Code No: 113BR **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, March - 2017
BASIC ELECTRICAL ENGINEERING
(Common to CSE, IT)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a) State and explain Kirchoff's current law. [2]
b) Four lamps are connected in parallel to a 100 V supply. The current taking by first three lamps are 1.9 A, 1. 3 A and 0.7 A .If the total supply current is 5A, calculate the resistance of all the lamps. [3]
c) An impedance of (30+j45) ohm in series with an impedance of (6-j7) ohm to a 60 V supply. Find the voltage across each impedance. [2]
d) Define the terms (i) peak factor (ii) form factor and (iii) rms value of alternating current. [3]
e) A 3300/300 V, single phase 30kVA transformer has 1100 primary turns. Find (i) secondary turns (ii) secondary current when it supplies a load of 200 kW at 0.8 pf lagging. [2]
f) Define the terms (i) efficiency and (ii) regulation of a transformer. [3]
g) Draw well labelled connection diagrams to show shunt and series generators. [2]
h) Explain the principle of operation of three phase induction motor. [3]
i) Name different torques available in measuring instruments and write their significance. [2]
j) Write the classification of electrical measuring instruments. [3]

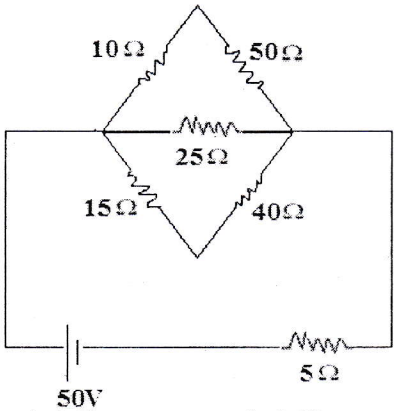
PART- B

(50 Marks)

2.a) State and explain superposition theorem.
b) The impedances AB= (30-j67) Ω, BC=(45+j56)Ω and AC=(35-j46) Ω are connected in delta form. Obtain its equivalent star circuit impedances. [5+5]

OR

3.a) State and explain Maximum power transfer theorem for DC circuits.
b) Calculate the current flowing through 25 Ω in the circuit shown below using Thevinin's Theorem. [5+5]



4.a) Obtain the average and rms values of a sinusoidal current wave.

b) A 23 ohm resistor connected in series with 5H inductor and further this circuit is connected in parallel with 3 μF capacitor. Find (i) the supply current (ii) current in each branch (iii) supply power if the supply voltage is $v(t) = 10\sin(2000t)$. [5+5]

OR

5. Find the rms 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. [10]

6.a) Describe the working principle of transformer and also deduce the expression for emf in secondary winding.

b) The no load current of a transformer is 5 A at 0.2 pf when supplied at 240 V, 50 Hz. The number of turns on the primary winding is 250. Determine the (i) maximum value of the flux in the core (ii) the core loss and (iii) magnetising current. [5+5]

OR

7.a) What is transformer? Differentiate between step up and step down transformers. Write the applications of step up and step down transformers.

b) A 200/400 V, 50 Hz single phase transformer on test gave the following readings:
OC (LV) 200 V, 0.7 A, 70 W
SC (HV) 15 V, 10 A, 80 W.
Find voltage regulation at 0.8 pf lagging at full load. [5+5]

8.a) A six pole machine has an armature with 90 slots and 8 conductors per slot and runs at 1000 rpm, the flux per pole is 0.05 Wb. Determine the induced emf if winding is lap connected winding.

b) How is back emf produced in a motor? Also derive an expression for back emf. [5+5]

OR

9.a) Derive the condition for maximum efficiency of a DC motor.

b) A six pole induction motor is fed from 50 Hz supply. If the frequency of rotor emf at full load is 2 Hz. Find full load speed and slip. [5+5]

10. With a neat diagram explain the operation of moving coil permanent type instruments. [10]

OR

11. With a neat diagram explain the operation of attraction type moving iron instrument. [10]

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