Code No: 182AF **R22**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech I Year II Semester Examinations, January/February - 2024
ELECTRICAL CIRCUIT ANALYSIS – II
(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 60**

Note: This question paper contains two parts A and B.
i) **Part- A** for 10 marks, ii) **Part - B** for 50 marks.
- Part-A is a compulsory question which consists of ten sub-questions from all units carrying equal marks.
- Part-B consists of **ten questions** (numbered from 2 to 11) **carrying 10 marks each**. From each unit, there are two questions and the student should answer one of them. Hence, the student should answer five questions from Part-B.

PART- A

(10 Marks)

1.a) A circuit having a resistance of 5 ohms, and a variable capacitance of 50 μF in series, is connected across a 230 V, d.c supply. Calculate the current flowing through the circuit. [1]

b) Define time constant of R-C series circuit under transient conditions. [1]

c) Find the inverse Laplace transform of the following function. [1]

$$F(S) = \frac{(S+1)}{(S^2+S+1)}$$

d) Find the current in the following network figure.1 after the switch closes at t=0. Assume initial current to be i_0. [1]

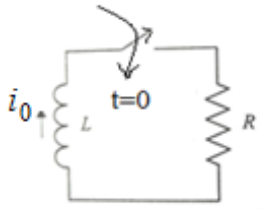

Figure.1

e) Calculate the open circuit impedance parameters for the resistive T network shown in figure.2 below. [1]

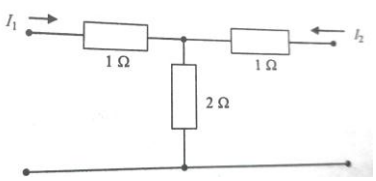

Figure. 2

f) Derive the condition of reciprocity for the symmetrical Π network. [1]

g) State the differentiation rule for Fourier transform. [1]

h) What is discrete spectrum? [1]

i) What is band pass filters? [1]

j) What is low pass filter? [1]

PART - B

(50 Marks)

2. Obtain the expressions for the initial value and slope of v_c, i_c, i_r and i_L in the figure 3 given below when $i_s = I_1$ $t<0$. [10]

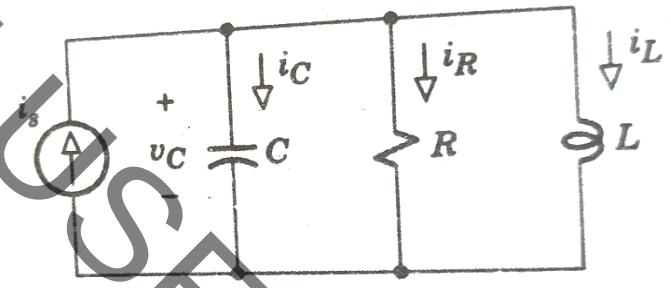

Figure 3

OR

3. The figure 4 shown below represents an electronic switching circuit. The switch has been in the upper position a long time before t = 0. Find v(t) and i(t) for t>0, taking the element X to be a 5 microfarad capacitor. [10]

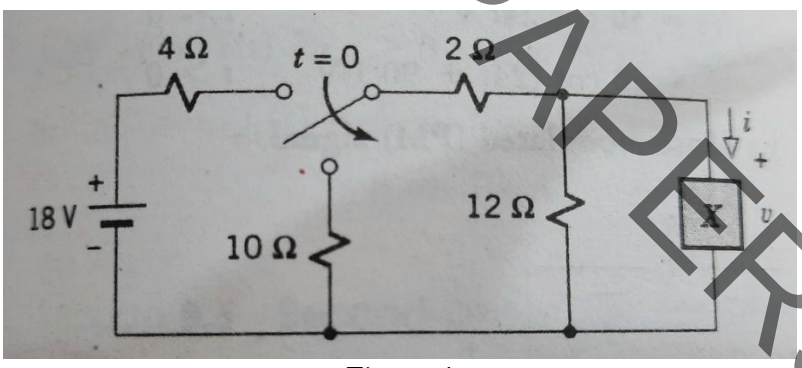

Figure 4

4. For the Circuit given in the figure 5 below, find V_0 (t) for t > 0, when the switch (s) is opened at t = 0. [10]

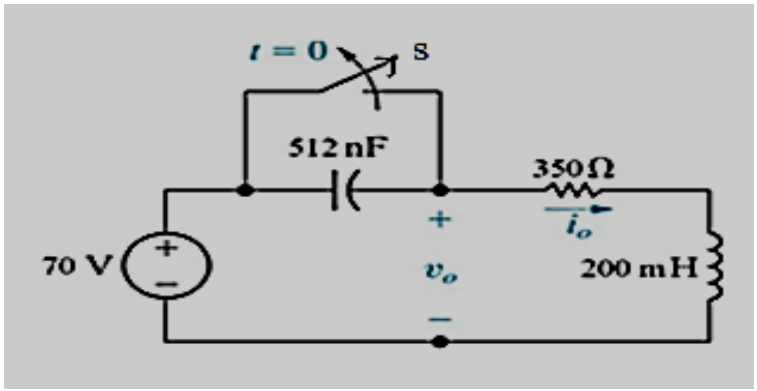

Figure 5

OR

5. Find the transient current flowing through series R-L-C circuited suddenly excited by d.c source of 'V' volts at t=0. [10]

6. For the given figure 6 below two port network, calculate the Y parameters, ABCD parameters. [10]

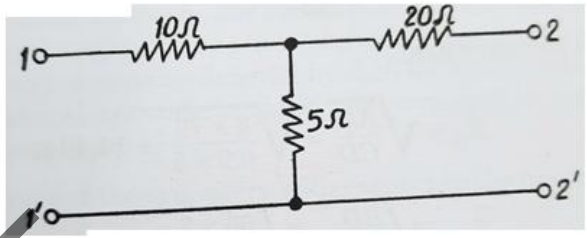

Figure 6

OR

7. For the following circuit figure 7, calculate Z parameters and hybrid parameters. [10]

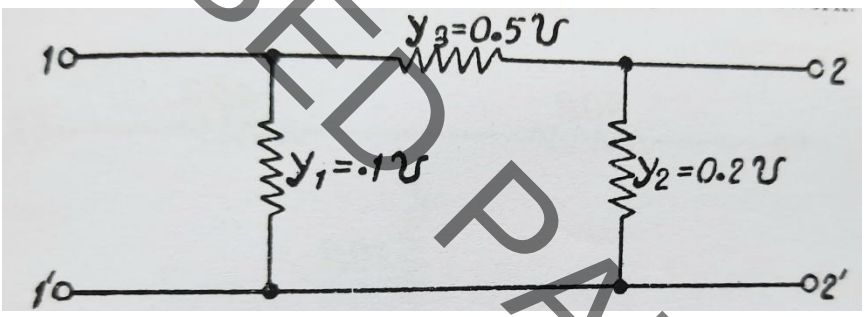

Figure 7

8. What is fourier integral? Explain its properties. [10]

OR

9. Determine the constant coefficients, and fundamental and third harmonic coefficients of the Fourier series for the periodic waveform shown below figure 8. [10]

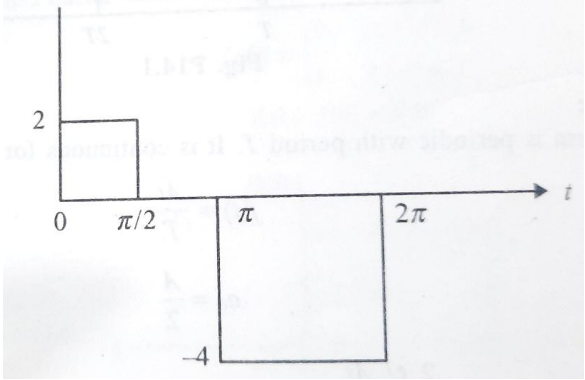

Figure 8

10 Describe the design procedure of the constant K high pass filter. [10]

OR

11 Describe the design procedure of the m-Derived filters. [10]

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