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Code No: 123BR

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, April/May - 2018

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 Ohm's law. [2]

b) 2 ohm, 4 ohm and 6 ohm resistors are connected in delta form, obtain its equivalent star connected network. [3]

c) Define the term average value of sinusoidal current wave. [2]

d) A series circuit has R=100 ohm and C=20 μF .At what frequency will the current lead the voltage by 30^0. Draw the corresponding phasor diagram. [3]

e) Write the principle of operation of a transformer on no-load condition. [2]

f) Obtain the emf equation of a transformer. [3]

g) A shunt generator supplied 500 A at 500 V. Calculate its generated emf if its armature and shunt field resistances are 0.02 and 125 ohms respectively. [2]

h) State different losses in a d.c machine. [3]

i) Mention the essential features of measuring instruments. [2]

j) Distinguish between moving iron and moving coil instruments. [3]

PART- B

(50 Marks)

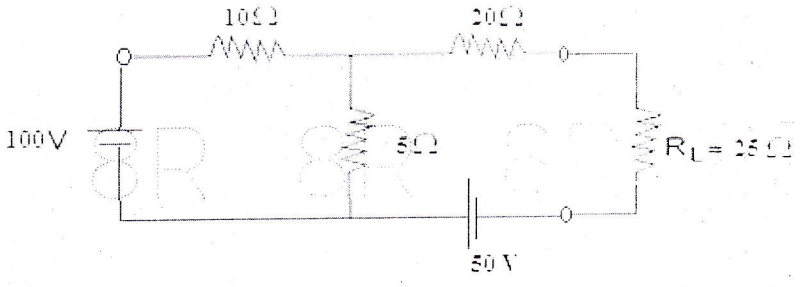
2.a) State and explain Thevenin's theorem.

b) State and explain superposition theorem. [5+5]

OR

3.a) State and explain Maximum power transfer theorem for AC circuits.

b) Find the voltage across R_L = 25 Ω in a circuit shown below using Thevinin's Theorem. [5+5]



4.a) A 35 H inductor connected in series with 5μF cpacitor and further this circuit is connected in parallel with 3+j6 ohm impedance. Find (i) the supply current (ii) current in each branch (iii) supply power if the supply voltage is $v(t) = 50\sin(2000t)$.

b) Obtain the form factor and peak factor of a sinusoidal voltage. [5+5]

OR

5.a) Calculate the maximum value of the emf generated in a coil which is rotating at 50 rev/sec in a uniform magnetic field of 0.8 Wb/m^2. The coil is wound on a square former having sides 5 cm length and is wound with 300 turns.

b) A 23 ohm resistor connected in parallel with 5H inductor and further this circuit is connected in series with 3 μF capacitor. Find i) the voltage across each component ii) current in each branch iii) supply power if the supply voltage is $v(t) = 10\sin(1000t)$. [5+5]

6.a) What is regulation of a transformer? How it can be obtained from the OC and SC test.

b) The primary and secondary windings of 30 kVA, 6000/230 V, 1-ph transformer have resistances of 10 ohms and 0.016 ohms respectively. The reactance of the transformer referred to the primary is 34 ohms. Calculate the primary voltage required to circulate full load current when the secondary is short circuited. [5+5]

OR

7.a) Explain the working of transformer on lagging load condition.

b) A 200/400 V , 50 Hz single phase transformer on test gave the following readings:
OC (LV) 220 V, 0.8 A, 60 W
SC (HV) 15 V, 15 A, 80 W.
Find voltage regulation at 0.8 pf lagging at full load. [5+5]

8.a) Describe the principle of operation DC motor.

b) A six pole machine has an armature with 100 slots and 8 conductors per slot and runs at 1000 rpm. the flux per pole is 0.08 Wb. Determine the induced emf if winding is wave connected winding. [5+5]

OR

9.a) Explain the principle of operation of three phase induction motor.

b) Calculate the flux per pole required for a four pole generator with 360 conductors generating 250 V at 1000 rpm, when armature is (i) lap connected and (ii) wave connected. [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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