EC101/201

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M S RAMAIAH INSTITUTE OF TECHNOLOGY

(AUTONOMOUS INSTITUTE, AFFILIATED TO VTU)

BANGALORE – 560 054

SEMESTER END EXAMINATIONS – JANUARY 2016

Course & Branch	: **B.E.- Common to all branches**	**Semester**	: **I/II**
Subject	: **Basic Electronics**	**Max. Marks**	: **100**
Subject Code	: **EC101/201**	**Duration**	: **3 Hrs**

Instructions to the Candidates:

- Answer one full question from each unit.

UNIT – I

1.	a)	Explain the operation of PN diode with basic structure and V-I characteristics.	CO1	(06)
	b)	With neat circuit diagram explain the operation of half wave rectifier with merits and de-merits.	CO1	(06)
	c)	In a Zener regulator the input DC is 10V±20% the output requirements are 5V 20mA, assuming I_{Zmax} and I_{Zmin} as 80mA and 5mA respectively, design a Zener regulator.	CO1	(08)
2	a)	Define dc-restorer? With relevant diagram explain the positive clamper.	CO1	(06)
	b)	Derive the relation between α_{dc} and β_{dc}. A transistor has I_B=100μA, I_C=2mA, find β_{dc}, α_{dc} and I_E.	CO1	(06)
	c)	With neat circuit diagram, illustrate the input and output characteristics of common base configuration.	CO1	(08)

UNIT – II

3.	a)	Why we need biasing? Describe voltage divider biasing with circuit and approximate analysis.	CO2	(06)
	b)	Compare the ideal characteristics of operational-amplifier with practical characteristics.	CO2	(06)
	c)	Describe how op-amp can be used as adder circuit and prove that V_o=-(V_1+V_2).	CO2	(08)
4.	a)	The base bias circuit is having R_B=470KΩ, R_C=2.2KΩ and V_{CC}=20V, determine I_C, I_B and V_{CE}. When transistor has h_{FE}=150.	CO1	(06)
	b)	With circuit, explain the operation of non-inverting amplifier using op-amp.	CO2	(06)
	c)	Explain how op-amp can be used as integrator with circuit and equations. Write its applications.	CO2	(08)

UNIT – III

5.	a)	Perform the following conversions. i) $(988.8125)_{10}=(?)_{16}=(?)_2$ ii)$(11101010.01011)_2=(?)_{10}=(?)_8$	CO3	(06)
	b)	State and prove the De-Morgan's theorems.	CO3	(06)
	c)	Design half adder combinational logic network using NAND gates only. Using this as a component, draw the circuit for full adder.	CO3	(08)

6.	a)	Perform the following. i)$10101001_{(2)}$-$10010011_{(2)}$ subtraction using 2's complement method ii) $10111010_{(2)}$-$11010101_{(2)}$ subtraction using 1's complement method.	CO3	(06)
	b)	Discuss the properties of Boolean algebra.	CO3	(06)
	c)	Simplify the following Boolean expressions and draw the logic circuit using minimum number of gates. i) Y=a'(b+c')(a+b'+c)(a+b+c) ii) F=xy+xyz+xyz'+x'yz	CO3	(08)

UNIT – IV

7.	a)	Explain the operation of clocked RS-flip flop with circuit and functional table.	CO3	(06)
	b)	Compare combinational logic circuit with sequential circuit with example.	CO4	(06)
	c)	With neat block diagram explain the architecture of 8051 microcontroller architecture.	CO4	(08)
8.	a)	Draw the circuit for simple SR-Latch using NOR gates and explain its operation with functional table and timing diagram.	CO3	(06)
	b)	Differentiate between microprocessor and microcontroller.	CO3	(06)
	c)	Discuss the architectural features of 8051 microcontroller with applications.	CO3	(08)

UNIT-V

9.	a)	Explain the need for modulation? Illustrate with example.	CO3	(06)
	b)	Explain the principle and operation of LVDT with neat sketches.	CO1	(06)
	c)	Define Amplitude modulation (AM) and derive the necessary equation for AM.	CO5	(08)
10.	a)	Describe the operation of a photo-electric transducer with neat diagram.	CO1	(06)
	b)	Compare Amplitude Modulation with Frequency Modulation.	CO5	(06)
	c)	A carrier of 500W, 1MHz is amplitude modulated with sinusoidal signal of 1 KHz, depth of modulation is 60%. Calculate bandwidth, power in the sidebands and total power transmitted.	CO5	(08)

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