PES University, Bangalore
(Established under Karnataka Act No. 16 of 2013)

August 2021: END SEMESTER ASSESSMENT- B.TECH. II SEMESTER

UE20EC101 –Electronic Principles and Devices

Time: 180 mins | Answer All Questions | Max Marks: 100

1.	a	Solve the following	6M
		(i) The knee voltage of a Si diode is 0.68V and its reverse saturation current is 15nA at 25°C. Determine knee Voltage at 40°C. (ii) The knee voltage of a Si diode is 0.69V and its reverse saturation current is 12nA at 28°C. Determine reverse saturation current at 43°C and 48°C.	
	b	Use Second approximation for a diode to determine the unknown values for the following.	7M
		(i) Determine I and V_o for the circuit shown in the Figure below. (ii) Determine I_D and V_0 for the circuit shown in the Figure below	
	c	A Ge diode has a reverse saturation current of 15µA at temperature 300K. Find diode current at 40°C using Shockley's equation, If the forward bias voltage is 0.27 volts.	7M
2.	a	With a neat diagram, explain the working principle of Full wave Rectifier with Centre tapped Transformer and derive the expression for V_{dc} and V_{rms}	7M
	b	Calculate the RMS value of the ripple voltage for the FWR if a 100µF Capacitor is connected to a load drawing 50mA of current .What is the dc voltage at the output if the peak rectified output voltage is 30V and frequency is 50Hz? Also find the ripple factor.	6M
	c	Determine the range of values of Vi that will maintain the Zener diode in the "on" state for the following Circuit.	7M

Circuit diagram: V_I with $R = 200\,\Omega$, current I_R, I_Z, I_L; Zener $V_Z = 18V$, $I_{ZM} = 60\,mA$; $R_L = 1k\Omega$, output V_L.

3.	a	Realize The following Logical gates using NAND Gates only (i) NOR (ii) XOR (iii) AND (iv) NOT	7 M
	b	With Characteristic Table and a neat circuit Diagram using ONLY NAND Gates, explain JK Flip flop.	6 M
	c	Define shift register. Draw the circuit diagram for 4-bit shift register. If the initial values of all the flip-flops are at logic zero and the data input given serially is 0001011 (LSB first), Find the states of the register for seven clock pulses.	7 M
4.	a	With a neat diagram, explain the Input and output V-I characteristics of PNP Common Base BJT. Find the value of α and I_B, if $I_E = 1.32mA$ and $I_C = 1.11mA$.	7M
	b	With a neat block diagram, explain Communication System.	7M
	c	With respect to Cellular Communication, define Cell. What are the Principles of Cellular Communication? Explain	6 M
5	a	Give the Differences between: (i) Second Generation Embedded System and Third Generation Embedded System (ii) General Purpose Computing system and Embedded Systems (iii) RAM and ROM (iv) Microprocessor and Microcontroller	8M
	b	Explain the Data Flow Model of ARM Processor with a neat diagram.	8 M
	c	With examples illustrate the usage of embedded systems for the following Applications. 1. Consumer electronics 2. Health care 3. Home automation 4. Automotive industry	4 M