Code No: 114DH

R13

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, December - 2017

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) Distinguish between natural response and forced response of an electrical circuit. [2]
b) Find the Laplace transform of $\{t.\sin(5t + 0.2\pi)\}$ [3]
c) Define input admittance of a one-port network and give the expression for determining it. [2]
d) Define transmission parameters of a two-port network. [3]
e) Distinguish between Pass band and Stop band filter. [2]
f) Give the uses of symmetrical Attenuators. [3]
g) Draw the Magnetization and Load Characteristics of DC Generators. [2]
h) Draw the circuit diagram of D.C series motor. [3]
i) A 5KVA, single phase transformer has full-load copper losses of 400W and no-load losses of 200W. Determine the load at which maximum efficiency of the transformer occurs. [2]
j) What is the principle of working of synchro? [3]

PART –B

(50 Marks)

2. Derive the expression for i(t) when the switch is moved from position 1 to position 2 at t=0 in the circuit shown figure 1. The switch was in position1 for a Long Time. Sketch the variation of i(t). Also determine $V_C(t)$. [10]

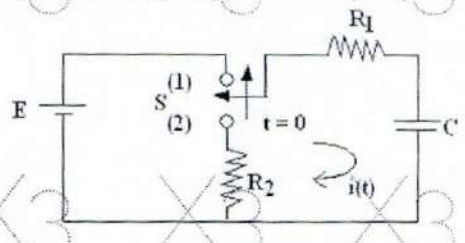

Figure: 1

OR

3. Find $\frac{d^2i}{dt^2}$ at $t = 0^+$, if the switch is closed at t=0 shown in figure 2. [10]

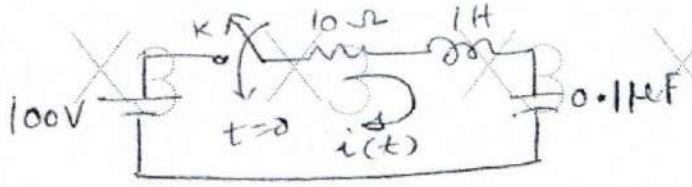

Figure: 2

4.a) Derive the ABCD parameters of the equivalent two-port network for two different two-port networks connected in cascade form.

b) Obtain h-parameters of the network shown in figure 3. [5+5]

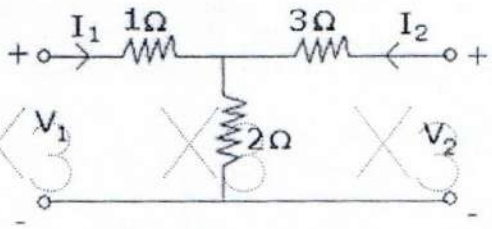

Figure: 3

OR

5.a) For the network shown in figure 4, determine the Z parameters.

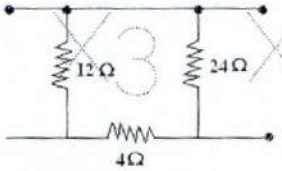

Figure: 4

b) Write the hybrid parameter equations for a standard two-port network. Explain how they can be determined from Y and Z-parameters. [6+4]

6.a) What is high pass filter? In what respects it is different from a low pass filter? Derive the equation to find the inductances and capacitances of a constant k high pass filter.

b) If the ratio of R_1 and R_2 of a symmetrical T-network is 1/4. Find the ratio of the input current to the output current. Also, calculate the attenuation in dB. [6+4]

OR

7.a) Define Attenuator. Explain the different types of attenuators.

b) Draw the circuit of symmetrical Π-attenuator. Derive the design equations giving the series and shunt arm resistors in terms of:
i) the characteristic impedance R_0.
ii) the current ratio N. [4+6]

8.a) How D.C. Generators are classified?

b) The armature of a 6-pole d.c. generator has a wave winding containing 664 conductors. Calculate the generated e.m.f. when flux per pole is 0.06Wb and the speed is 250 rpm. At what speed must the armature be driven to generate an e.m.f. of 250V if the flux per pole is reduced to 0.058Wb? [4+6]

OR

9.a) Explain with a neat sketch the principle of operation of a D.C. Motor.

b) A 4-pole series motor has 944 wave-connected armature conductors. At a certain load the flux per pole is 34.6mWb and the total mechanical torque developed is 209Nm. Calculate the line current taken by the motor and the speed at which it will run with an applied voltage of 500V. Total armature resistance is 3. [5+5]

10.a) Discuss the constructional details of single-phase transformer and hence obtain the expression for induced e. m. f. of transformer.

b) Explain how the equivalent circuit parameters can be obtained from open circuit and short circuit tests. [5+5]

OR

11.a) Briefly explain various losses in a transformer.

b) Calculate the effective resistance and leakage reactance of a transformer, in terms of primary, which gave the following data on test with the secondary terminals, short-circuited: Applied voltage, 60V; current, 100A; Power input, 1.2kW. [5+5]

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