R22 Regulation *Subject code:4E4DC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech IV Semester Regular/Supplementary Examinations, June 2026

PULSE AND DIGITAL CIRCUITS

(ECE)

Maximum Marks: 60 Date:12.06.2026 Duration: 3 hours

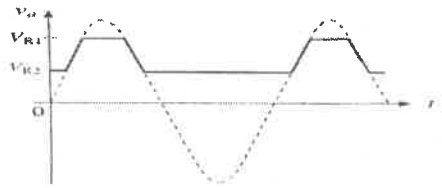
Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	Bloom Tx
1.a)	Illustrate the relationship between Rise Time and Time Constant of an RC circuit?	1M	1	L3
b)	A 5 KHz square wave output from an amplifier has tilt=10%. Determine the lower 3- dB frequency.	1M	1	L3
c)	Which kind of a clipper is called a slicer circuit?	1M	2	L2
d)	Why is a clamper called a dc inserter?	1M	2	L2
e)	Mention any two differences between Bootstrap sweep circuit and Miller sweep circuit?	1M	3	L2
f)	Define Rise time & fall time of a transistor switch?	1M	3	L2
g)	Distinguish between Symmetrical and Asymmetrical Triggering Methods	1M	4	L2
h)	Write any two methods to eliminate the Hysteresis in Schmitt Trigger?	1M	4	L2
i)	Draw the two input OR gate using diodes.	1M	5	L3
j)	Write the basic principle of a Sampling Gate.	1M	5	L2

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	a) Analyze the Frequency Response of High Pass RC circuit when input is Sinusoidal signal and relate the Time constant and lower cut off frequency? b) A 10Hz square wave is fed to an amplifier. Calculate and plot the output waveform under the following conditions: The lower 3dB frequency is i)0.3Hz ii)3 Hz iii)30Hz.	5M 5M	1	L3
	OR			
3	a) Prove that the expression for the percentage tilt of a square wave output of a High pass RC circuit is given by $P=\frac{1-e^{-1/2fRC}}{1+e^{-1/2fRC}}\times 200\%$. If the tilt is small, show that this reduces to $P=\frac{T}{2RC}\times 100\%.\left[\frac{e^{\frac{1}{2fRC}-1}}{e^{\frac{1}{2fRC}+1}}\right]x200$	7M	1	L4

	b) With the help of necessary equations and waveforms explain the response of low pass RC circuit for ramp input.	3M		
4	a) Draw the circuit diagram of an emitter-coupled clipping circuit and draw its transfer characteristic indicating all intercepts, slopes and voltage levels? b) Explain the operation of negative clamper by applying sinusoidal wave as input and also explain with square input.	5M 5M	2	L3
	OR			
5	a) Construct a clipping circuit with ideal components, for the output waveform shown in figure. Apply sinusoidal input and assume ideal diodes.  b) State the clamping circuit theorem and analyze the practical clamping circuit?	5M 5M	2	L4
6	a) Explain transistor as a switch and transistor switching times. b) Explain how Miller time base generator produces negative voltage ramp with neat circuit diagram and waveforms?	5M 5M	3	L3
	OR			
7	Draw the circuit of simple current time-base generator and explain its operation with the help of neat waveforms and necessary equations.	10M	3	L3
8	Design fixed bias Bistable multivibrator using npn silicon transistor for the following specification: $V_{CC}=V_{BB}=10V$, $h_{fe(min)}=10$, $i_{c(sat)}=2mA$, $V_{CEsat}=0.2V$, $V_{BE\ sat}= 0.6V$.	10M	4	L4
	OR			
9	Define Upper Triggering Point (UTP) and Lower Triggering Point (LTP)? Derive the expressions for UTP and LTP of an emitter coupled Bistable Multivibrator circuit?	10M	4	L4
10	a) Explain operation of 4 Diode sampling gate. b) Verify the truth table of DTL NAND gate logic with circuit diagram?	5M 5M	5	L3
	OR			
11	a) Why totem pole is used in TTL? Examine the circuit diagram and explain TTL NOR gate with the help of truth table. b) With a neat diagram explain the operation of CMOS NAND gate?	5M 5M	5	L3