Printed Pages:03 **Sub Code: KEC101T**

Paper Id: 233103 **Roll No.** | | | | | | | | | | |

B. Tech.
(SEM I) THEORY EXAMINATION 2022-23
EMERGING DOMAIN IN ELECTRONICS ENGINEERING

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If you require any missing data, then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2*10 = 20**

(a)	What is PIV of Half wave and Full wave bridge rectifier.
(b)	Calculate the reverse saturation current of a diode if the current at 0.4V forward bias is 0.2 mA at room temperature and the ideality factor is 2.
(c)	How FET differs from the BJT?
(d)	Calculate the value of transconductance (gm) for a JFET, I_{DSS}=12mA,$V_P = -3V$ at a bias point of $V_{GS} = -2V$
(e)	What is the difference between microprocessor and microcontroller?
(f)	The output of a particular OPAMP increases 10V in 15µs. What is the slew rate?
(g)	Write down the truth table of 3 input X-NOR gate.
(h)	State De Morgan's Law.
(i)	A broadcast radio transmitter radiates 15KW when the modulationpercent is 70. How much is the career power?
(j)	Define Satellite communication.

SECTION B

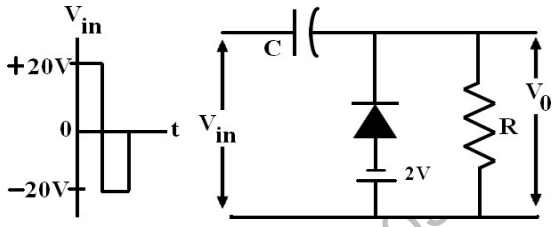
2. Attempt any *three* of the following: **10*3 = 30**

(a)	(i) Write short notes on: LED and LCD. (ii) Define the various components of IOT system with neat blockdiagram.
(b)	Draw and explain the common emitter (CE) circuit of a bipolar junction transistor. Sketch its output and input characteristics. Indicate the region of operation on output characteristics.
(c)	Explain unity gain OP-AMP. With suitable circuit diagram obtain the expression for integrator and differentiator OP-AMP.
(d)	(i) $(BDA.C)_{16} = (\ )_{10}$ (ii) $(1110111)_2 = (\ )_8$ (iii) Perform $(1011)_2 - (101)_2$ using 2's complement method. (iv) $(225)_X = (341)_8$, Find the value of X.(v) $(78.25)_{10} = (\ )_2$
(e)	(i) Explain the amplitude modulation. Obtain an expression for an AM wave sinusoidal modulation.

	(ii) The antenna current of an AM broadcast transmitter, modulated to adepth of 40 percent by an audio sine wave, is 11A. It increases to 12A as a result of simultaneous modulation by another sine wave. What is the modulation index due to second wave.

SECTION C

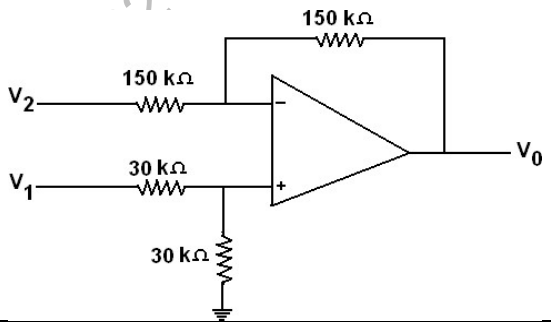
3. Attempt any *one* part of the following: 10*1 = 10

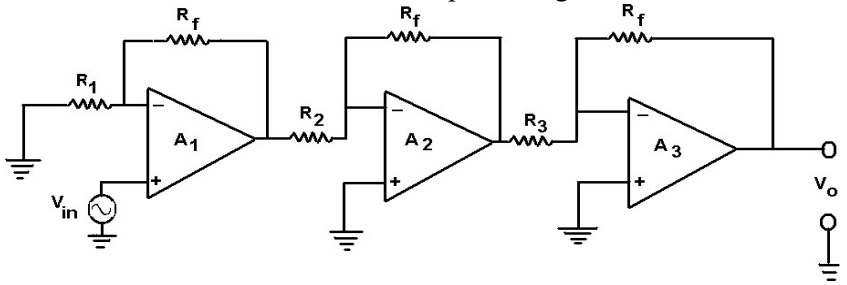
(a)	(i) Draw the circuit diagram and explain the working of a full wavebridge rectifier circuit. (ii) Define Static and Dynamic resistance of PN junction diode? Obtain the mathematical expression for the Dynamic resistance (r_{ac}).
(b)	(i) Draw and explain the operation of center tapped full wave rectifierwith input and output waveforms. Calculate ripple factor. (ii) Determine the output V_0 for the given network. 

4. Attempt any *one* part of the following: 10 *1 = 10

(a)	Explain construction, working and characteristics of n-channelDepletion MOSFET. Distinguish between D-MOSFET and E-MOSFET..
(b)	What is voltage multiplier? Draw and explain the circuit diagram of halfwave voltage Doubler. How can you construct voltage Tripler and Quadrupler?

5. Attempt any *one* part of the following: 10*1 = 10

(a)	(i) Define an operational amplifier? Draw its block diagram. Draw thetransfer characteristics. (ii) Determine the output voltage (Vo) for the given circuit, where. V_1= 10V and V_2 = 5V 

(b)	(i) Enlist the characteristics of OP-AMP. Obtain the expression forvoltage gain in non-inverting OP-AMP. (ii) Calculate the output voltage for the given circuit, resistance value ifRf= 470KΩ, R1=R2=R3=33KΩ for input voltage of 5mV. 

6. Attempt any *one* part of the following: 10*1 = 10

(a)	(i) What are universal Gates. (ii) Construct the two input XOR gate by using only NAND gates
(b)	Simplify the given expression and implement this NOR gate only.F (A, B, C, D) = Π (1,3,4,5,6,7,11,12,14,15).d(2,9,10,13)

7. Attempt any *one* part of the following: 10*1 = 10

(a)	An Audio frequency signa10 Sin 2π×400t is used to amplitude modulate a carrier of 50 sin 2π×105 t. Calculate: (i)Modulation Index (ii)Amplitude of each side band (iii) Total power delivered to the load of 1KΩ (iv) Bandwidth (v) Transmission efficiency
(b)	(i) Sketch the block diagram of communication systems and explainthe function of each system. (ii) Explain the evolution of mobile communication.