Register Number: ……..

B.E DEGREE EXAMINATIONS: MAY/JUNE 2014

(Regulation 2009)

Second Semester

ELECTRONICS AND INSTRUMENTATION ENGINEERING

EIE103: Electronic Devices

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Reverse breakdown is a condition in which a diode
   a) is subjected to a large reverse voltage. b) is reverse-biased and there is a small leakage current.
   c) has no current flowing at all. d) is heated up by large amounts of current in the forward direction.
2. In a Semiconductor diode , V I relationship is such that
   a) Current varies linearly with voltage b) Current increases exponentially with voltage
   c) Current varies inversely with voltage d) Current does not depend on voltage
3. If the α is 0.9, the value of β is
   a) 1 b) 0.9
   c) 9 d) 10
4. Relation between leakage currents in CB and CE configurations is
   a) $I_{CEO}=(1-\beta)I_{CBO}$ b) $I_{CEO}=(1-\beta)/I_{CBO}$
   c) $I_{CEO}=(1+\beta)/I_{CBO}$ d) $I_{CEO}=(1+\beta)I_{CBO}$
5. The extreme high input impedance of a MOSFET is primarily due to
   a) absence of its channel b) negative gate-source voltage
   c) depletion of current carriers d) Extremely small leakage current of its gate capacitor
6. The forward transfer admittance of JFET is also known as _____
   a) Transconductance b) Transresistance
   c) Transvoltage d) Output Admittance
7. Solar cell is a type of
   a) photo-conductive device b) photo-emissive device
   c) photo-voltaic device d) electromotive device
8. Sensitivity of a phototransistor as compared to any other photosensitive semiconductor device is
   a) the same slightly less
   c) slightly more much more
9. TRIAC behaves like two
   a) Inverse parallel SCR with common gate b) Diodes in series
   c) Four layer diodes in parallel d) Resistor and one diode
10. A varactor is a pn junction diode that always operates in _____-bias and is doped to _____ the inherent capacitance of the depletion region.
    a) forward, maximize b) reverse, maximize
    c) reverse, minimize d) forward, minimize

PART B (10 x 2 = 20 Marks)

11. Define the space charge capacitance of PN diode
12. What is meant by dynamic resistance of diode?
13. In a BJT, the emitter current is 12 mA and the emitter current is 1.02 times the collector current. Find the base current.
14. What are power transistors?
15. What is the major difference in construction of the D-MOSFET and the E-MOSFET?
16. Determine the transconductance of a JFET if its amplification factor is 96 and drain resistance is 32 KΩ.
17. List the applications of opto-electronic device
18. Differentiate PN diode and Laser diode.
19. List the applications of charge coupled device.
20. What is LDR?

PART C (5 x 14 = 70 Marks)

21. a) (i) With VI characteristics, explain the working principle of the PN diode (7)
    (ii) Discuss about the capacitance effect of a reverse biased PN diode. State its importance. (7)

(OR)

b) (i) Show the effect of temperature on its VI characteristics of PN diode. (2)
   (ii) Derive the expression for diode current equation. (12)

22. a) For a common emitter bipolar transistor configuration, explain the working principle and input/output characteristics and also derive the expression for current in transistor.

(OR)

b) (i) Explain the switching characteristics of transistor with neat sketch. (7)

(ii) Write a note on transistor construction with suitable diagram. (7)

23. a) (i) With neat diagram explain the construction, working characteristics of Unijunction Transistor. Give its equivalent circuit. (7)

(ii) Explain with the help of neat diagrams, the structure of an N-channel JFET and its Volt-ampere characteristics. (7)

(OR)

b) Explain in detail the construction and working principle of Depletion MOSFET. Also explain how Depletion MOSFET acts both in enhancement and depletion mode

24. a) (i) Draw the display of number 1 using seven segment displays and explain the theory of liquid crystal cells. (10)

(ii) Give a detailed account on opto-coupler and their applications. (4)

(OR)

b) (i) Explain the alpha numeric display configuration using LEDs and describe its working (7)

(ii) Explain in detail, the construction and working principle of Photo Diode. (7)

25. a) (i) Define tunneling phenomenon. Explain how tunnel diode operates under different operating conditions. (7)

(ii) Explain the working of a Zener diode as a Regulator (7)

(OR)

b) Draw the circuit and equivalent circuit of SCR. Explain the construction, working, advantages and application of SCR.

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