Code No:114DH

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, May - 2016
PRINCIPLES OF ELECTRICAL ENGINEERING
(Common to ECE, ETM)

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) Give the expression of transient current flows in a RLC series circuit suddenly excited by d.c. source. [2]
b) Define time constant of RC circuit. Give its expression. [3]
c) What is meant by input driving point admittance and output driving point admittance? [2]
d) Express the relation between Y-parameters and ABCD parameters. [3]
e) Draw the circuits for symmetrical low-pass T filters. [2]
f) What is filter? Define pass band, stop band and cut-off frequency. [3]
g) Draw the cross section of a 2-pole DC machine and name its parts. [2]
h) If the speed of the DC motor is below the rated speed which method do you suggest? Justify your statement with the relevant expressions. [3]
i) Derive the condition for zero regulation of a single phase transformer. [2]
j) What are the applications of Synchros? [3]

PART - B **(50 Marks)**

2.a) Write the stepwise procedure in determining the forced response for RLC circuits with dc sources.
b) In the circuit shown in figure 1, switch S is in position 1 for a long time and brought to position 2 at time *t=0*. Determine the circuit current. [4+6]

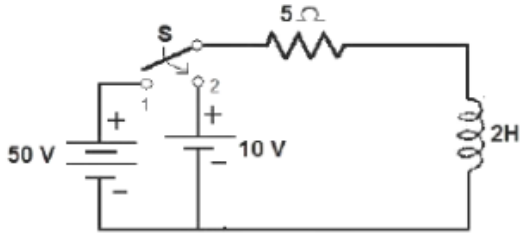

Figure: 1

OR

3.a) Why there are no transients in pure resistive circuits?
b) Describe the current *i(t)* flowing in the circuit shown in figure 2 i(t) through the 8 KΩ resistor by providing the mathematical formula(s) for *t >0*. Sketch a graph of *i(t)* for *t>0*. [2+8]

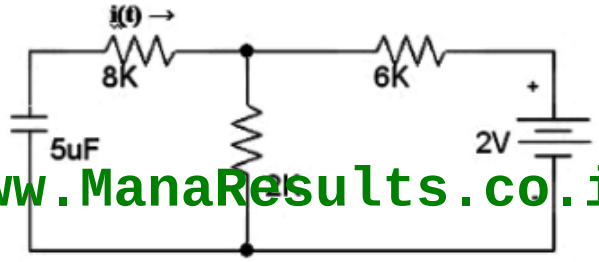

Figure: 2

4.a) What are the conditions for Reciprocity and symmetry of open circuit impedance parameter?

b) Test results for a two port network are:

i) port 2 short circuited:

$V_1 = 50\angle 0^0 V,\ I_1 = 2.1\angle -30^0 A,\ I_2 - 1.1\angle -20^0 A.$

ii) port 1 short circuited:

$V_2 = 50\angle 0^0 V, I_1 = 3.0\angle -15^0 A, I_1 - 1.1\angle -20^0 A.$

Find y-parameters. [3+7]

OR

5.a) What is the use of *h*-parameters? Derive equations to determine these parameters. Draw *h*-parameter equivalent circuit.

b) Find the transmission parameters of the network in figure 3. [4+6]

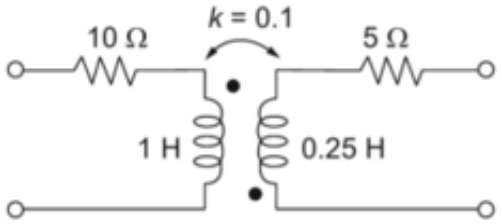

Figure: 3

6.a) Explain in brief units of attenuation and obtain relation between the two units.

b) A prototype HPF has cut-off frequency of 10 kHz and design impedance of 600 Ω. Find element values of L and C. Also find attenuation in dB and phase shift in degrees at a frequency of 8 kHz. [4+6]

OR

7.a) What is an attenuation frequency curve of an ideal low-pass filter?

b) Design symmetrical π-attenuator with 25 dB attenuation with 25 dB attenuation and 600 Ω design impedance. [4+6]

8.a) From the fundamentals, derive an expression for the induced emf in the armature of a DC Machine.

b) A 400V, dc series motor has an armature resistance of 0.12Ω. When motor takes a current of 85A, its speed is 600 rpm. Determine its speed if current drawn by the motor changes to 40A.

c) What are the applications of differentially compounded DC generator? [4+3+3]

OR

9.a) A 250V DC shunt motor takes 4A when running unloaded. Its armature and field resistances are 0.3 Ω and 250 Ω respectively. Calculate the efficiency when the dc shunt motor taking a current of 60A.

b) Explain the application of DC shunt generator along with its characteristics. [4+6]

10.a) Derive the condition for maximum efficiency of a single phase transformer.

b) A 20 kVA, single-phase transformer has 200 turns on the primary and 40 turns on the secondary. The primary is connected to 1000 V, 50 Hz supply. Determine the secondary voltage on open circuit and the current flowing through the two windings on full load.

c) What happens when 50 Hz transformer is used at higher frequencies? [3+3+4]

OR

11.a) Draw the phasor diagram of Transformer on load assuming the load is a lagging power factor load.

b) A single-phase transformer has 500 turns in the primary and 1200turns in the secondary. The cross-sectional area of the core is 80sq.cm. If the primary winding is connected to a 50 Hz supply at 500V, calculate (i) peak flux-density, and (ii) Voltage induced in the secondary. [5+5]

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