



B.E DEGREE EXAMINATIONS: DEC 2014

(Regulation 2013)

Second Semester

U13ECT201: CIRCUIT THEORY

(Common to ECE & EIE)

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The maximum current that a 2W, 80k Ω resistor can safely conduct is
 - a) 160 kA
 - b) 40 kA
 - c) 5 mA
 - d) 25 μ A
2. Under balanced condition the conversion formula for transforming wye network to and equivalent delta network is.....
3. The current through a branch in linear network is 2 A when the input source voltage is 10 V. If the voltage is reduced to 1V and the polarity is reversed, the current through the branch is
 - a) -2 A
 - b) -0.2 A
 - c) 2 A
 - d) 0.2 A
4. Source modeling and resistance measurement using the wheatstone bridge provide applications for..... theorem.
5. A function that repeats itself after fixed intervals is said to be
 - a) a phasor
 - b) harmonic
 - c) periodic
 - d) reactive
6. The voltage across an inductorthe current through it by 90°.
7. An RC circuit has R= 2 ohm and C= 4F. The time constant is
 - a) 0.5s
 - b) 2s
 - c) 4s
 - d) 8s
8.response is the behavior of the circuit after an independent source has been applied for a long time.
9. In order to match a source with internal impedance of 500 ohm to a 15 ohm load, the transformer needed is
 - a) Step-up transformer
 - b) Step-down transformer
 - c) Step-up ideal transformer
 - d) Step-down ideal transformer

10. Frequency of resonance in RLC series circuit is given by.....

PART B (10 x 2 = 20 Marks)

(Not more than 40 words)

- 11. State Kirchoff's laws.
- 12. Three resistors 10Ω , 20Ω and 30Ω are connected in parallel across 100 V supply. Compute the current through each resistor.
- 13. Draw the equivalent circuit of Thevenin's theorem.
- 14. Write some applications of maximum power theorem.
- 15. Relate Average power and RMS power.
- 16. Compare mesh and nodal analysis.
- 17. What is the time constant for series RL and series RC circuits?
- 18. How does an inductor act at time(t) $t=0$ and $t=\infty$?
- 19. What is dot convention?
- 20. Define coefficient of coupling.

PART C (5 x 14 = 70 Marks)

(Not more than 400 words)

Q.No. 21 is Compulsory

- 21. When 230 V at 50 Hz is applied to an RL series circuit ($R= 5 \text{ ohm}$, $L=30 \text{ mH}$) determine the current, power factor and power dissipated. Draw the phasor diagram.
- 22. a) Determine the value of R in the circuit shown in Fig.1 when the current is zero in the branch CD.

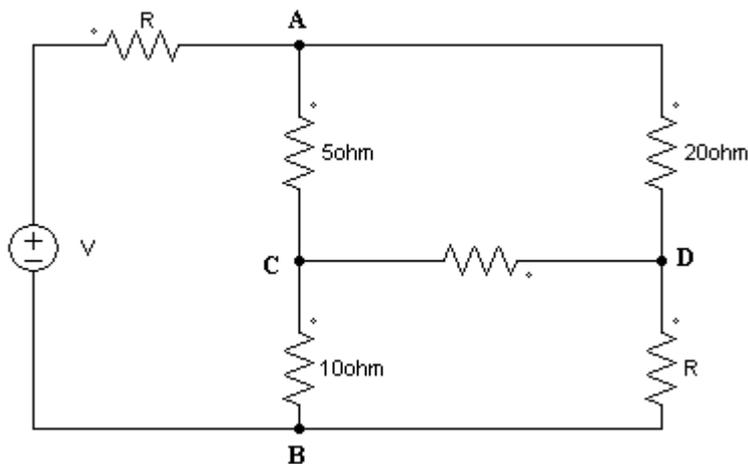


Fig.1

(OR)

- b) Find the voltage between A and B of the circuit shown in Fig.2 by mesh analysis.

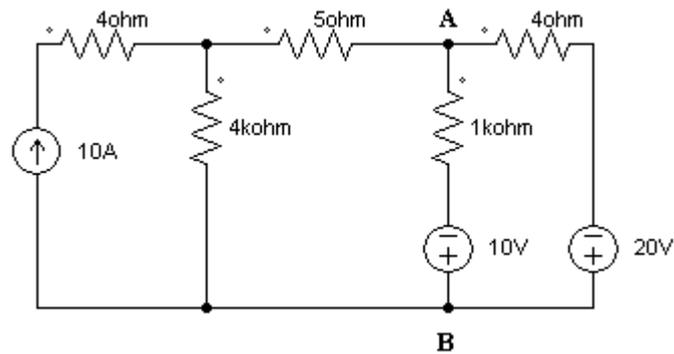


Fig. 2

23. a) Find the current flowing through 5Ω resistor in the circuit shown in Fig.3 by using principle of superposition theorem.

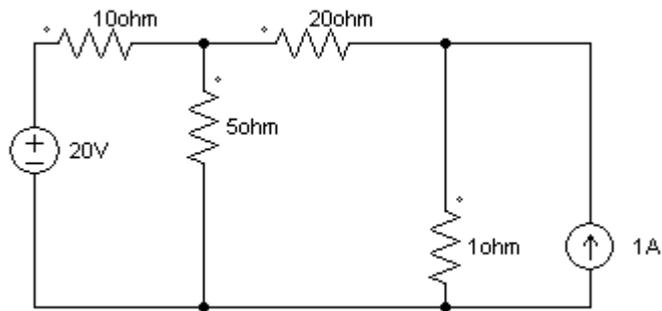


Fig. 3

(OR)

- b) Find the value of R in the circuit shown in Fig.4 so that maximum power is delivered to the load resistance R

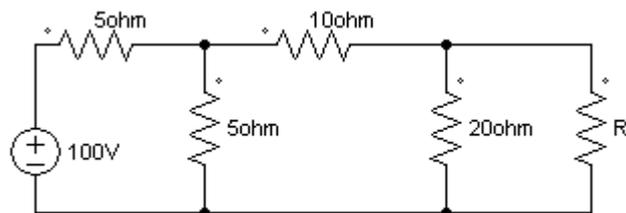


Fig. 4

24. a) Obtain the transient voltages across, the elements R and C in a series RC circuit excited by a d.c. voltage when the switch is closed at $t=0$.

(OR)

- b) In the circuit shown in Fig.5 switch is closed at $t=0$. Obtain the expression for the current in circuit and find i at $t=0.20$ sec.

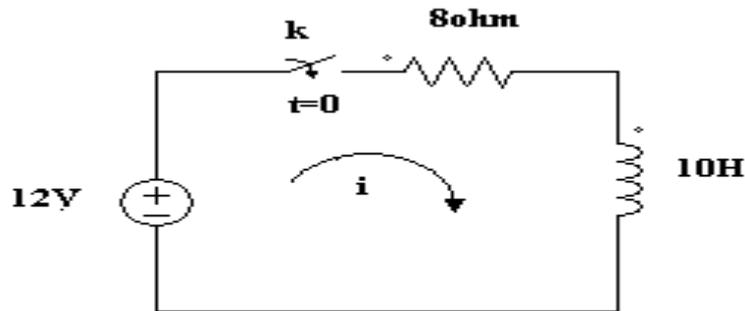


Fig.5

25. a) A series RLC circuit consists of 50Ω resistance, 0.2 H inductance and $10\mu\text{F}$ capacitance with applied voltage of 20 V . Determine resonant frequency and Q factor of the circuit. Also compute the lower and upper frequency limits and the bandwidth of the circuit.

(OR)

- b) A coil of $800 \mu\text{H}$ is magnetically coupled to another coil of $200 \mu\text{H}$. The coefficient of coupling between two coils is 0.05 . Calculate inductance if two coils are connected in, (i) series aiding (ii) series opposing (iii) parallel aiding (iv) parallel opposing
