



Registration No:

--	--	--	--	--	--	--	--	--	--

Total Number of Pages : 2

AR-18

B.TECH

1st Semester (BACK PAPER) Examination-December 2019
 BBSES1042 BASICS OF ELECTRICAL ENGINEERING

Time : 3 Hours

Maximum : 100 Marks

Answer ALL Questions

The figures in the right hand margin indicate marks.

PART – A: (Multiple Choice Questions) 10 x 2=20 MarkQ.1. Answer ALL Questions

- An Ideal voltage source should have _____ internal resistance.
(a) Zero resistance (b) Infinite resistance (c) Both (d) none of these
- An Ideal current source should have _____ internal resistance.
(a) Zero resistance (b) Infinite resistance (c) Both (d) none of these
- An ideal voltage source should have _____.
(a) large value of e.m.f. (b) small value of e.m.f. (c) zero source resistance (d) infinite source resistance
- The power factor of a pure capacitive circuit is _____.
(a) 1 (b) 2 (c) 0 (d) None of these.
- The power factor is the ratio of _____ power and _____ power?
(a) Active & Apparent (b) Apparent & Active (c) Real & Active (d) None of these
- For a Delta connected load, Phase current = _____ × Line current. a) $\sqrt{3}$ b) $1/\sqrt{3}$ c) 1 d) none
- What is the relative permeability of a air? a) 1 (b) 2 (c) 0 (d) 1
- The loop obtained from BH- curve of a ferromagnetic material is _____ loop.
(a) Eddy Current Loss (b) Hysteresis Loss (c) Maxwell's (d) None of these
- In order to improve the power factor of equipment operating at lagging power factor, a capacitor is connected a) in series with the equipment b) in parallel with the equipment
c) in series-parallel with the equipment d) either (a) or (b)
- Generally earthing is provided for _____.
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

PART – B: (Short Answer Questions) 10X2=20 MarksQ.2. Answer ALL questions

- Write the time constants of RL and RC series circuit for DC excitation?
- Draw the Thevenin's equivalent circuit?
- Three identical impedances connected in delta draw a current of $(2 < 30^\circ)$ A, when connected across a 440V, 50 Hz AC supply. Find the phase current and total power consumption.
- Define RMS value of a sinusoidal quantity, Also justify that the effective value is same as the RMS value.
- An AC is given by: $I = 100 \sin \pi t$, after how many seconds the current will reach 50A.
- What do you mean by magnetism and magnetic field?
- What do you understand by retentivity?
- What are the voltage source inverters?
- What is requirement of earthing ?
- What are the different types of wires and cables ?

PART – C: (Long Answer Questions) 4X15=60 MarksAnswer ALL questions

Q.3

- A resistance of 1000 ohm and capacitance of 100 μ F are connected in series to 100V DC supply. calculate
 (i) Initial current
 (ii) Final current
 (iii) Current after 0.2 second.
- Derive the Expression for growth and decay of transient current in RL circuit with DC excitation. An inductor coil of inductance 0.5 H and resistance 10 Ω is connected to a DC source of 100 V. Assuming that steady state is already achieved, the battery is suddenly removed and replaced with shorted link at $t=0$. Calculate (i) Time constant of the circuit (ii) Initial and final steady state current and (iii) Time taken for the circuit to decay the current to 70% of the initial current.

OR

- Two batteries are connected in parallel with emf and internal resistances as 100V, 10 ohm and 2000V, 20 ohm

7

8

7



respectively. Another load resistance of 50 ohm is connected across battery terminals. Calculate the Current through 50 ohm resistor using superposition theorem.

- d An inductor 2H is connected to a DC supply of 100V through a series resistor having resistance 200Ω . Find the time constant for the given setup and hence calculate the value of the current after 20ms of the switching the supply. Also calculate the steady state current. 8

Q.4

A pure resistance of 50 ohms is in series with a pure capacitance of 100 microfarads. The series combination is connected across 100-V, 50-Hz supply.

- a Find (a) the impedance (b) current (c) power factor (d) phase angle (e) voltage across resistor (f) voltage across capacitor. 7
- b A resistance of 20Ω , an inductance of 0.2 H and a capacitance of $100\mu\text{F}$ are connected in series across 220-V, 50-Hz mains. Determine the following (a) impedance (b) current (c) voltage across R, L and C (d) power in watts and VA (e) p.f. and angle of lag. 8

OR

- c A balanced 3 ph star connected load impedance of $(6+j8)\Omega$ per phase and is supplied from a balanced three phase 400V, 50 Hz supply. Determine the values of (a) Line voltages and phase voltages. (b) The phase currents and line currents (c) Power consumed. 7

- d A balanced 3-ph star load has load impedance of $(5-j10)\Omega$ per phase and is supplied from a balanced 3-ph 400V, 50 Hz AC supply. 8

Calculate the values for:

- (a) Line voltages.
(b) Phase voltages
(c) Line currents
(d) Phase currents.
(e) Power consumption at the load. [7M]

Q.5

- a Explain B-H curve with the help of a neat diagram. 7
- b A 400V, 4-pole, 3- Φ 50Hz star connected Induction motor has a rotor resistance and reactance per phase are 0.01Ω and 0.1Ω respectively. Determine (a) starting torque (b) slip at which Maximum torque will occur (c) Maximum Torque. 8

OR

- c Explain B-H curve for magnetic materials and also define hysteresis loss & Eddy current loss of the magnetic material. How to minimize those types of losses. 7
- d 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 e.m.f. 8

Q.6

- a Explain the different methods of earthing. 10
- b Explain the method of power factor improvement. 5

OR

- c What do you mean by Battery backup ? Discuss different types of batteries. 7
- d What is the elementary calculation for energy consumption? 8

==0==