Code: 15A02301 **R15**

B.Tech II Year I Semester (R15) Regular & Supplementary Examinations November/December 2017

ELECTRICAL CIRCUITS – II

(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Define transient State with their classifications.

(b) A series RLC circuit with R = 10 Ω, L = 2 H and C = 1 F has a constant voltage of 100 V applied at t = 0. Determine the initial values of I(t) and di(t)/dt.

(c) Define phase sequence with their instantaneous e.m.f equations.

(d) Draw the balanced delta-delta connection circuit.

(e) Mention the properties to be satisfied by the periodic function f(t) of trigonometric form of Fourier series.

(f) Mention the general properties of Fourier transforms.

(g) Define tie set and cut set.

(h) What is duality? What are dual quantities?

(i) Sketch the low pass filter with its quadrant of operation.

(j) State incidence matrix.

PART – B

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

UNIT – I

2 Prove that pure capacitance when connected across an alternating source draws the current leading over voltage by 90 degree. Show that power consumed by pure capacitance is zero.

OR

3 A coil of inductance 0.0805 H takes a current of 5 A when connected in series with a 50 μF loss-free capacitor across a 240 V, 50 Hz supply. Calculate: (i) Resistance of the coil. (ii) Power factor of the coil. (iii) The overall power factor. Sketch the phasor diagram.

UNIT – II

4 Obtain the expressions for star-delta and delta-star equivalence of resistive network.

OR

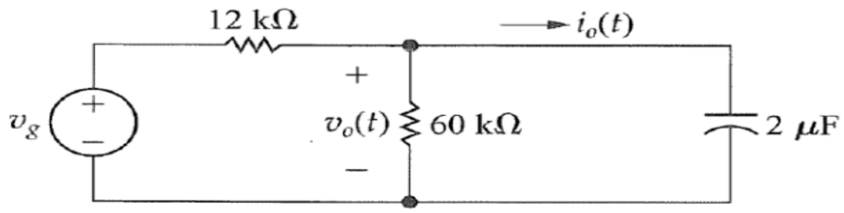
5 A balanced, three phase, star-connected load is fed from a 400 V, three phase, 50 Hz supply. The current per phase is 25 A (lagging) and the total active power absorbed by the load is 13.56 kW. Determine: (i) The resistance and inductance of the load per phase. (ii) The total reactive power. (iii) The total apparent power.

UNIT – III

6 Derive trigonometric Fourier series representation of a periodic signal x(t) with fundamental period T.

OR

7 (a) Use the Fourier transform method to calculate $v_0(t)$ for the given circuit.



(b) List the advantages of Fourier series and express its equations with its coefficients.

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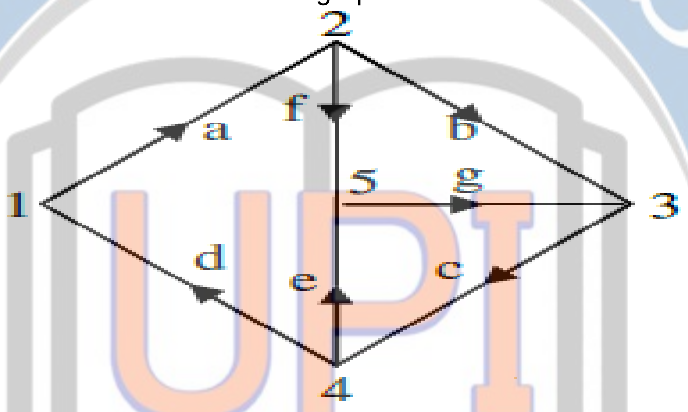
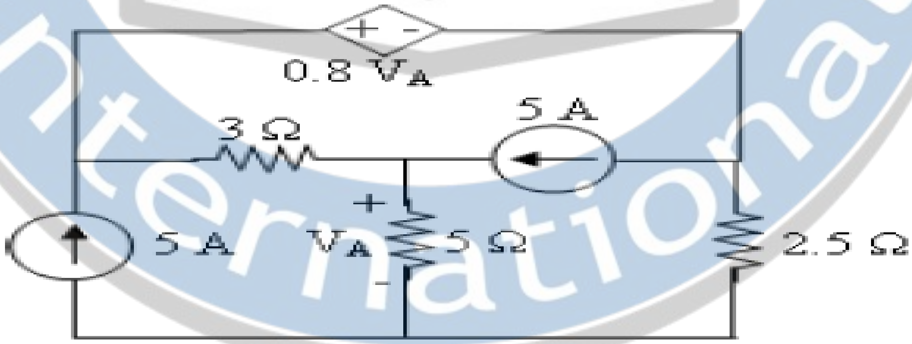
UNIT – IV

8 Find fundamental tie-set and cut-set matrix for the graph and its tree shown below.



OR

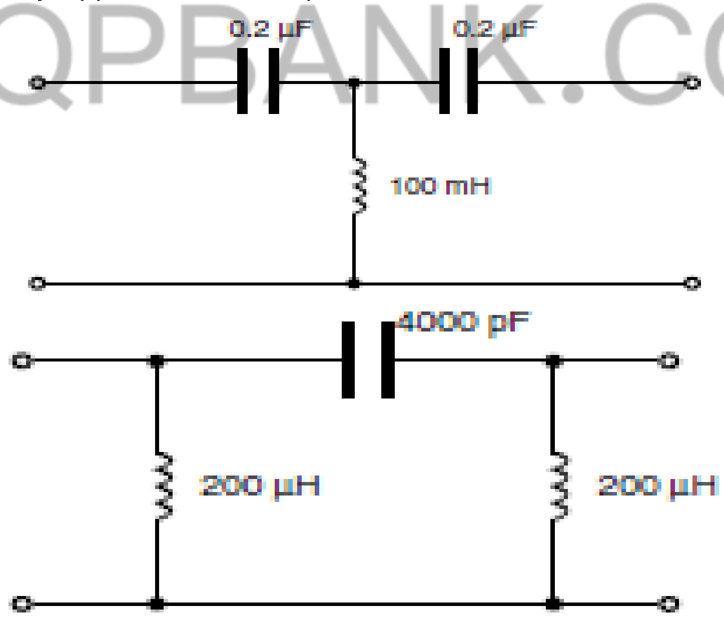
9 With the help of nodal analysis on the circuit shown below: Find: (i) VA. (ii) The power dissipated in 2.5 ohms resistor.



UNIT – V

10 Determine for each of the high-pass filter sections shown in figure:

(i) The cut-off frequency. (ii) The nominal impedance.



OR

11 Elucidate the following terminologies with an example:

(i) Node. (ii) Linear graph. (iii) Tree. (iv) Twig. (v) Path.

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