Register Number: ……

B.E DEGREE EXAMINATIONS: NOV/DEC 2010

Third Semester

ELECTRONICS AND INSTRUMENTATION ENGINEEIRNG

U07EI305: Electronic Devices

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

Answer ALL Questions:-

PART A (10 x 1 = 10 Marks)

1. A pn junction is formed by

   A) The recombination of electrons and holes

   B) ionization

   C) the boundary of an p-type and an n-type material

   D) the collision of a proton and neutron

2. A silicon diode is in series with a 1KΩ resistor and a 5V battery. If the anode is connected to the positive battery terminal, the cathode voltage with respect to the negative battery terminal is

   A) 0.7 V B) 0.3 V C) 5.7 V D) 4.3 V

3. For operation as an amplifier, the base of an npn transistor must be

   A) Positive with respect to the emitter B) Negative with respect to the emitter

   C) Positive with respect to the collector D) 0 V

4. If the base-emitter junction is open, the collector voltage is

   A) Vcc B) 0 V C) Floating D) 0.2 V

5. A MOSFET differs from a JFET mainly because

   A) Of the power rating B) The MOSFET has two gates

   C) The JFET has a pn junction D) MOSFETs do not have a physical channel

6. Which of the following is not a characteristic of the UJT?

   A) Intrinsic standoff ratio B) Negative resistance

   C) Peak-point voltage D) Bilateral conduction

7. An infrared LED is optically coupled to a photodiode. When the LED is turned off, the reading on an ammeter is series with the reverse-biased photodiode will

   A) Not change B) Decrease C) Increase D) Fluctuate

8. In a phototransistor, base current is

A) Set by a bias voltage B) Directly proportional to light

C) Inversely proportional to the light D) Not a factor

9. The specified value of holding current for an SCR means that

A) The device will turn on when the anode current exceeds this value

B) The device will turn off when the anode current falls below this value

C) The device may be damaged if the anode current exceeds this value

D) The gate current must equal or exceed this value to turn this device on

10. A varactor diode exhibits.

A) A variable capacitance that depends on reverse voltage.

B) A variable resistance that depends on reverse voltage.

C) A variable capacitance that depends on forward current.

D) A constant capacitance over a range of reverse voltages.

PART B (10 x 2=20 Marks)

11. When does reverse breakdown occur in a pn junction?
12. What happens to the barrier potential when the temperature increases?
13. If the collector current is 1mA and the base current is 10μA, what is the emitter current?
14. Under what conditions is $V_{CE}=V_{CC}$?
15. Define Transconductance.
16. If the gate-to-source voltage in a depletion MOSFET is zero, what is the current from drain to source?
17. What is Photodiode?
18. What type of input device is normally used in opto coupler?
19. How does a triac differs from a diac?
20. Draw the characteristic curve of the thermistor.

PART C (5 x 14 = 70 Marks)

21. a) Describe a pn junction and explain about

1) Depletion region
2) Barrier potential

(OR)

b) Explain the current-voltage (I-V) characteristic curve of a pn junction under forward and reverse bias condition.

22. a) Explain the Input and Output characteristics of CE, CB Configuration with neat diagram.

(OR)

b) (i) Develop the ac equivalent circuit for a C.E transistor amplifier.

(ii) Discuss a basic application of a transistor switching circuit.

23. a) (i) Describe how gate-to-source voltage controls the drain current in JFET.

(ii) Explain the D-MOSFET transfer characteristic to calculate I_D

(OR)

b) Describe the basic structure and operation of the UJT.

24. a) Discuss the operation and characteristics of LEDs and photodiodes.

(OR)

b) Write short notes on

(i) Solar Cell.

(ii) Laser diode.

25. a) (i)Draw the equivalent circuit of an SCR. Explain the characteristic curves of an SCR. (8)

(ii) Compare PUT to that of the SCR. (6)

(OR)

b) (i) Describe the characteristics of a zener diode. (7)

(ii) Explain the characteristics of Teerzel diode. (7)

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