	Utech
Name :	<u>A</u>
Roll No.:	To Danie (y Exercising and Explains)
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)  $m^2 V^{-1} s^{-1}$
- c)  $m^2 \text{ Vs}^{-1}$
- d)  $m^2 V^{-1} s^{-2}$ .
- 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.

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iv)	A differential amplifier has a differential gain of 20,000.				
	CMRR = 80 dB. The common mode gain is given by				
	a)	2	b)	1	
	c)	0.5	d)	0.	
v)	Whe	When both junctions are forward biased the transistor			
	region operates in				
	a)	active region	b)	cut-off region	
	c)	saturation region	d)	inverted region.	
vi)	The input offset current is equal to the				
	<ul><li>a) difference between two base currents</li><li>b) average of two base currents</li></ul>				
	c) collector current divided by current gain				
	d) none of these.				
vii)	Negative feedback				
	<ul><li>a) increases the input &amp; output impedances</li><li>b) increases the input impedance &amp; bandwidth</li></ul>			it impedances	
				nce & bandwidth	
	<ul><li>c) decreases the output impedance &amp; bandwidth</li><li>d) does not affect impedance &amp; bandwidth.</li></ul>			ance & bandwidth	
				k bandwidth.	
viii)	i) Which of the following devices has the highest input impedance?				
	a)	JFET	b)	MOSFET	
	c)	Crystal diode	d)	BJT.	



- 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.

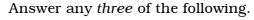
 $3 \times 5 = 15$ 

- 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.



### (Long Answer Type Questions)

 $3 \times 15 = 45$ 



- 8. a) Describe half wave rectifier with circuit diagram. What is ripple factor? Derive the expression of ripple factor.
  - 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.
  - b) A Ge transistor with  $\beta$  = 49 has a self bias arrangement. Given  $V_{cc}$  = 10 V,  $R_L$  = 1 k,  $V_{CE}$  = 5 V,  $I_c$  = 4·9 mA and  $V_{BE}$  = 0·2 V. The stability factor S is desired to be 10. Obtain the values  $R_1$ ,  $R_2$  and  $R_e$ .
  - 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.
- 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.

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- 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.

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