Elen.1201   BASIC ELECTRICAL ENGINEERING (2+1)
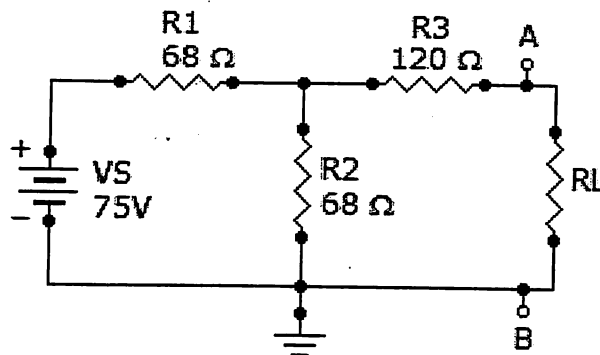
Marks: 50

Time:2 hours

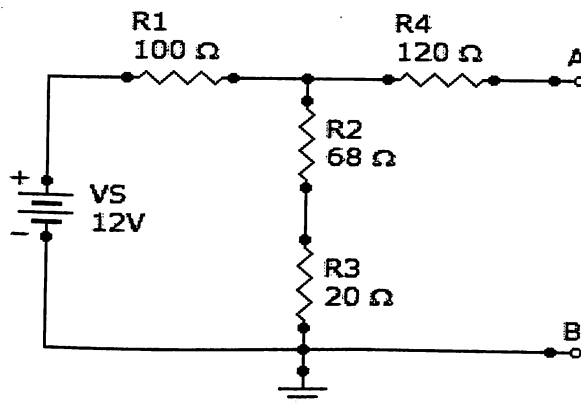I   **Answer the Following.**   (10x1=10)

1   Kirchoff's laws are applicable to
   a. dc only
   b. sinusoidal wave only
   c. dc and ac sinusoidal waves
   d. all wave shapes

2   Determine I_N for the circuit consisting of V_S, R_1, R_2, and R_3 shown in the given circuit


   a. 676 mA
   b. 245 mA
   c. 431 mA
   d. 75 mA

3   Find the Thevenin equivalent (V_{TH} and R_{TH}) between terminals A and B of the circuit given
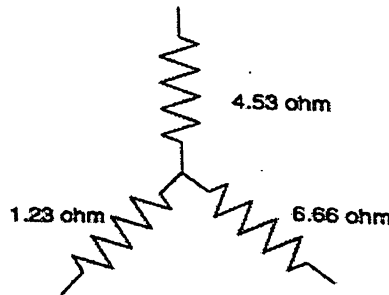

   a. 562 mV, 167
   b. 5.62 V, 167
   c. 5.62 V, 188
   d. 562 mV, 188

4   What is the angular difference between $+j4$ and $-j4$?
   a. 30°
   b. 90°
   c. 180°
   d. 270°

5   The complex number $40\angle 55°$ is equivalent to
   a. 55 + j55
   b. 40 + j40
   c. 45.88 + j65.52
   d. 22.94 + j32.76

P.T.O

6   An infinite ladder is constructed with 1 Ω and 2 Ω resistors shown below
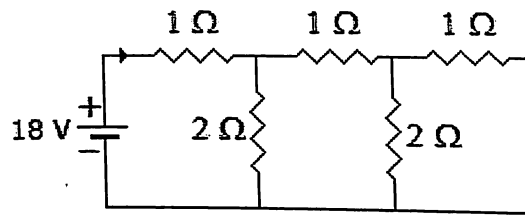
a. 8.18 A   b. 0 A
c. 9 A   d. can't determined

7   Find the equivalent delta circuit.

a. 3ohm, 10ohm, 5ohm   b. 3ohm, 10ohm, 15ohm
c. 3ohm, 1ohm, 5ohm   d. 3ohm, 10ohm, 6ohm

8   The forward voltage across a conducting silicon diode is about
a. 0.3 V.   b. 1.7 V.
c. –0.7 V.   d. 0.7 V.

9   Zener diodes with breakdown voltages less than 5 V operate predominantly in
what type of breakdown?
a. Avalanche   b. Zener
c. Varactor   d. Schottky

10   Which of the following controls the level of I_D?
a. V_{GS} b. V_{DS}
c. I_G d. V_{DG}

II   **Write Short notes on any FIVE of the following**
                                                                    (5x2=10)
1   Give statement of Superposition theorem and explain with suitable example?
2   What is meant by distribution board? What is the difference between fuse and a
switch?
3   What is meant by earth continuity conductor? What should be the minimum size
of ECC? Why charcoal and salt is used in earthing?
4   What are the active and reactive powers?
5   Simplify $ABC + \overline{AB}C + \bar{A}BC + \overline{ABC}$
6   Implement AND gate using NOR gate only and verify using truth table
7   In a series RLC circuit, the voltage across L and C at resonance may exceed even
the supply voltage. Why?

**III**   **Answer any FIVE of the following.**   **(5x4=20)**

1. Explain the method to derive star equivalent resistance of delta structured resistances.
2. Describe difference between n-type, p-type and intrinsic semiconductors.
3. Phenomenon of self inductance and mutual inductance.
4. Need for biasing the transistor. Also define Q-point of a transistor
5. Convert the numbers:

     a. $(205)_8 = (\quad)_2$ b. $(FACD)_{16} = (\quad)_8$

6. Biasing and working of pnp transistor.
7. Working and characteristics of SCR.

IV   **Answer any ONE of the following**   **(1x10=10)**

1. A series resonance network consisting of a resistor of 30Ω, a capacitor of 2uF and an inductor of 20mH is connected across a sinusoidal supply voltage which has a constant output of 9 volts at all frequencies. Calculate, the resonant frequency, the current at resonance, the voltage across the inductor and capacitor at resonance, the quality factor and the bandwidth of the circuit.

$R = 30\Omega$ $L = 20mH$ $C = 2uF$

$V = 9volts$
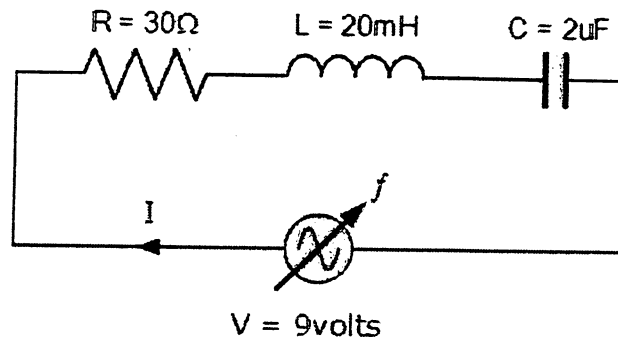
2. Discuss the working of Half wave rectifier with the help of suitable schematic diagram. Also find out the expression for average and rms output current.

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