CBCS SCHEME

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BBEE103/203

First/Second Semester B.E/B.Tech. Degree Examination, Dec.2023/Jan.2024
Basic Electronics for EEE Stream

Time: 3 hrs. Max. Marks:100

Note: *1. Answer any FIVE full questions, choosing ONE full question from each module.*
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
1	a.	Explain the forward and reverse characteristics of pn–junction diode (consider a silicon semiconductor).	6	L2	CO1
	b.	With a neat circuit diagram and waveform, explain the working of Bridge rectifier.	6	L1	CO1
	c.	A 9.1V reference source in to use a series connected zener diode and a resistor of 1kΩ, connected to a 30V supply. Calculate the circuit current when the supply voltage drops to 27V. Assume I_{ZT} = 20mA. Also find the power dissipated in the resistor.	8	L3	CO1
		OR			
2	a.	Write a note on diode approximation, also calculate current in the circuit when a silicon diode connected in series with a resistor of 4.7KΩ is driven by a 15V dc supply.	6	L1	CO1
	b.	With necessary waveform and circuit diagram, explain how a RC π-filter work.	6	L1	CO1
	c.	Explain how Zener diode works as voltage regulator considering no-load and full-load conditions.	8	L2	CO1
		Module – 2			
3	a.	Considering a BJT common emitter circuit, explain how voltage amplification is obtained.	6	L1	CO2
	b.	With a neat circuit diagram, and characteristics graph, explain common base configuration of pnp transistor.	8	L1	CO2
	c.	Explain the drain and transfer characteristics of n-channel JFET.	6	L2	CO2
		OR			
4	a.	Explain how Q-point is obtained on a DC load line, considering a transistor base bias circuit.	6	L2	CO2
	b.	Explain common collector configuration of pnp transistor with neat circuit diagram and characteristics.	8	L2	CO2
	c.	With neat semiconductor model, explain how an enhancement type MOSFET works.	6	L1	CO1

		Module – 3			
5	a.	Define the following with respect to op-amp : i) Input offset voltage ii) Input bias current iii) CMRR iv) Slew rate.	**8**	**L1**	**CO2**
	b.	Explain the open loop differential amplifier circuit using op-amp. Mention the advantage of negative feedback in amplifier circuit.	**6**	**L2**	**CO2**
	c.	Derive output voltage equation for 3 input inverting summer using op-amp.	**6**	**L3**	**CO2**
		OR			
6	a.	Mention all the ideal op-amp characteristics.	**6**	**L1**	**CO2**
	b.	Design a non-inverting amplifier circuit using op-amp, if the gain of the amplifier in 10 and input voltage is 1V.	**6**	**L3**	**CO2**
	c.	Explain the working of op-amp connected as integrator, also draw the output waveforms.	**8**	**L2**	**CO2**
		Module – 4			
7	a.	Convert the following numbers : i) 141.6875_{10} = ———$_2$ ii) 125.076_8 = ———$_{16}$ iii) $41F.BD_{16}$ = ———$_{10}$.	**6**	**L3**	**CO3**
	b.	Find the complement of the functions : i) $F_1 = \bar{X}Y\bar{Z} + \bar{X}\bar{Y}Z$ ii) $F_2 = X(\bar{Y}\bar{Z} + YZ)$ Apply De-Morgan's theorem as many times as necessary.	**6**	**L3**	**CO3**
	c.	Define combinational circuit. Design a half adder and implement using NAND gates.	**8**	**L1**	**CO3**
		OR			
8	a.	Solve the following : i) Subtract using 10's complement 3250 – 72532 ii) Subtract using 2's complement 1010100 – 1000100.	**6**	**L3**	**CO3**
	b.	Express the Boolean function $F = XY + \bar{X}Z$ in product of maxterms form.	**6**	**L2**	**CO3**
	c.	Design a full adder and implement using basic gates.	**8**	**L3**	**CO3**

		Module – 5			
9	a.	A strain gauge with 40cm wire length and 25μm wire diameter has a resistance of 250Ω and a gauge factor of 2.5. Calculate the change in wire length and diameter when the resistance change is measured as 0.5Ω. Assume that the complete length of wire is strained positively.	**6**	**L3**	**CO4**
	b.	With a neat diagram, explain the working of LVDT. Also mention the applications of it.	**8**	**L1**	**CO4**
	c.	With a neat block diagram, explain the simple communication system.	**6**	**L1**	**CO4**
		OR			
10	a.	A parallel – plate capacitive transducer has a plate area ($l \times w$) = (40mm × 40mm) and plate spacing (d) = 0.5mm. Calculate the device capacitance and the displacement (Δd) that causes the capacitance to change by 5pF. Also, determine the transducer sensitivity.	**6**	**L4**	**CO5**
	b.	With neat diagram, explain potentiometer type resistive transducer. Also mention the applications of it.	**8**	**L1**	**CO5**
	c.	With a neat block diagram, explain AM superheterodyne receiver.	**6**	**L1**	**CO5**

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