Roll No. | | | | | | | | | | \ |

# B.E / B.Tech ( Full Time ) DEGREE ARREAR EXAMINATIONS, NOV / DEC 2013

## INFORMATION TECHNOLOGY BRANCH

## SECOND Semester

## EC191 BASIC ELECTRONICS ENGINEERING / EC 194 / EC9161 ELECTRONIC DEVICES AND CIRCUITS

(Regulation 2004 / 2008)

Time : 3 Hours | Answer ALL Questions | Max. Marks 100

## PART-A (10 x 2 = 20 Marks)

1. Determine the voltage at node a,b for the circuit shown in Fig.1

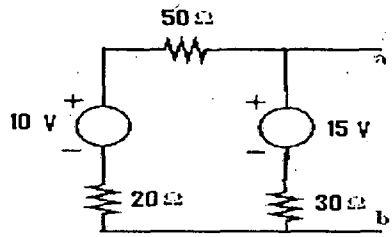


Figure.1

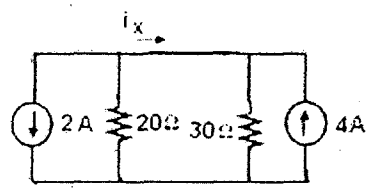


Figure.2

2. Compute the current labeled $i_x$ in the circuit shown in Fig.2.
3. Compute the Thevenin resistance looking into the terminal a,b for the circuit shown in Fig.1.
4. Define power factor.
5. What is meant by break down voltage of a zener diode?
6. What is meant by channel length modulation of MOSFET?
7. State the need for biasing in amplifier circuits.
8. Give the advantages of negative feedback.
9. List any four features of an ideal operational amplifier.
10. Draw an inverting amplifier circuit to realize a gain of 10.

## PART-B (5 x 16 = 80 Marks)

11.(i) Use Nodal analysis and determine the voltage labeled $V_X$ at the open circuit terminal of the circuit shown in Fig.3. **(8)**

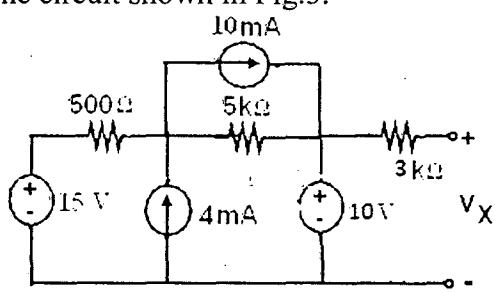


Figure 3.

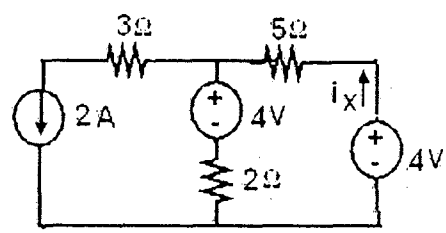


Figure 4

(ii) Determine current $i_x$ in the circuit shown in Fig.5. **(8)**

12.(a)(i) State Superposition theorem. **(4)**

(ii) For the circuit given in Fig. 5 determine the voltage Vx using superposition theorem. **(12)**

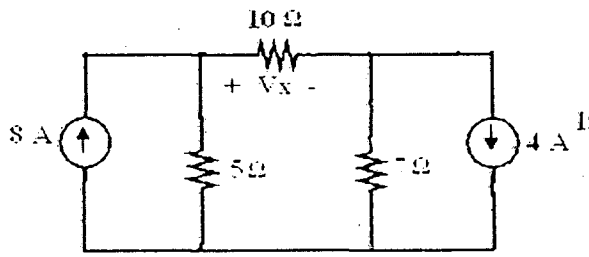


Figure 5

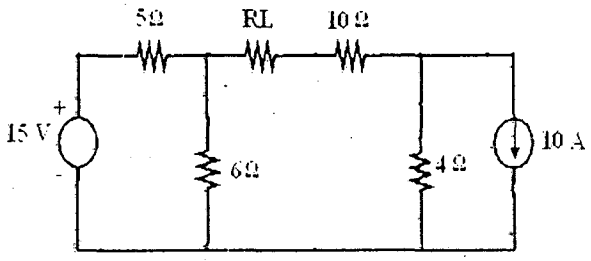


Figure 6

**OR**

12.(b)(i) State maximum power transfer theorem. **(4)**

(ii) For the circuit shown in Fig. 6 determine the value of RL so that maximum power is delivered to RL. **(12)**

13.(a)(i) Explain the principle of operation of voltage regulator circuit using zener diode . **(4)**

**(ii)** Draw the V-I characteristic of BJT and derive its h parameter model. **(12)**

**OR**

13.(b)(i) Explain the exponential model of the diode forward characteristic and derive its incremental resistance. **(8)**

(ii) Explain the various region of operation of n-channel MOSFET. **(8)**

14.(a) Derive the voltage gain of CE amplifier and explain its frequency response. **(16)**

**OR**

14.(b) Derive the voltage gain of CS amplifier and derive its unity gain frequency. **(16)**

15.(a) Describe the functionality of an opamp used as an integrator and differentiator with appropriate circuit diagram. **(16)**

**OR**

15.(b)(i) Derive the gain of an operational amplifier used in inverting and noninverting negative feedback configuration. **(8)**

(ii) Explain the principle of operation of binary weighted resistor DAC. **(8)**

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