



Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech(O)/SEM-1/EC-101/2012-13
2012
BASIC ELECTRONICS

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

$10 \times 1 = 10$

i) Barrier potential of Ge diode is

- | | |
|---------|---------|
| a) 0.3V | b) 0.7V |
| c) 0.4V | d) 0V. |

ii) A differential amplifier has a differential gain of 20,000. CMRR=80dB. The common mode gain is given by

- | | |
|--------|-------|
| a) 2 | b) 1 |
| c) 0.5 | d) 0. |

iii) With both junction reverse biased the transistor operates in

- | | |
|----------------------|---------------------|
| a) active region | b) cut-off region |
| c) saturation region | d) inverted region. |

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[Turn over



- ix) JFET is a
- current control device
 - voltage control device
 - temperature control device
 - none of these.
- x) Which one is used as a reference voltage source ?
- Junction diode
 - Zener diode
 - Transistor
 - Op-amp.
- xi) UJT is used as
- rectifier
 - voltage follower
 - relaxation oscillator
 - none of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

- What is the importance of forbidden energy gap in material science ? What are the forbidden energies of Si and Ge ?
- How does the depletion layer width change with doping concentration of a $p-n$ junction diode ? Draw the ideal diode characteristic curve.
- What is ripple factor ? Give an expression for the ripple factor.
- What are effects of 'early effect' ? Define "punch through" in "early effect".



GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

6. a) Explain the operation of a full-wave Bridge Rectifier with the help of circuit diagram. 10
b) Obtain a mathematical expression for the efficiency of a full-wave rectifier and show that its ripple factor is 0.482. 5
7. a) Discuss the two-transistor analogy of an SCR. 5
b) Explain the working principle of SCR. 7
c) Draw the forward and reverse characteristics. 3
8. a) For a rectifier circuit using diodes, define
(i) rectification frequency
(ii) ripple factor
(iii) PIV.
b) Each of two diodes in a full-wave rectifier circuit has a forward resistance of 50Ω . The DC voltage drop across a load resistance of 1.2Ω is 30 V. Find the primary to total secondary turns ratio of the centre-tapped transformer, primary being fed from $220 V_{rms}$. 9
9. Write short notes on any *three* of the following : 3×5
 - a) UJT
 - b) Clamping circuit
 - c) Barkhausen criterion
 - d) Advantages of negative feedback amplifier
 - e) Lissajous figures.