

KERALA AGRICULTURAL UNIVERSITY

B.Tech (Agrl.Engg) 2014 Admission

Ist Semester Final Examination- January -2015

Cat. No: Fpme.1101

Title: Electrical Circuits (2+1)

Marks: 50

Time: 2 hours

PART-A-Answer all-Each question carries one mark

(10 x 1=10)

1. In _____circuits, the voltage current relation is same for current flowing in either direction.
2. Average value of sine wave over a full cycle is equal to_____.
3. If capacitance $C=0.001\mu\text{F}$ and voltage applied is $V=1\text{kV}$, charge stored is equal to_____.
4. In a circuit of source voltage 10V and source impedance of 2.5Ω with a source resistance of 1.5Ω , the maximum power transferred to the load is _____.
5. Three equal resistances of 5Ω are connected in delta. Resistance in one of the arm of equivalent star circuit is _____.
6. Norton equivalent circuit consists of _____ in parallel with equivalent impedance.
7. The current in a pure inductor _____the voltage by 90° .
8. In a 3ϕ system the volt ampere rating is given by_____.
9. An ideal filter has _____ attenuation in the pass band.
10. In an m derived high pass filter, resonant frequency is to be chosen so that it is _____ the cut off frequency.

PART-B- Write short notes on any FIVE questions

(5 x 2=10)

1. If four resistors 10Ω , 20Ω , 30Ω and $4\text{k}\Omega$ are parallel connected across a 100V supply. Find equivalent resistance and current in 10Ω resistor.
2. Find current in the 10Ω resistor, V_1 and source voltage for the circuit shown in Fig.1

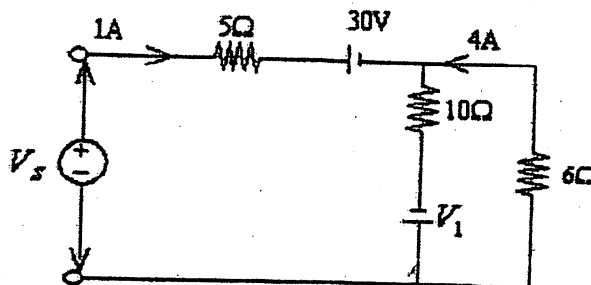


Fig.1

3. Determine Norton equivalent for the circuit shown in Fig.2

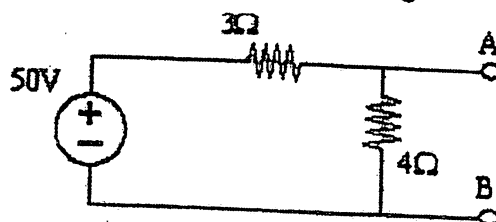


Fig.2

4. Verify reciprocity theorem for the circuit shown in Fig.3

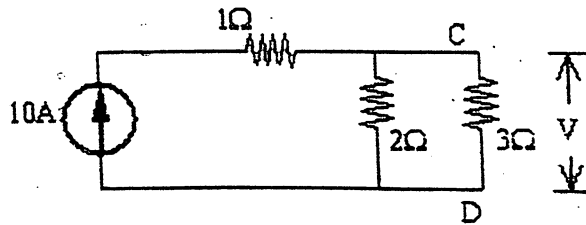


Fig.3

5. Represent the following impedances in rectangular form and polar form. 1) A pure resistance of $10\ \Omega$. 2) A pure inductance of $10\ \text{mH}$. 3) A pure capacitance of $5\ \mu\text{F}$. Assume frequency = $50\ \text{Hz}$.
6. Explain advantages of polyphase system.
7. Design a low pass filter having cut off frequency of $2\ \text{kHz}$ to operate with a terminated load resistance of $500\ \Omega$.

PART-C. Write short notes on any FIVE questions (5 x 4=20)

1. Write mesh equation for the network shown in Fig.4 and Find source current.

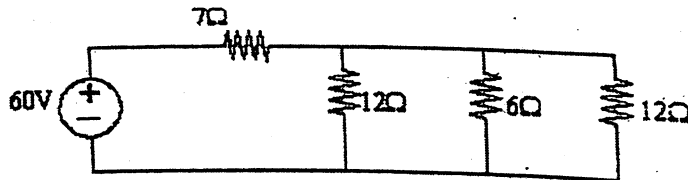


Fig.4

2. Explain steps to thevenise an electrical circuit.
3. In the network shown in Fig.5 determine the equivalent resistance between the terminals A and B.

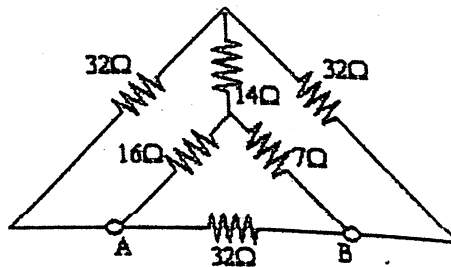


Fig.5

4. Write node voltage equations and determine current in each branch for the network shown in Fig.6

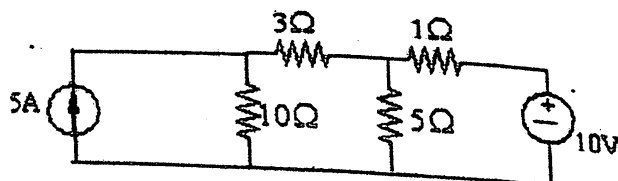


Fig.6

- A 3 ϕ delta connected load consumes a power of 100kW taking a lagging current of 200 A at a line voltage of 400V, 50Hz. Calculate 1) Parameters of each phase, 2) Power factor 3) Active power 4) Reactive power and 5) Apparent power.
- Determine form factor and peak factor of following periodic waveform in Fig.7.

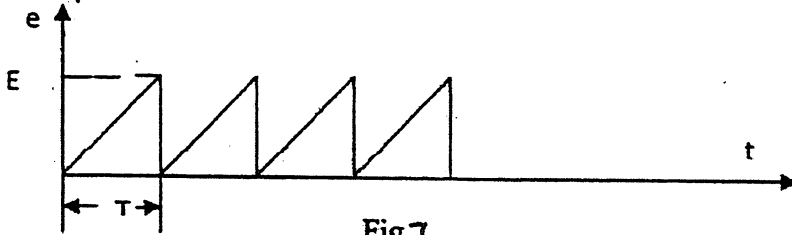


Fig.7

- In the circuit shown in Fig.8, an inductive reactance of 0.1H having a Q of 5 is in parallel with a capacitor. Determine the value of capacitance and coil resistance at resonant frequency of 500 rad/sec.

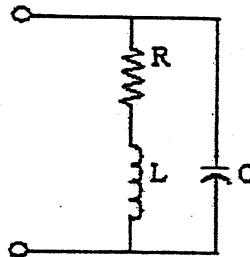


Fig.8

PART-C- Write an essay on any ONE

(1 x 10=10)

- Determine the currents in bridge circuit shown in Fig.9 by using mesh analysis.

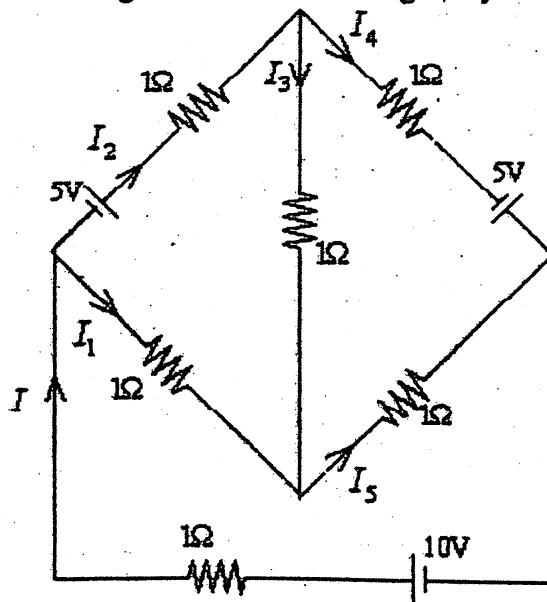


Fig.9.

- Explain series and parallel resonance.