



Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech (OLD)/SEM-2/EC-201/2013

2013

BASIC ELECTRONICS ENGINEERING

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 the following : $10 \times 1 = 10$

i) The unit of mobility of charge carriers in SI unit is

- | | |
|--------------------------------|---|
| a) Ωm | b) $\text{m}^2 \text{V}^{-1} \text{s}^{-1}$ |
| c) $\text{m}^2 \text{Vs}^{-1}$ | d) $\text{m}^2 \text{V}^{-1} \text{s}^{-2}$. |

ii) Emission co-efficient for Si is

- | | |
|------|-------|
| a) 1 | b) 3 |
| c) 2 | d) 4. |

iii) If $\beta = 200$ then α will be

- | | |
|---------|----------|
| a) 0.99 | b) 0.98 |
| c) 0.95 | d) 0.96. |

- 2001 (O)



- ix) The operating point is also called the
- a) Cut-off point
 - b) Q point
 - c) Saturation point
 - d) None of these.
- x) The emitter of a transistor is doped
- a) lightly
 - b) moderately
 - c) heavily
 - d) none of these.

GROUP – B

(Short Answer Type Questions)

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

2. Describe centre tapped full wave rectifier with circuit diagram.
3. Derive the expression for conductivity of a semiconductor material.
4. What is efficiency of a rectifier circuit ? Derive the expression of efficiency of a rectifier circuit.
5. Describe common emitter transistor configuration with I/P and O/P characteristic curves.
6. What is Barkhausen criterion ? Explain voltage shunt feedback.
7. Derive the expression for voltage gain for common source FET amplifier.



GROUP – C

(Long Answer Type Questions)

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

8. a) Describe half wave rectifier with circuit diagram. What is ripple factor ? Derive the expression of ripple factor. 10
 b) Explain Zener breakdown and Avalanche breakdown. 5
9. a) What are the amplification factors for common base and common emitter transistor configuration. Derive the relationship between them. 3
 b) A Ge transistor with $\beta = 49$ has a self bias arrangement. Given $V_{cc} = 10 \text{ V}$, $R_L = 1 \text{ k}$, $V_{CE} = 5 \text{ V}$, $I_c = 4.9 \text{ mA}$ and $V_{BE} = 0.2 \text{ V}$. The stability factor S is desired to be 10. Obtain the values R_1 , R_2 and R_e . 6
 c) Explain adder circuit using Op-Amp. What is CMRR ? 4 + 2
10. a) Explain the operation of n channel enhancement type MOSFET with transfer and drain characteristics. 8
 b) Derive the expression for current gain, voltage gain of common emitter transistor configuration using h parameter model. 7
11. a) What is Barkhausen criterion ? What are the conditions of oscillation ? Explain voltage shunt feedback topology. Derive the expression for transfer gain of a feedback amplifier circuit. 2 + 2 + 4 + 4
 b) Explain offset errors of Op-Amp. 3
12. a) How is the electron beam in a CRT deflected horizontally and vertically ? Distinguish between electrostatic and magnetic deflections. 5 + 5
 a) Write a brief account on the operation of SCR. 5
