



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) $\Omega\text{m}$            | 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  $\alpha$  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

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