

I B.Tech Examinations, June 2011
BASIC ELECTRICAL ENGINEERING
Common to Information Technology, Computer Science And Engineering,
Computer Science And Systems Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) A capacitor having a capacitance of $10 \mu\text{F}$ is connected in series with a non inductive resistance of 120Ω across 100V , 50Hz . Calculate the power, current and the phase difference between current and voltage.
(b) In a R-C series circuit, voltage across the combination is given by $40 \sin(2000t+45)$, $R = 10 \Omega$. The current leads the voltage by $\pi/3$ radians. Find the value of C. Also find the expression for current. [8+8]
2. (a) Give a detailed comparison of series and parallel circuit.
(b) What are the applications, merits and demerits of a series circuit?
(c) What are the applications and advantages of a parallel circuit? [6+5+5]
3. What do you understand by attraction type and repulsion type instruments? Explain. [16]
4. (a) Sketch the torque - slip characteristics, and the torque - speed characteristics of three phase induction motor with relevant explanations.
(b) A 3 phase, 6 pole 50 Hz induction motor has a slip of 1% at no load and 3% at full load. Find [8+8]
 - i. No load speed
 - ii. Full load speed
 - iii. Frequency of rotor current on full load.
5. (a) Deduce an expression for the lifting power of a magnet.
(b) Two coils having 50 and 400 turns respectively are wound side by side on a closed iron circuit of cross sectional area 150sq.cm and of mean length 200cm . [6+10]
6. (a) A copper wire of diameter 1cm has resistance of 0.15Ω . It was drawn under pressure so that its diameter was reduced to 50%. What is the new resistance of the wire?
(b) State and explain Faradays law of electromagnetic induction. [10+6]
7. (a) Give the difference between the cumulative and differentially compounded DC generator.

(b) A DC series generator has an armature resistance of 0.5Ω and series resistance of 0.03Ω . It drives a load of 50 A . It has 6 turns per coil and total 540 coils on the armature and is driven at 1500 rpm. Calculate the terminal voltage at load. Assume 4 poles lap type winding, flux per pole as 2 mWb and total brush drop is 2 V . [6+10]

8. Starting from the ideal transformer, obtain the approximate equivalent circuit of a commercial transformer in which all the constants are lumped and represented on one side.

A single phase transformer has a turn ratio of 6. The resistance and reactance of primary winding are 0.9Ω and 5Ω respectively and those of the secondary are 0.03Ω and 0.13Ω respectively. If 330 V at 50 Hz be applied to the high voltage winding with the low-voltage winding short circuited. Find the current in the low-voltage winding and its power factor. Neglect magnetizing current. [16]

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