Registration No : | | | | | | | | | | |

Total Number of Pages : 02 **B.Tech.**
BE2102

2nd Semester Back Examination 2017-18
BASIC ELECTRICAL ENGINEERING
BRANCH : AEIE, AERO, AUTO, BIOMED, BIOTECH, CHEM, CIVIL, CSE, ECE, EEE, EIE, ELECTRICAL, ENV, ETC, FASHION, FAT, IEE, IT, ITE, MANUFAC, MANUTECH, MARINE, MECH, METTA, METTAMIN, MINERAL, MINING, MME, PE, PLASTIC, TEXTILE
Time : 3 Hours
Max Marks : 70
Q.CODE : C1173
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.
Answer all parts of a question at a place.

Q1 **Answer the following questions:** **(2 x 10)**

a) A resistor of 5 Ω is connected across a potential difference of 50V.Calculate the power dissipated and energy transferred to heat in 2 minutes ?

b) Explain the term 'Permeability' & ' coercivity' ?

c) Define R.M.S value of an alternating quantity?

d) Two impedances of $0.5\angle -90^0$ & 3+j4 Ω are connected in series .Find out the resultant impedances in polar form?

e) What is back emf in a DC motor, explain?

f) Find the frequency of the induced emf of an alternator having six pole rotating at 1500 rpm?

g) Differentiate between active and reactive power ?

h) What is the value of starting torque in case of a single phase induction motor?

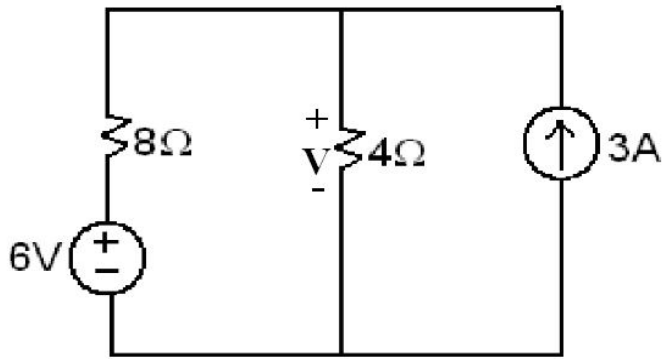
i) What is the relation between phase and line current in three phase star connected circuit ?

j) Why the transformer core is laminated ?

Q2 **a)** A 50 Hz sinusoidal voltage; V=141 sin wt is supplied to a series R-L circuit comprising of R =5 ohm, and L=0.015 Henry. Calculate: **(5)**

i. The effective value of the steady state current as well as the relative phase angle?
ii. The instantaneous current (time equation) ?

b) Using Super position theorem Find V in the circuit shown in Fig (1)? **(5)**



Q3 **a)** State & explain Thevenin's theorem by giving a suitable example? **(5)**

b) The voltage applied to a circuit is V= 230 sin(wt + 30^0) and the current through the circuit is i= 10 sin(wt - 30^0) . Determine the parameter of the circuit, power consumed in the circuit and also the power factor of the circuit? **(5)**

Q4 **a)** Draw the analogy between electric circuits & magnetic circuits? **(5)**

b) An iron ring has a mean diameter of 25cm and a cross sectional area of $4cm^2$ .It is wound with a coil of 1200 turns .An air of gap 1.5 mm width is cut In the ring .Determine the current required in the coil to produce a flux of 0.48 m Wb in the air gap .If the relative permeability of iron is 800? (neglect magnetic leakage and fringing) **(5)**

Given $\mu_0 = 4\pi \times 10^{-7}$ H/m

Q5 **a)** An inductance of 0.5 H in series with a capacitance of 100μF.Find the impedance of the circuit for the condition given below : **(5)**

i. At a frequency 60Hz
ii. At a frequency 1kHZ

b) A balanced star connected load has resistance of 10Ω & inductance of 50mH per phase is connected to a three phase supply of 440V & 50Hz . **(5)**

Find the

i. Line Current.
ii. Phase current
iii. Power Factor.

Q6 **a)** Explain in brief various losses occurred in a DC machine? **(5)**

b) A 220/20V transformer has 50 turns on its low voltage side. **(5)**

Calculate

i. The number of turns on the high voltage side?
ii. The turn ratio when it is used as step down transformer?
iii. The turn ratio when it is used as step up transformer?

Q7 **a)** Name the series and shunt methods of excitation provided in DC machines? **(5)**

b) Describe the Principle of alternator? Also write names of various parts Of a rotating electrical machine ? **(5)**

Q8 **ANSWER ANY TWO :** **(5 x 2)**

a) Voltage sources & Current Sources
b) Laws of magnetic circuits.
c) AC power distribution.
d) Measurement Systems