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Total Number of Pages :2

B.TECH. DEGREE EXAMINATION-NOV-DEC.2018

End Semester Examination-I Semester

BBS1042-Basics of Electrical Engineering

(Regulations 2017, Common to AEIE, CSE, ECE, BT and IT)

(Regulations 2018, Common to all Branches except CSE and Mechanical)

Time : 3 Hours

Maximum : 100 Marks

Question Code:091512

Answer ALL Questions

PART A - (10 X 2 = 20 Marks)

1. (a) Kirchoff's Current Law is applicable at.....only. [CO1][PO1]
a) Joints b) Loops c) Branches d) None of these
- (b) An Ideal voltage source should have.....internal resistance. [CO1][PO1]
a) One b) No c) Infinite d) Maximum
- (c) A series $R - C$ Circuit is excited by DC voltage E volt through a switch. The value of initial current is.....? [CO2][PO1]
a) Maximum b) Zero c) Half of current d) None of these
- (d) Identify the unity power factor element from the following. [CO2][PO1]
a) Inductance b) Capacitance c) Resistance d) Diode
- (e) For a Star connected load, Line Voltage =..... x Phase voltage. [CO2][PO1]
a) 3 b) $1/3$ c) 1 d) none
- (f) The unit of magnetic field intensity is.....? [CO3][PO1]
a) AT b) AT/m c) Weber d) none
- (g) The core of the Transformer is laminated to reduce.....loss. [CO3][PO1]
a) Hysteresis b) Eddy current c) Copper loss d) Iron Loss
- (h) Generally earthing is provided for.....purpose? [CO4][PO1]
a) only for the safety of the equipment b) only for the safety of the operating personnel
c) both (a) and (b) d) none of the above
- (i) What is the relation between rms value of current and maximum value of Current? [CO2][PO1]
a) $I_{rms} = I_m/2$ b) $I_{rms} = I_m/2$ c) $I_{rms} = I_m/4$ d) $I_{rms} = I_m$
- (j) Three nos. of 6Ω resistors are connected in Delta. Find out its Star equivalent. [CO1][PO2]
a) 2Ω b) 12Ω c) 18Ω d) 12Ω

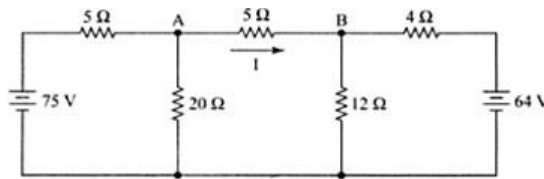
PART B - (10 X 2 = 20 Marks)

2. (a) A D.C. Voltage V is switched on to a series R-L circuit. Write the differential equation for the circuit. Find the expression for instantaneous current. [CO1][PO1]
- (b) A Resistance R is connected across a potential difference of 110 volts and dissipates energy at the rate of 220 watts. Calculate the value of resistance R . [CO1][PO2]
- (c) What is the RMS value of an alternating quantity? Find the RMS and Average value of a sinusoidal quantity of $v = 100\sin 314t$ volt. [CO2][PO1]
- (d) Describe the relationship between 3 phase Power of Star and Power of Delta for a same load. [CO2][PO1]
- (e) Explain the series $R-L-C$ Resonance frequency. [CO2][PO1]
- (f) Two impedances of $Z_1 = (5 + j7)\Omega$ and $Z_2 = (8 - j2)\Omega$ are connected in parallel. Find out the net impedance of the combination in polar form. [CO3][PO1]
- (g) Explain the relationship between Hysteresis loss and frequency. [CO3][PO1]
- (h) Identify the different losses in a Transformer? [CO3][PO1]
- (i) Define duty ratio? [CO4][PO1]
- (j) Describe the different types of earthing? [CO4][PO1]

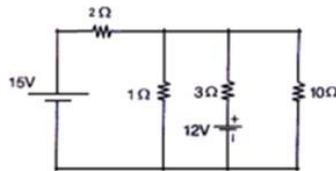


PART C - (4 X 15 = 60 Marks)

3. (a) i. Calculate the current I using Maxwells Loop current method. [8][CO1][PO2]

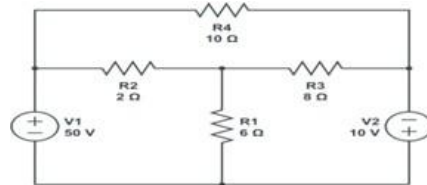


- ii. Find the current through 10Ω resistor by Nodal Analysis [7][CO1][PO2]

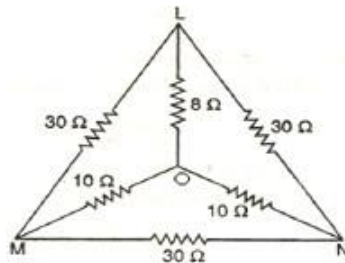


(or)

- (b) i. Find out the current in the 6 ohm resistor by the superposition theorem [7][CO1][PO2]



- ii. Find out equivalent resistance between MN by the Star-Delta transformations technique [8][CO1][PO2]



4. (a) i. Explain the effective value of a sinusoidal e.m.f over the period 0 to 2π by Analytically? [7][CO2][PO1]

- ii. In a series circuit containing pure resistance and a pure inductance, the current and the voltage are expressed as : $i(t) = 5\sin(314t + 2\pi/3)$ Amp and $v(t) = 15\sin(314t + 5\pi/6)$ Volt.

- (a) What is the impedance of the circuit?
(b) What is the value of the resistance?
(c) What is the inductance in henrys?
(d) What is the average power drawn by the circuit?
(e) What is the power factor?

[8][CO2][PO2]

(or)

- (b) i. A 400 volt (line to line) is connected to a star-connected load of $(3 + j4)\Omega$ in each phase. Find the line current. [7][CO2][PO2]
ii. A balanced 3-phase star load has load impedance of $(5-j10)$ ohms per phase and is supplied from a balanced 3-ph 400V, 50 Hz AC supply. [8][CO2][PO2]



Calculate the values for:

(a) Line voltages. b)Phase voltages c) Line currents.d) Phase currents.e)Power consumption at the load.

5. (a) i. Explain the EMF equation and voltage transformation ratio constant equation of a single phase Transformer. [7][CO3][PO1]
ii. A single phase transformer is excited at its primary from a 230V, 50Hz single phase AC supply. It has 200 primary turns and 400 secondary turns. What is the maximum flux in the core and the secondary induced EMF. [8][CO3][PO2]
- (or)
- (b) i. Explain B H-curve of magnetizing materials and also describe the hysteresis loss and Eddy current loss and suggest how to minimize that types of losses. [8][CO3][PO1]
ii. What do you mean by slip and sketch the Torque Slip characteristics of a three phase Induction Motor? [7][CO3][PO1]
6. (a) i. Explain about DC-DC buck and boost converter. [7][CO4][PO1]
ii. Illustrate about the single phase voltage source inverter. [8][CO4][PO1]
- (or)
- (b) i. What is the necessity of Earthing and Discuss about the Pipe Earthing in detail? [8][CO4][PO1]
ii. Explain the method of power factor improvement. [7][CO4][PO1]

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