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

Total Number of Pages: 02

B.TECH
BE2102

1st Semester Back Examination 2015-16
BASIC ELECTRICAL ENGINEERING
BRANCH(S): ALL
Time: 3 Hours
Max Marks: 70
Q.CODE: T851

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

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

a) Differentiate between active elements and passive elements with examples of each.

b) Write down the expression for energy consumption in a resistor, a capacitor and an inductor and specify each term.

c) A 15H inductance coil of 10 ohm resistance is suddenly connected to a 20V d.c supply. Calculate the rate of change of current after 2 second.

d) Find the effective value of the resultant current in a wire which carries simultaneously a direct current of 10 A and a sinusoidal alternating current with a peak value of 15 A.

e) A 3-phase star connected alternator delivers a line current of 65A to a balanced delta connected load at a line voltage of 380V. Calculate the phase voltage of the alternator and load phase current.

f) What is noise and write various noise reduction methods.

g) Explain briefly magnetic leakage and fringing.

h) What is the maximum speed at which a 50Hz synchronous machine can be operated?

i) Why is high voltage preferred for transmission of electric power.

j) Why does the rotor of an induction motor never succeed in catching up with the stator field?

Q2 **a)** Explain maximum power transfer theorem. Show that for maximum power transfer condition, the power transfer efficiency is 50% only. **(5)**

b) Find the current flowing in the 2 Ω resistor of the circuit shown in Fig. 1 by applying (i) Thevenin's theorem and (ii) Superposition theorem. **(5)**

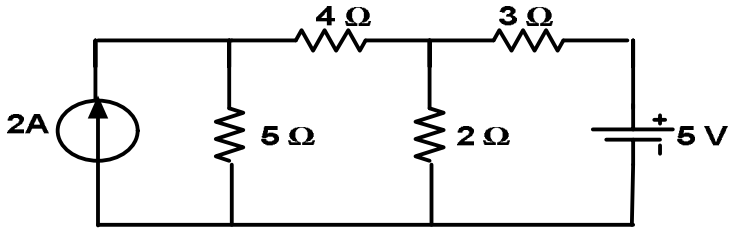

FIG - 1

Q3 **a)** Use nodal analysis to determine the value of current 'i' in the network shown in Fig. 2. **(5)**

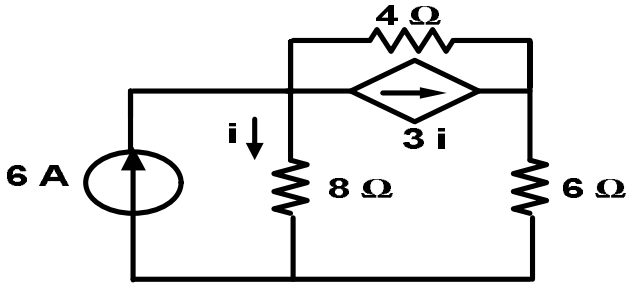

FIG - 2

b) A capacitor of capacitance 10 μF is connected to a dc source of 220 V through a resistance of 10 MΩ and the source is switched on at t=0. Calculate: **(5)**

i) Time constant of the circuit.
ii) Steady-state voltage across the capacitor.
iii) Time taken for the circuit to charge the capacitor to 50% of supply voltage.
iv) Voltage across capacitor after 50 sec of switching

Q4 **a)** Define the following terms: **(9)**
(i)B-H Curve. (ii)Ampere's Circuit Law. (iii)Hysteresis Loss.

b) What is the internal resistance of an ideal voltmeter? **(1)**

Q5 **a)** An inductor of 0.63 H is in series with a capacitor of 0.95 μF. Find the admittance of the circuit when the frequency is (i) 80 Hz and (ii) 15kHz. **(5)**

b) Prove that the average power in a R-L A.C circuit is $VI\cos\phi$, where V is the r.m.s value of the voltage, I is the r.m.s value of the current and $\cos\phi$ is the power factor. **(5)**

Q6 **a)** A single phase 7.46 kW motor is supplied from a 400 V, 50 Hz, A.C. mains. If its efficiency is 85% and power factor 0.8 lagging, Calculate: **(5)**
(i) kVA input.
(ii) Active and Reactive Component.
(iii) kVAR.

b) A coil having an inductance of 50 mH and resistance of 10 Ω is connected in series with a 25 μF capacitor across a 200 V A.C supply. Calculate : **(5)**
(i) Resonant frequency of the circuit.
(ii) Current flowing at resonance.
(iii) Value of quality factor.

Q7 **a)** Derive the e.m.f equation of a transformer. **(5)**

b) Explain briefly the comparison between three phase and single phase system. **(5)**

Q8 Write short-notes on any TWO: **(5 x 2)**

a) Working of an LVDT.
b) Different methods of signal conditioning.
c) Generation of A.C power.
d) Analog to Digital converter.