	Utech
Name:	
Roll No.:	In Summar IV Exercising 2 and Experiment
Invigilator's Signature :	

CS/B.TECH (ECE)(N)/SEM-3/EC-304/2012-13

2012

ANALOG ELECTRONIC CIRCUITS

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) An instrumentation amplifier has a high
 - a) supply voltage
- b) power gain

c) CMRR

- d) output impedance.
- ii) A transistor is said to be in quiescent state when
 - a) no signal is applied to the input
 - b) no currents are following
 - c) it is unbiased
 - d) emitter junction and collector junction biased are equal.
- iii) If three cascaded stages of amplifier have gains 10, 20, 30 the overall gain will be
 - a) 200

b) 400

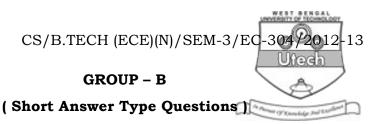
c) 1200

d) 6000.

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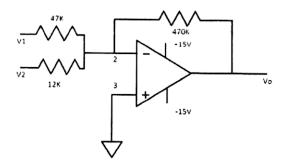
iv)		ich of the following co	onfigu	ration can be used as
	a)	CE	b)	CB
	c)	CC	d)	All of these.
v)	An astable multivibrator generates			
	a)	triangular waveform	b)	sinusoidal waveform
	c)	square waveform	d)	none of these.
vi)	For	PLL		
	a)	capture range is great	er tha	an lock range
	b) capture range is less than lock range			
	c) capture range is equal to lock range			
	d)	no relationship betwee	en the	em.
vii)	The output impedance of an Op-Amp is			
	a)	medium		
	b)	very low		
	c)	very high.		
viii)	CM	RR for an Op-Amp shou	ıld be	
	a)	all small as possible	b)	closed to unity
	c)	close to zero	d)	as large as possible.
ix)	In an active RC filter, the active element is			
	a)	the resistance R	b)	the capacitor C
	c)	the Op-Amp	d)	none of these.
x)		ideal regulated power s ch is	upply	should have regulation
	a)	maximum	b)	50%
	c)	zero	d)	75%.
- (NI)				



Answer any three of the following

 $3 \times 5 = 15$

- 2. What is ripple? How it can be removed from the output of a rectifier? Explain with suitable diagram. 1 + 4
- 3. Calculate the output voltage of the circuit shown below, where V_1 = 40 mV, V_2 = 20 mV.



- 4. Draw and explain the Schmitt trigger circuit using Op-Amp.
- 5. Draw the circuit diagram of an emitter follower and state the nature of feedback in the circuit. Derive the expression of the voltage gain of the circuit from the concept of feedback.

2 + 3

6. What is regulated power supply? Draw a series voltage regulator and explain its operation. 1 + 4

GROUP - C

(Long Answer Type Questions)

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

- 7. a) Sketch the circuit of Wien-bridge oscillator. Explain the principle of operation and find an expression for the frequency of oscillation.
 - b) Prove that the amplifier gain in a phase shift oscillator is at least 29 for sustained oscillation.

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- c) A phase shift oscillator using a transistor has the following parameter values : $R_L = 3 \cdot 3 \text{ k}\Omega$, $R = 5 \cdot 6 \text{ k}\Omega$ and $C = 0 \cdot 01 \, \mu\text{F}$.
- 8. a) What is the function of a voltage regulator?
 - b) Draw and explain the operation of a Series regulated power supply.
 - c) Compare Series and Shunt regulated power supply.
 - d) Calculate the ripple factor of a rectifier using capacitor filter with figure. 2 + 5 + 3 + 5
- 9. a) What is meant by Thermal runaway? How it can be avoided?
 - b) Draw and explain Self-bias circuit of an NPN transistor in CE configuration.
 - c) Derive an expression for the stability factor $S = \left(\frac{\partial l_c}{\partial l_{co}}\right)$ for Self-bias circuit. (2+2)+6+5
- 10. a) Explain the operation of a transformer coupled class *A* power amplifier.
 - b) What is the cross-over distortion found in a class B amplifier? How it can be avoided?
 - c) In which respect class B push-pull amplifier is better than a class A amplifier? 6 + (4 + 1) + 4
- 11. Write short notes on any *three* of the following: 3×5
 - a) Schmitt Trigger
 - b) High frequency model of transistors
 - c) Hartley Oscillator
 - d) Four basic feedback topologies
 - e) SMPS
 - f) Current Mirror.
