parallel with another circuit having an impedance of $(10-j8)\ \Omega$. The supply voltage is 230V, 50Hz. Calculate (1) the admittance, conductance and susceptance of the circuit, (2) the total current and (3) power factor. [02]

-----END OF PAPER-----

ALL THE BEST