Register Number: ……..

B.E DEGREE EXAMINATIONS: MAY/JUNE 2014

(Regulation 2009)

Second Semester

MECHATRONICS ENGINEERING

ECE280: Electronics Devices and Circuits

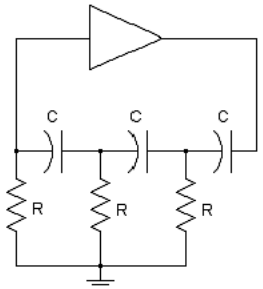
Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Mesh analysis is based on
   a) KCL b) KVL
   c) Both a&b d) Super position principle
2. Which parameters are widely used in transmission line
   a) Z parameters b) Y parameters
   c) ABCD parameters d) h parameters
3. Effectively, how many valence electrons are there in each atom within a pure silicon crystal?
   a) 2 b) 4
   c) 8 d) 16
4. In the active region, while the collector-base junction is _____-biased, the base-emitter is _____-biased
   a) Forward, forward b) Forward, reverse
   c) Reverse, forward d) Reverse, reverse
5. What is the range of the operating voltage level for LEDs?
   a) 5–12 mV b) 1.7–3.3 V
   c) 5–12 V d) 20–25 V
6. Voltage regulators keep a constant _____ output voltage when the input or load varies within limits.
   a) dc b) Ac
   c) ripple d) none of the above
7. The class D amplifier uses what type of transistors?
   a) JFETs b) BJTs
   c) MOSFETs d) any of the above

8. This circuit is a _____ oscillator



   a) Phase-shift b) Wien bridge
   c) Colpitts d) Hartley
9. What is the open-loop gain of an op-amp at the gain-bandwidth product of the op-amp?
   a) 200,000 b) 200
   c) 50,000 d) 1
10. Monostable is useful for creating a timing period of fixed duration in response to some external event. This circuit is also known as a
    a) One shot b) frequency dividers
    c) Monostable d) None of the above

PART B (10 x 2 = 20 Marks)

11. Find the z-parameters in the shown T-network at Fig.1 are given by

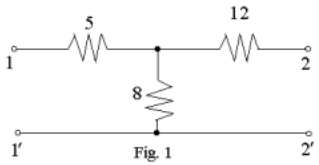


Fig. 1

12. Mention the limitations of Ohm's Law
13. What is P-type and N-type Semiconductor?
14. Write the current amplification factor for a CB transistor
15. What is the static resistance of a diode?
16. What is a voltage regulator? List the main components of voltage regulator.
17. What are the conditions of the sustained oscillations?

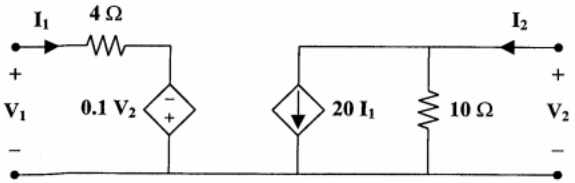
18. The input power to an amplifier is 20 mw while output power is 2.5 W. Find the gain of the Amplifier

19. Define CMRR of an op-amp.

20. State the advantage and disadvantage of RC Phase shift oscillator

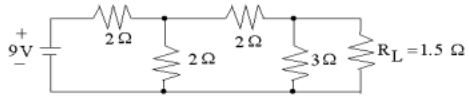
PART C (5 x 14 = 70 Marks)

21. a) Find the Y parameter for the circuit in the fig



(OR)

b) (i) By using Norton's theorem, find the current in the load resistor RL for the circuit Shown in Fig. (10)



(ii) State the Thevinin and Norton theorems. (4)

22. a) (i) What is an intrinsic semiconductor? How can you convert an intrinsic semiconductor into N-type extrinsic semiconductor? Explain. (10)

(ii) Distinguish between n-type and p-type semiconductors on the basis of energy band diagram. (4)

(OR)

b) (i) Draw the drain and transfer characteristics of a JFET and explain (10)

(ii) Discuss the advantages of JFET over BJT (4)

23. a) (i) How does the zener diode act as a voltage regulator? Explain (7)

(ii) Write a note on voltage multiplier. (7)

(OR)

b) Explain the half wave and full wave rectifier with relevant diagram

24. a) Draw the circuit of Hartley oscillator and explain its working. Derive the expressions for frequency of oscillation for starting of oscillation.

(OR)

b) Explain the types of feedback amplifier with neat diagram

25. a) Explain how an op amp can be used as an inverting amplifier, non inverting amplifier, summing amplifier, and subtractor. Derive expressions for output voltages

(OR)

b) With a neat sketch explain the working of an Astable Multivibrator. On what factors does the frequency of the output waves depend?

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