IE 2005

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1E 2005

B.Tech. I Semester (Main/Back) Examination - 2015
105 Basic Electrical and Electronics Engg.

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks(Old Back) : 24
Min Passing Marks (Main/Back):26

Instructions to Candidates:

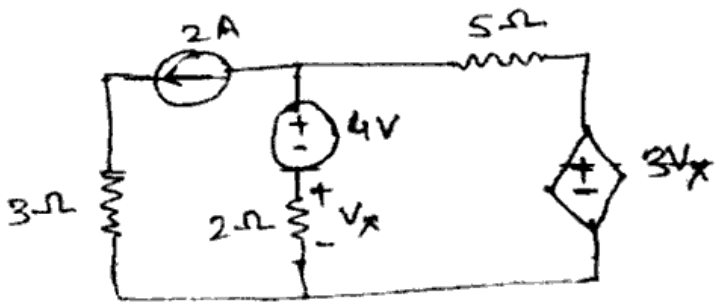
*Attempt any **five** questions, selecting **one** question from each **unit**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)*

Unit - I

1.1 a) Explain the Faraday's law of Electromagnetic Induction. What are eddy currents? Explain the process of generation of eddy currents on the basis of Faraday's law of EMI. **(6)**

b) A direct voltage is applied to a capacitor and the voltage across the capacitor is $\upsilon = 150(1 - e^{-20t})$. After 0.05 sec, the current flow is equal to 1.14mA. Find the capacitance and the energy stored in the capacitor. **(5)**

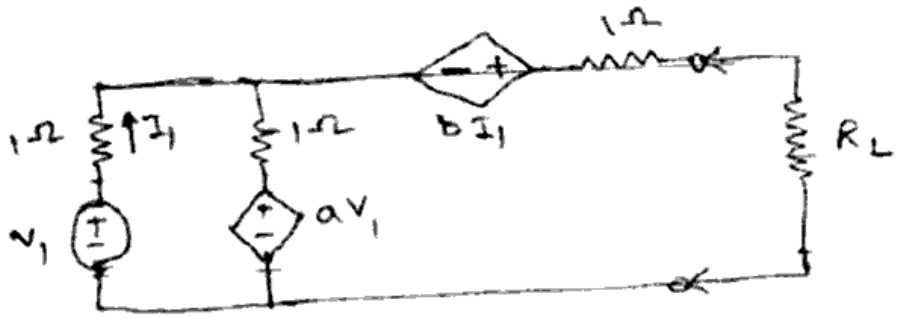
c) Find the current in 5Ω resistance using superposition theorem.



(5)

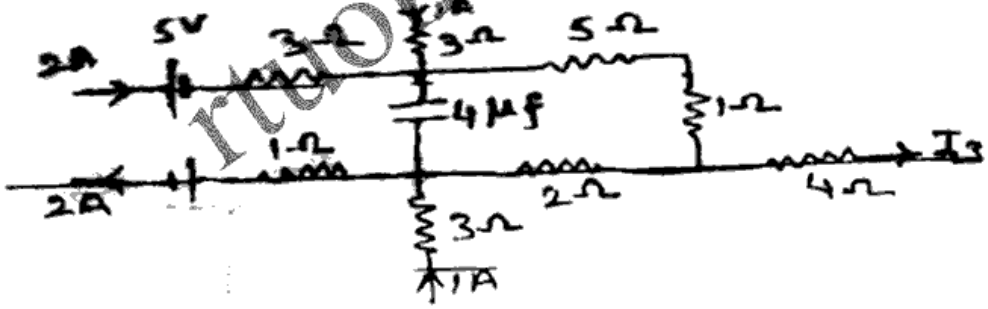
(OR)

1.2 a) Find the Thevenin's equivalent circuit for the network shown below :



(6)

b) Find out the energy stored in capacitor in the figure shown below under steady state conditions Also find current I_3.



(5)

c) 'N' cells, each of emf 'E' and internal resistance 'r' are connected in a closed ring so that the positive terminal of each cell is joined to the negative terminal of the next. Any two points of this ring are connected through an external resistance 'R'. Find the current in 'R' using Kirchoff's mesh equations. **(5)**

UNIT - II

2.1 a) Draw and explain phasor diagram to show relationship between phase/line voltages and currents for a star-connected lagging load connected to a balanced 3 phase voltage source. Give the mathematical relationship between line and phase values of voltages and current(s). **(8)**

b) Find the angle by which i_2 lags i_1 if

$i_1 = 120\cos(100\pi t - 30^0)$ and

i) $i_2 = -8\cos(100\pi t + 20^0)$

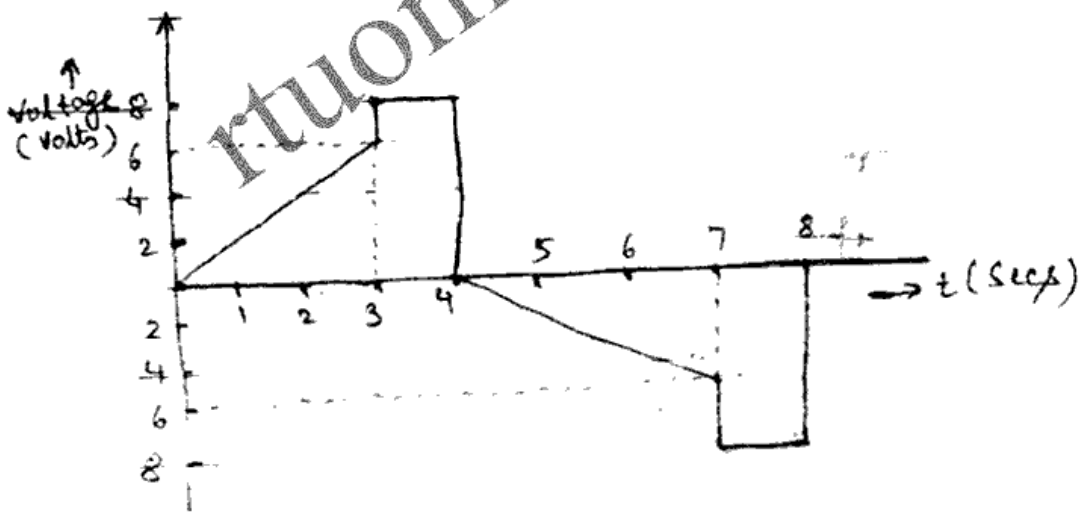
ii) $i_2 = 5\sin(100\pi t + 50^0)$

iii) $i_2 = -6\sin(100\pi t - 30^0)$

iv) $i_2 = 2\sin(100\pi t - 20^0) + 2\cos(100\pi t - 20^0)$ **(8)**

(OR)

2.2 a) A voltage wave has variation as shown below :



Find the average and RMS value (effective value) of voltage wave shown in figure. **(8)**

b) A coil having a resistance of 5Ω and an inductance of ($1/\pi$) Henry is connected in series with a capacitor of $(100/\pi)$ microfarad A 200V, 50Hz alternating voltage source (sinusoidal) is applied across the circuit.

i) Find the current flowing through the voltage Source.

ii) Find the total impedance of the circuit.

iii) Find the voltage across R,L and C components

iv) Draw the phasor diagram. **(8)**

UNIT - III

3.1 a) Explain the following terms :

i) Cogging ii) Skewing

iii) Armature reaction iv) per unit voltage regulation **(8)**

b) A 250 volt DC shunt motor takes 30 Amp current while running at full load. The resistance of motor armature and field windings are 0.1 ohm and 200 ohm respectively. Determine the back emf generated in the motor when it runs on full load. **(8)**

(OR)

3.2 a) Explain the following terms :

i) Interpoles

ii) Leakage flux and leakage reactance.

iii) Critical field circuit resistance in D.C generators.

iv) Commutation **(8)**

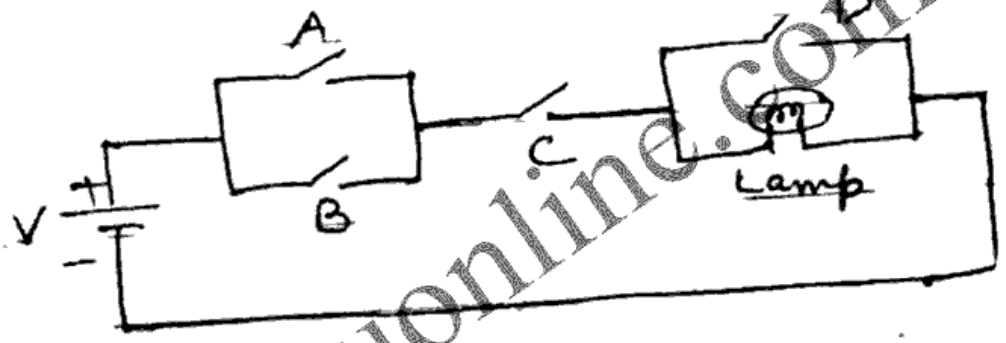
b) Explain how the back emf of a motor causes development of mechanical power. **(4)**

c) Explain why the speed - torque characteristic of a DC shunt motor is non - linear in high - torque region. **(4)**

UNIT - IV

4.1 a) Draw the circuit diagram of a single stage CE transistor amplifier. Discuss DC biasing and role of coupling capacitor in this circuit. **(8)**

b)



Derive the boolean expression to represent the given circuit. **(4)**

c) Minimize the following Boolean function $z = ABC + \bar{A}B + AB\bar{C}$ **(4)**

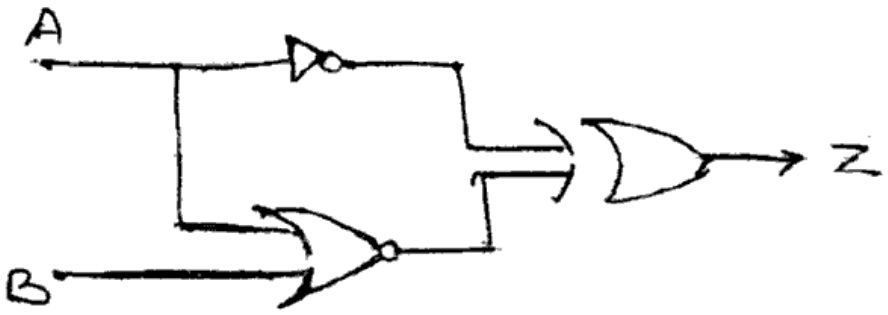
(OR)

2 a) Draw the circuit diagram of full wave rectifier with capacitor filter by using two diodes and discuss its working. **(8)**

b) $F = A\bar{B}C\bar{D} + \bar{A}BC\bar{D} + A\bar{B}\bar{C}D + \bar{A}B\bar{C}D$ Implement the function by XOR gate only

(4)

c)



Give the truth table for the given combinational circuit **(4)**

UNIT - V

5.1 a) Discuss Need of modulation Draw comparision between amplitude and frequency modulation schemes by taking important features one by one.

(4+4=8)

b) Discuss working of thermocouple by taking an important application of it **(4)**

c) Differentiate between Transducers and inverse transducers. **(4)**

(OR)

5.2 a) Discuss following types of important communication methods briefly and stating their important applications along with range of frequency used

i) Microwave Line of sight communication.

ii) Satellite communication. **(4+4=8)**

b) Define gauge factor in strain gauge and find expression for the same. **(4)**

c) Differentiate Active and passive transducers. **(4)**
