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NMAM INSTITUTE OF TECHNOLOGY, NITTE

(An Autonomous Institution affiliated to VTU, Belagavi)

II Sem B.E. (Credit System) Mid Semester Examinations – II, March 2017

16EC112 – BASIC ELECTRONICS

ration: 1 Hour | Max. Marks: 20

*Note: Answer any **One** full question from **each Unit.***

		Marks	BT*
	Unit – I		
a)	Sketch the typical frequency response of **RC coupled amplifier** and indicate mid frequency region , cut off frequencies and bandwidth . Why are cut off frequencies known as half power frequencies as well as 3 **dB** frequencies?	06	L*4
b)	A voltage amplifier having absolute voltage gain of **10** is cascaded with a power **amplifier** having absolute power gain of **10** . Calculate the overall gain in **dB**.	04	L3
a)	Show the circuit of a **R-C phase shift** oscillator using **NPN** transistor and explain . State the expression for frequency of oscillation.	06	L3
b)	A **Hartley** oscillator has **L1 = L2 = 0.2mH** and **C = 0.2 μH** . Determine (i) frequency of oscillation and (ii) value of loop gain.	04	L4
	Unit – II		
a)	Draw circuit of of **OPAMP Integrator** and derive expression for output voltage . Sketch the output waveform along with input waveform if input is a square wave considering time constant (RC) is a high value.	06	L4
b)	An inverting **OPAMP adder** has two inputs , **V1 = + 2** volts with series resistance , **R1 = 10 kΩ** and **V2 = – 6** volts with series resistance , **R2 = 20 kΩ** . Feedback resistance is **40 kΩ** and d.c power supply is **± 9** volts . Determine output voltage for above inputs.	04	L3
a)	Show the circuit of **noninverting OPAMP** amplifier and derive expression for output voltage.	05	L4
b)	With a block diagram explain operation of a **communication system**.	05	L3

T* Bloom's Taxonomy, L* Level

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II Sem B.E. (Credit System) Mid Semester Examinations - I, February 2017

16EC112 – BASIC ELECTRONICS

Duration: 1 Hour | Max. Marks: 20

*Note: Answer any **One** full question from **each Unit.***

			Marks	BT*
		Unit – I		
1.	a)	Sketch forward and reverse V-I characteristics of germanium diode. Mark cut-involtage, dynamic resistance and reverse break-over voltage on the sameand explain their significance.	6	L*2
	b)	A diode bridge rectifier has an input voltage of 110 volts (rms), 60 Hz. Load Resistance is 300 ohms. Considering diodes to have conducting resistance of 5 ohms, calculate (i) average load current and (ii) % load voltage regulation.	4	L4
2.	a)	Draw the circuit required to obtain reverse V-I characteristic of Zenerdiode. Sketch the reverse V-I characteristic of Zener diode and mark the important parameters. Explain their significance.	5	L3
	b)	A Zener voltage regulator has an input voltage of 24 volts and the series resistance has a value of 300 ohms. The Zener has V_Z of 12 volts. Load resistance is 1000 ohms.Obtain the value of current in Zener. If Zener has $I_{ZK}$of 10 mA and $P_{ZM}$of 500 mW, will the circuit work correctly or not and justify your answer.	5	L5
		Unit – II		
3.	a)	Draw the circuit symbols for NPN and PNP transistors. Show the current and voltage polarities for both to operate in active region. Define the parameters, common base emitter to collector current gain, $\alpha_{dc}$and common emitter base to collector current gain,β_{dc}.	6	L3
	b)	If an NPN transistor has β_{dc} of 200 and collector current of 50 mA, determine the values of (I) α_{dc} and (ii) base current.	4	L4
4.	a)	Draw circuit required to obtain input and output characteristics of NPN transistor in CB configuration. Sketch typical family of input and output characteristics. Mark regions of operation in output characteristics and explain.	6	L4
	b)	If a transistor has a base current of 1 mA and β_{dc} of 100, the collector circuit DC supply of 12 volts and collector resistor of 1Kohm, (i) Calculate the value of collector current and (ii) In which region of operation is it?	4	L5

BT* Bloom's Taxonomy, L* Level

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I Sem B.E. (Credit System) Mid Semester Examinations - I, September 2017

17EC112 – BASIC ELECTRONICS

uration: 1 Hour | Max. Marks: 20

*Note: Answer any **One** full question from **each Unit.***

			Marks	BT*
		Unit – I		
1.	a)	Outline the typical forward and reverse characteristics for a silicon diode and explain the important parameters.	6	L*2
	b)	A 6V Zener diode regulator circuit (with load) operates from a 10 V dc supply. It has a knee current of 5 mA and series resistance of 50 Ω. Identifythe minimum value of resistance so that voltage across it does not fall below 6V.	4	L3
2.	a)	Sketch and explain the VI characteristics of the Zener diode and define its parameters V_Z, I_{ZK}, I_{ZT} and I_{ZM}.	6	L2
	b)	A half-wave rectifier circuit has internal resistance of 20Ω and load resistance of 1000Ω from an 110V rms supply source. Calculate I_{DC}, I_{rms} and percentage load regulation.	4	L3
		Unit – II		
3.	a)	Draw the NPN transistor Common-Emitter configuration circuit and mark the regions of operation on the characteristics plot and explain the input characteristics and output characteristics.	6	L2
	b)	Calculate the values of I_C, I_E and $\beta_{dc}$for a transistor with α_{dc}=0.97 and I_B=50μA. Also, analyze the significance of transistor parameters α_{dc} and β_{dc}.	4	L4
4.	a)	Sketch the typical NPN transistor Common-Base configuration circuit and mark the regions of operation on the characteristics plot and explain the input characteristics and output characteristics.	6	L2
	b)	With appropriate circuit diagrams, indicating the directions of currents and voltages, analyze the application of a transistor as an amplifier. Consider NPN transistor in the circuit.	4	L4

T* Bloom's Taxonomy, L* Level

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NMAM INSTITUTE OF TECHNOLOGY, NITTE

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I Sem B.E. (Credit System) Mid Semester Examinations - II, October 2017

17EC112 – BASIC ELECTRONICS

Duration: 1 Hour | Max. Marks: 20

*Note: Answer any **One** full question from **each** Unit.*

			Marks	BT*
		Unit – I		
1.	a)	Draw the frequency response of single-stage RC-coupled amplifier. Identify the significant parameters and briefly explain them.	4	L*3
	b)	Using suitable diagram and mathematical expressions illustrate the operation of series voltage negative feedback amplifier.	6	L2
2.	a)	Calculate the frequency of oscillations of an oscillator feedback circuit with two capacitors **0.01μF** and **0.001μF** and an inductor 5μH. Also sketch the circuit diagram of appropriate oscillator.	4	L3
	b)	Outline the circuit diagram for RC phase-shift oscillator and discuss its operation.	6	L2
		Unit – ii		
3.	a)	Draw circuit diagram for non-inverting operational amplifier (Op-amp) and develop the expression for closed loop voltage gain.	5	L3
	b)	Analyse how an Op-amp can be used as an Integrator. Also derive the expression for its output voltage.	5	L4
4.	a)	Using suitable circuit and equations explain the operation of an Op-amp differentiator.	5	L2
	b)	Design an adder circuit using Op-amp to obtain an output voltage, $V_o = -[0.5V_1 + 0.8V_2 + 2V_3]$. Assume $R_f = 10k\Omega$.	5	L6

BT* Bloom's Taxonomy, L* Level

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