

NATIONAL INSTITUTE OF TECHNOLOGY, KURUKSHETRA-136119
THEORY EXAMINATION

Month and Year of the Exam.....May 2011.....

Programme.....B.Tech.....

Session.....

Subject.....Basic Elect. Engg.

Course No. ELT-105 & ELT-101

Maximum Marks...50....

Number of questions to be Attempted.....5.....

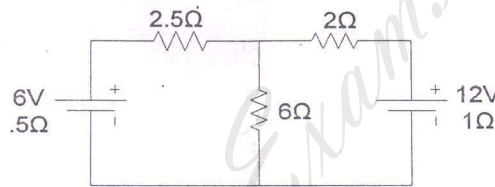
Time allowed...3 hours....

The question paper has8...question spread over....2...pages.

Note: Each question carry equal marks.

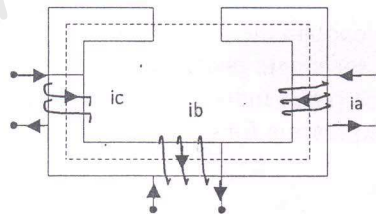
Q1.a) Explain Thevenin and Norton Theorems with suitable examples. Also give their applications. (2+2+1)

Q1.b) Define Superposition theorem for dc circuits. Find the current in every branch in the circuit given below. (1+4)



Q2.a) Give the analogy between electric and magnetic circuits. Also explain the three major differences between them. (3.5+1.5)

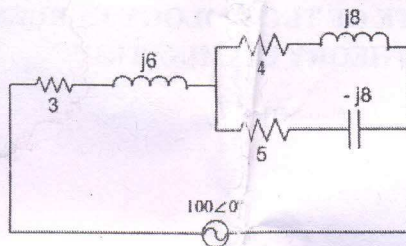
Q2.b) A rectangular iron core is shown in figure given below which has a mean length of magnetic path of 100cm, cross section of 2cm×2.5cm, relative permeability of 1500 and an air gap of 5mm cut in the core. The three coils carried by the core has no. of turns and currents flowing through them are 200,300,400; 2,3,4 respectively. The directions of currents are shown in figure. Find the flux in air gap. (5)



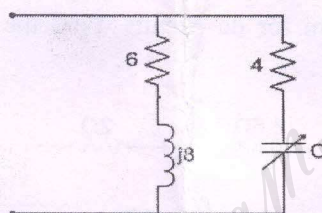
Q3.a) Define the following terms for the alternating current:
i) RMS value ii) Average value iii) Maximum value iv) Form factor v) Peak factor (5)

Q3.b) For the circuit shown below, find i) total impedance ii) total current iii) total power absorbed and power factor. Draw the vector diagram also. (3+2)

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- Q4.a) Define resonance in series RLC circuit. Draw the reactance curve and show the point of resonance. Derive the expression for edge frequencies. (1+2+2)
- Q4.b) Compute the value of C which results in resonance for the circuit shown below when $f=2500/\pi$ Hz. (5)



- Q5.a) How can power in three phase balanced circuit measured using two wattmeter method? Also find out the power factor from the two wattmeter readings. (3+2)
- Q5.b) Show that for the case of three phase system:

$$V_{Line} = \sqrt{3} V_{Phase} \text{ in star connection}$$

$$I_{Line} = \sqrt{3} I_{Phase} \text{ in delta connection} \quad (2.5+2.5)$$

- Q6.a) Derive the torque equation for DC motor. What are the different type of DC motors? Write the voltage, current and power equations for all the types. (2+3)
- Q6.b) How can we control the speed of DC motor? Give suitable equations. Explain armature voltage control method of speed control of DC shunt motor. (2+3)
- Q7.a) Define transformer and also explain the working principle with emf equation. Draw phasor diagram for lagging power factor for single phase transformer on load. (1+2+2)
- Q7.b) Name the main parts of three phase induction motor. What is the difference between cage rotor and wound rotor? Give the expression for torque for induction motor. (1+2+2)
- Q8.a) Write short note on any two:
 - 1) Delta to star and star to delta conversion.
 - 2) Apparent power, active power, reactive power, power factor, Q-factor.
 - 3) Open circuit and short circuit test on transformer. (5+5)