Register Number: ……………………..

B.E DEGREE EXAMINATIONS: DEC 2014

(Regulation 2009)

Second Semester

MECHATRONICS ENGINEERING
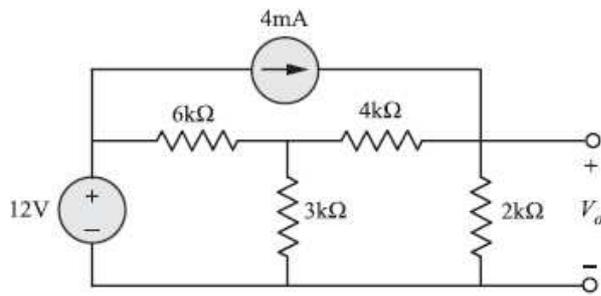
ECE280: Electronic Devices and Circuits

Time: Three Hours   **Maximum Marks: 100**
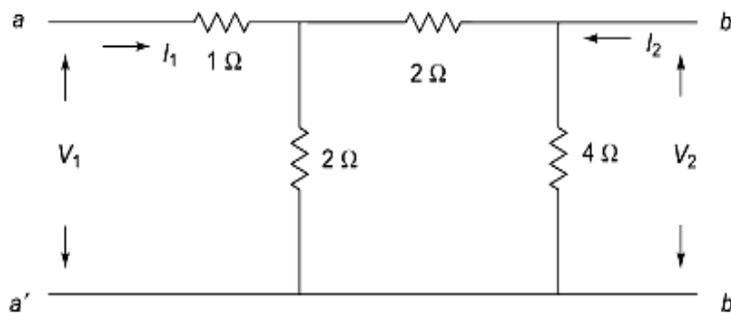
Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. What is the condition for reciprocity in Z parameter?

   a) $Z_{21}=Z_{12}$ b) $Z_{12}+Z_{21}=0$

   c) $Z_{11}=Z_{22}$ d) $Z_{12}=Z_{22}$

2. Kirchhoff's current law is applicable only to _____

   a) junction in a network   b) closed loops in a network

   c) electric circuits   d) electronic circuits

3. In semi-conductor, the energy gap between valence and conduction band is about _____.

   a) 15 eV   b) 100eV

   c) 50eV   d) 1eV

4. Gate – source junction in JFET is

   a) Forward biased   b) Reverse biased

   c) Unbiased   d) in breakdown region

5. The ripple factor of half wave rectifier is _____.

   a) 2   b) 1.21

   c) 0.48   d) 2.5

6. A Zener voltage regulator is used for _____ load currents.

   a) High   b) Very high

   c) Moderate   d) Small

7. Closed loop gain of practical oscillators must be _____.

   a) Less than 1   b) Greater than 1

   c) Equal to 1   d) Equal to 0

8. The transistor Hartley Oscillator uses _____.

   a) Resistive feedback   b) Negative feedback

   c) Inductive feedback   d) Capacitive feedback

9. Phase shift of open loop inverting amplifier is _____.

   a) 0° b) 180°

   c) 60° d) 90°

10. Bi-stable multi-vibrator is a _____.

    a) Free running oscillator.   b) Triggered oscillator.

    c) Saw tooth wave generator.   d) Crystal oscillator

PART B (10 x 2 = 20 Marks)

11. Find the Z parameters for the two-port network described by the following equations

    $V_1 = 50I_1 + 10I_2$; $V2 = 30I_1 + 20I_2$.

12. Five resistances are connected as shown in figure below. Find the equivalent resistance between the points A and B.

13. Define the various diode resistances.

14. Distinguish JFET and D-MOSFET.

15. What is a clipper? State the applications of clippers.

16. What are the advantages of bridge rectifier over its centre tapped counterpart?

17. Draw the hybrid model of a transistor and define any two 'h' parameters.

18. Give the applications of Hartley Oscillator.

19. Sketch a non – inverting operational amplifier.

20. What is a summing amplifier?

PART C (5 x 14 = 70 Marks)

21. a)   State Thevenin's theorem and find Thevenin's equivalent circuit for the following circuit:

(OR)

b) Find the h parameters of the given network.

22. a) (i) Compare intrinsic and extrinsic semi-conductors. (4)

   (ii) Explain the operation of pn junction diode in forward and reverse bias. (10)

(OR)

b) Enumerate the operation and characteristics of Common Base Bi-polar junction transistor.

23. a) Define voltage regulator and hence elucidate the operation of Zener voltage regulator in detail.

(OR)

b) Give the purpose of using diode rectifiers. Analyse the parameters of half wave rectifier.

24. a) Explain the working of common collector amplifier with neat diagram.

   b)   (i)   State the Barkhausen criteria for oscillation.   (2)

        (ii)   Discuss the operation of high frequency Hartley oscillator   (12)

25.   a)   (i)   Explain how Op-amp works as Instrumentation amplifier   (6)

        (ii)   Explain the application of Op-amp as sign changer and subtractor.   (8)

(OR)

   b)   With neat sketches explain the functioning of astable multivibrator and hence derive the period and frequency of oscillation.

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