Register No: ……

B.E. DEGREE EXAMINATIONS: MAY / JUNE 2011

Second Semester

MECHATRONICS ENGINEERING

ECE 280: Electronic Devices & Circuits

Time: Three hours **Maximum Marks: 100**

Answer ALL Questions

PART A (10x1 = 10 Marks)

1. An ideal voltage source should have

   (A) zero source resistance (B) large value of emf

   (C) infinite source resistance (D) none of these

2. In order to find Z in Thevenin's theorem

   (A) all independent voltage sources are short circuited and all independent current sources are open circuited

   (B) all independent current sources are short circuited and all independent voltage sources are open circuited

   (C) all independent current and voltage sources are open circuited

   (D) all independent current and voltage sources are short circuited

3. The forward resistance of a diode will be

   (A) very high (B) small (C) infinity (D) zero

4. In an n-channel JFET, the connections of the battery are such that

   (A) the drain is at zero potential with respect to source

   (B) the drain is at positive potential with respect to source

   (C) the drain is at negative potential with respect to source

   (D) none of these

5. In series and shunt type voltage regulator, transistor act as

   (A) reference (B) regulator (C) control element (D) none of the above

6. One of the part in half wave voltage doubler is

   (A) Clamper (B) Clipper (C) Amplifier (D) Oscillator

7. Current series feedback amplifier is otherwise called as

   (A) Voltage amplifier (B) Current amplifier

   (C) Transresistance amplifier (D) Transconductance amplifier

8. One type of non feedback oscillator is

(A) UJT relaxation oscillator (B) RC phase shift oscillator

(C) Wein bridge oscillator (D) None of these

9. The gain of closed loop non-inverting amplifier is

(A) $1 + (R_F / R_1)$ (B) $1 + (R_1 / R_F)$ (C) 1 (D) (R_1 / R_F)

10. Astable Multivibrator has

(A) 1 stable and 1 quasi stable state (B) 2 stable states

(C) no stable state (D) no quasi stable state

PART B (10 x 2 = 20 Marks)

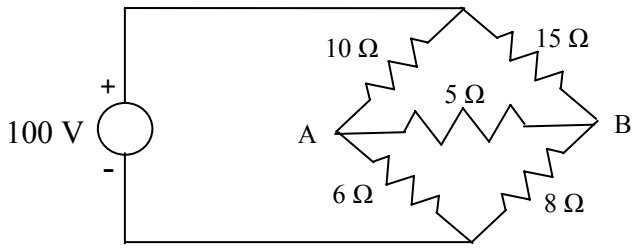
11. State Kirchoff's voltage and current law.
12. Draw the Norton's equivalent circuit.
13. Show that the Zener diode can be used as a voltage regulator.
14. Why a Field effect transistor is called so?
15. Define the term peak inverse voltage of a rectifier.
16. What is the need for filters in power supplies?
17. Classify the different types of amplifiers.
18. State Barkhausen Criterion.
19. List any four ideal OP-AMP characteristics.
20. How multivibrators are classified based on number of stable states?

PART C (5 x14 = 70 Marks)

21. a) With necessary equations explain how a star connected circuit can be converted to Delta connection and vice versa.

(OR)

b) Use Thevenin's Theorem to find the current through the 5 Ω resistor in figure shown below.



22. a) Explain how a PN junction is formed and state its properties under no bias, forward bias and reverse bias condition.

(OR)

b) Explain the working of a JFET and draw the VI characteristics of an N- channel JFET. Also define dynamic drain resistance and amplification factor.

23. a) Sketch the circuit of a full wave rectifier and explain its operation. Draw the output voltage with and without capacitor filter and discuss.

(OR)

b) With neat circuit diagrams, explain the action of a clipper and clamper circuit.

24. a) Draw a neat diagram of a transistorized Colpitts oscillator with a suitable equivalent circuit and explain its operation. Also give the expression for the frequency of oscillation.

(OR)

b) Draw the hybrid π model of BJT in CE connection and derive the equation for input impedance, output impedance, voltage gain and current gain.

25. a) Explain in detail with a neat circuit diagram and waveform, the operation of an Astable Multivibrator using OP-AMP.

(OR)

b) Sketch the circuit of a RC phase shift oscillator using OP-AMP and discuss its operation.

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