Total No. of Printed Pages:3

SUBJECT CODE NO:- P-59
FACULTY OF ENGINEERING AND TECHNOLOGY
F. E. (All) (CGPA) Examination May/June 2017
Basic Electrical Engineering
(Revised)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B i. Q.5 and Q.10 are compulsory.
ii. Attempt total three questions from each section.
iii. Make suitable assumption where necessary, stating the same.

Section A

Q.1 a. Explain discharging of capacitor through resistance when a fully charged capacitor is disconnected from the supply. Derive equation for discharge current and voltage 06

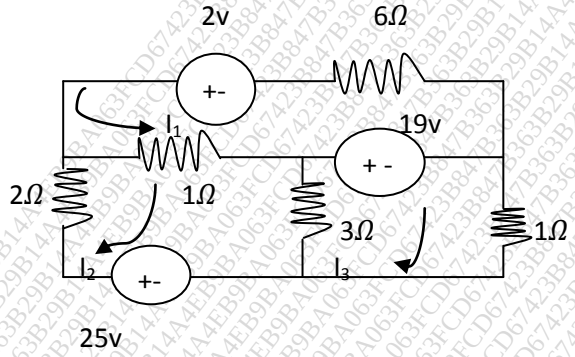
b. Explain the terms capacity and efficiency in connection with battery. 04

c. Define temperature coefficient of resistance and prove that 04

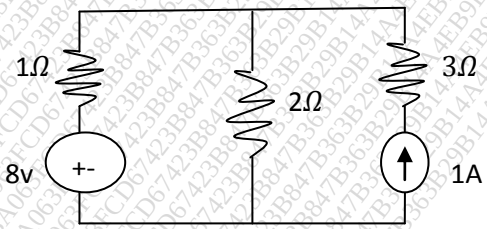
$$\alpha_t = \frac{\alpha_\circ}{1+\alpha_\circ t}$$

Where symbol have their usual meanings

Q.2 A. for the circuit shown below Find I_1, I_2, I_3 using loop- current analysis. Hence find I_{AB}. 05



b. For the network shown below, find current flowing through 2Ω resistor using superposition Theorem. 04



c. derive an expression for conversion of delta-connected resistance network into an equivalent star connected network. 05

Q.3 a. State and prove Maximum power transfer Theorem 05

b. Find the current flowing through 4Ω resistor using Thevenin's Theorem. 05

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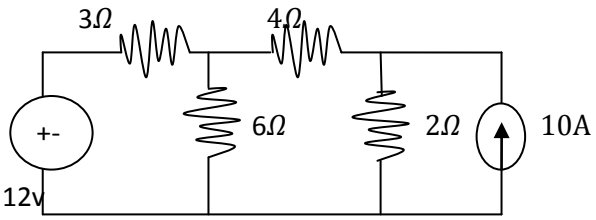


c. Define the following terms and state their units. 04

i. MMF ii. Reluctance iii. Flux iv. Permeability.

Q.4 a. Draw, series magnetic circuit with an air gap and explain method of calculation of total ampere-turns required to produce flux. 05

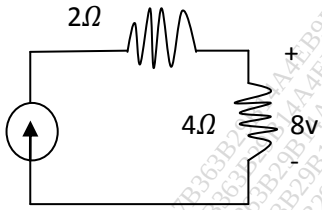
b. Derive the relationship between mutual inductance and self-Inductance of two mutually coupled coils. 05

c. Explain why hysteresis and eddy current losses occur in magnetic materials when changing magnetic flux passes through the material on what factors these losses depend? 04

Q.5 Answer the following (Any six) 12

Show calculation wherever necessary.

a. In the fig. Shown below, find the value of current source and power dissipated in2Ω resistor.



b. Three equal resistance of 9Ω are connected in delta. Calculate resistances of equivalent star connection.

c. Define leakage flux. What is leakage factor

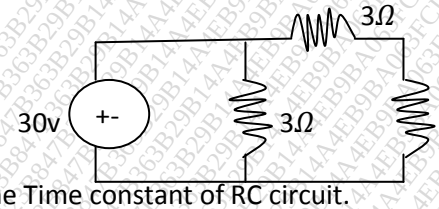
d. What is the effect of temperature on resistance of following

i) Alloys ii) semiconductors.

e. State Thevenin's Theorem.

f. In a three branch parallel circuit 10A current flows in each branch .If one of the branch opens, what is the current in each of other branches.

g. Calculate voltage drop across 6Ω resistor.



h. Define Time constant of RC circuit.

Section-B

Q.6 a. Explain the behaviour of pure capacitor when connected across single phase a. c. supply. 04

b. The waveforms of voltage and current of a circuit are given by ϑ=150 sin 314t and i =10sin (314t+π /4) find the values of circuit components which are connected in series to form the circuit. 05

c. A coil having an inductance of 50mH and resistance of 10Ω is connected in series with a 25uf capacitor across a 200v a. c. Supply. Calculate : 05

i. frequency at resonance ii. Current at resonance iii. Quality factor iv. Voltage across capacitor and inductors

Q.7 a. Give comparison between series resonance and parallel resonance. 07

b. A coil of resistance 15Ω and inductance 0.05H is connected in parallel with a non inductive resistor of 20Ω find 07

i. The current in each branch
ii. The total current supplied.
iii. The phase angle of combination when a voltage of 200v at 50 Hz is applied. Draw vector diagram.

Q.8 a. Explain principal of working of Transformer. 05

b. A single phase transformer has 400 primary and 1000 secondary turns. The net cross sectional area of core is 60 cm^2. If the primary is connected to a 50Hz, 500v supply. Determine 05

i. The peak value of flux density in the core and
ii. Voltage induced in the secondary winding

c. Write short note on 'Transformer losses'. 04

Q.9 a. Explain construction and working of Metal halide lamp 05

b. Write short note on 'Multimeter' 05

c. Explain various safety measures adopted in an Electrical installation. 04

Q.1o Answer the following questions in short. show calculations wherever necessary (Any six) 12

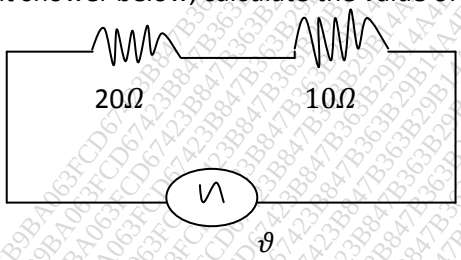
a. In a particular circuit, the applied voltage leads current by 90°,What type of circuit is this? What is the p. f.

b. How are transformers classified based on their construction. Give any two points of comparison.

c. A 115/230v, 1KVA transformer gives secondary voltage of 225v at a particular load. Calculate voltage regulation at the load.

d. 'If frequency of the applied alternating voltage is doubled, The inductive reactance offered by a pure coil remains constant' correct the statement if necessary and explain.

e. For the circuit shower below, calculate the value of conductance and susceptance.



f. The apparent power drawn by a. c. Circuit is 10 KVA and active power is 8KW. What is the reactive power in the circuit? What is the p. f. Of the circuit.

g. Where is the fuse placed in supply system? Why?

h. What is a power plant? Name different types of conventional plants.