	Utech
Name :	
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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 α will be
 - a) 0.99

b) 0.98

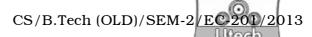
c) 0.95

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)	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				
	a)	a) difference between two base currents			
	b)	average of two base currents			
	c)	collector current divided by current gain			
	d)	none of these.			
vii)	Negative feedback				
	a)) increases the input & output impedances			
	b)	increases the input impedance & bandwidth			
	c)	decreases the output impedance & bandwidth			
	d) does not affect impedance & bandwidth.				
viii)	i) Which of the following devices has the highest inp			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.

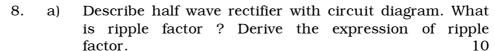
 $3 \times 5 = 15$

- 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)

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



- 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 β = 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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