

B.Tech II Year I Semester (R15) Regular Examinations November/December 2016

ELECTRICAL CIRCUITS – II

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

PART – A

(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- Draw the transient response in a RC circuit for a step voltage input.
 - Write equation for voltage in a RLC series circuit.
 - Define reactive power.
 - Calculate the reactance of a coil of inductance 0.32H when it is connected to a 50 Hz supply.
 - Define Fourier series.
 - Define tree.
 - Define graph.
 - What is a filter network?
 - Draw a circuit which acts as a low pass filter.
 - What is Laplace transform?

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

- 2 A circuit consists of a 10 μF capacitor connected in series with a 25K Ohm resistor with a switchable 100 V d.c supply. When the supply is connected, calculate: (i) The time constant. (ii) The maximum current. (iii) The voltage across the capacitor after 0.5s.

OR

- 3 The winding of an electromagnet has an inductance of 3H and a resistance of 15 Ohms. When it is connected to a 120 V d.c. supply, calculate: (i) The steady state value of current flowing in the winding. (ii) The time constant of the circuit. (iii) The value of the induced e.m.f. after 0.1s.

UNIT – II

- 4 Three loads, each of resistance 30 Ohms are connected in star to a 415 V three-phase supply. Determine: (i) The system phase voltage. (ii) The phase current. (iii) The line current.

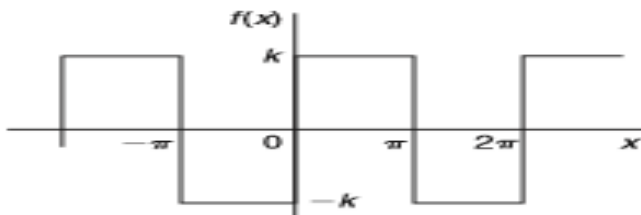
OR

- 5 Three identical coils each of resistance 30 Ohms and inductance 127.3mH are connected in delta to a 440 V, 50 Hz, three-phase supply. Determine: (i) The phase current. (ii) The line current.

UNIT – III

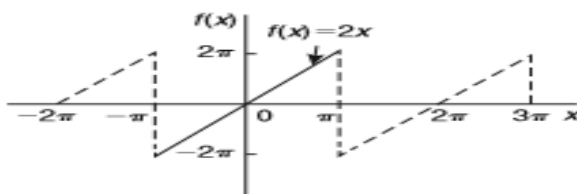
- 6 Obtain a Fourier series for the periodic function $f(x)$ defined as:

$$f(x) = \begin{cases} -k, & \text{when } -\pi < x < 0 \\ +k, & \text{when } 0 < x < \pi \end{cases}$$

The function is periodic outside of this range with period 2π 

OR

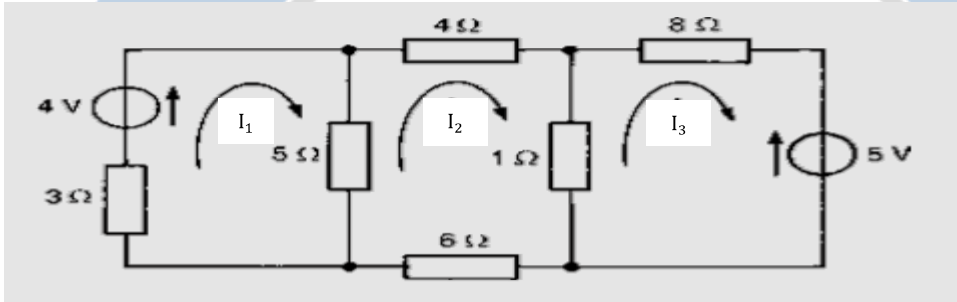
- 7 Determine the Fourier series to represent the function $f(x) = 2x$ in the range $-\pi$ to $+\pi$



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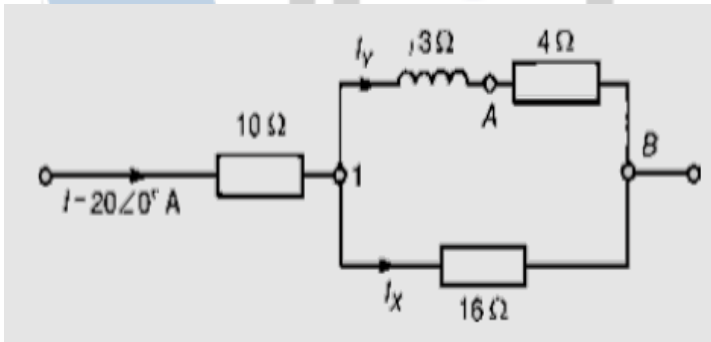
UNIT - IV

- 8 Use mesh-current analysis to determine the current flowing in: (i) 5 Ohms resistance. (ii) 1 Ohm resistance of the d.c. circuit shown in figure below.



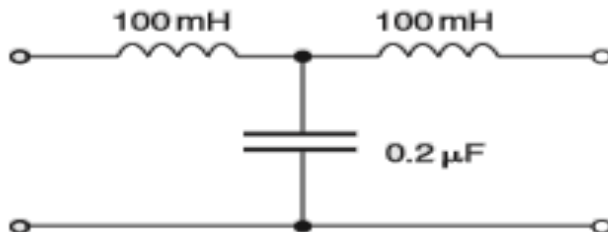
OR

- 9 For the network shown in figure below, determine the voltage V_{AB} , by using nodal analysis.



UNIT - V

- 10 Determine the cut-off frequency and the nominal impedance of the low-pass filter sections shown in figure below.



OR

- 11 A low pass π section filter has a nominal impedance of 600 Ohms, cut off frequency 2 MHz. Find the frequency at which the characteristic impedance of the section:
- 600 Ohms.
 - 1K Ohms.
