Code No: 114DH **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year II Semester Examinations, May - 2015
PRINCIPLES OF ELECTRICAL ENGINEERING
(Electronics and Communication Engineering)

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) What is meant by transient analysis? (2M)
b) Write the current equation of RC circuit for step response in transient state condition. (3M)
c) Obtain the relation for reciprocity and symmetry in terms of ABCD parameters. (2M)
d) Write short notes on interconnection of two port networks. (3M)
e) What is meant by filter and how are they classified? (2M)
f) State different parameters required to design a filter. (3M)
g) What is the function of commutator in DC machine? (2M)
h) Discuss Swinburne's test on a DC machine? (3M)
i) What is a stepper motor? (2M)
j) Obtain the condition for zero regulation of a 1-ϕ transformer. (3M)

PART-B

(50 Marks)

2.a) An inductor has a negligible resistance and an inductance of 200 mH and is connected in series with a 1 KΩ resistor to a 24 V, dc supply. Determine the time constant of the circuit and the steady-state value of the current flowing in the circuit. Also find the voltage drop across the inductor at a time equal to two time constants. (5M)
b) An L–R–C series circuit contains a coil of inductance 1 H and resistance 8Ω and a capacitor of capacitance 50μF. Assuming current 'i=0' at time t=0, determine i) the state of damping in the circuit, and ii) an expression for the current when a step voltage of 10 V is applied to the circuit. (5M)

OR

3. In the network shown in below figure 1, the switch is closed at t= 0. Find the value of current in each loop. (10M)

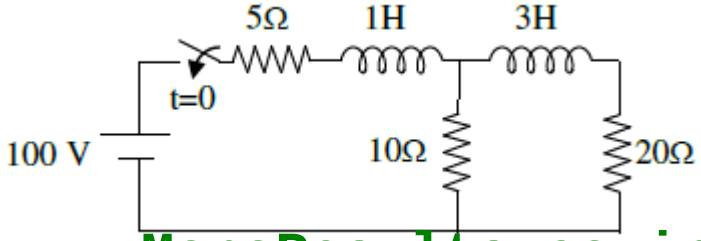

Figure: 1

4. For the network shown in below figure 2, find ABCD parameters. (10M)

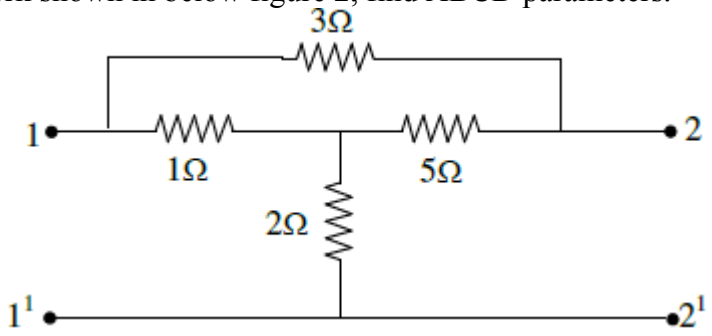

Figure: 2

OR

5. Develop the *z*-parameter and *h*-parameter equivalent circuits. Also express the *z*-parameters in terms of *y*-parameters. (10M)

6. What are attenuators? Discuss various types of attenuators briefly. (10M)

OR

7. A filter is required to pass all frequencies above 25 kHz and to have a nominal impedance of 600 Ω. Design a) a high-pass T section filter and b) a high-pass π section filter to meet these requirements. (5M+5M)

8.a) Explain the various methods of speed control of a DC Shunt Motor. (4M)

b) A 6 pole lap wound DC generator has 600 conductors on its armature. The flux per pole is 0.02 Wb. Calculate i) the speed at which the generator must be run to generate 300 V ii) What would be the speed if the generator were wave wound? (6M)

OR

9.a) Draw and explain the characteristics of a DC shunt generator. (4M)

b) The armature of a 4-pole, lap-wound DC shunt generator has 120 slots with 4 conductors per slot. The flux per pole is 0.05wb. The armature resistance is 0.05Ω and the shunt field resistance is 50 Ω. Then find the speed of the machine when supplying 45A at terminal voltage of 250V. (6M)

10.a) Discuss the constructional features of a single-phase transformer. (5M)

b) A single phase transformer has 400 primary and 1000 secondary turns. The net cross sectional area of the core is 60 cm^2. If the primary winding is connected to a 50 Hz supply at 520V, Calculate (i) Peak value of flux density in the core (ii) Transformation ratio (iii) EMF induced per turn in both the windings (5M)

OR

11.a) Derive the condition for maximum efficiency of single phase transformer. (5M)

b) A 20 KVA, 2500 / 250 volts, 50 Hz, 1-phase transformer gave the following test results:

O.C. test(L.V. side):	250 V	1.4 A	105 W
S.C. test (H.V. side):	104 V	8 A	320 W

Compute the parameters of the approximate equivalent circuit. (5M)

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