Code No: R22021                  **R10**                  SET - 1

**II B. Tech II Semester Supplementary Examinations, April-2018**
**PULSE AND DIGITAL CIRCUITS**
(Com. to EEE, ECE, ECC, BME, EIE)

Time: 3 hours                                                                 Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1.  a) Prove that for any periodic input waveform the average level of the steady
       State output signal of the RC high pass circuit is always Zero.
    b) Describe the step response of a RLC circuit for over-damped, critically damped and
       Under-damped cases. Obtain the expression for the output in each case. Also sketch
       the outputs.

2.  a) Explain the working of a two-level diode clipper with the help of circuit diagram,
       Input/output waveforms and transfer characteristics.
    b) State and prove clamping circuit theorem.

3.  a) Write briefly about transistor switching times. Explain how a transistor can be  used  as
       a switch and under  what  conditions  a  transistor  is  said  to be 'OFF'  and 'ON'
       Respectively?
    b) Compare DTL,TTL, ECL and CMOS logic  families  in  terms  of Fan out, propagation
       delay, power dissipation and noise immunity.

4.  a) Explain the procedure for calculating LTP and UTP in Schmitt trigger circuit.
    b) Discuss the applications of bistable multivibrator.

5.  a) A collector –coupled monostable multivibrator using n-p-n silicon transistors has   the
       following parameters. $V_{CC}$ = 12 V, $V_{BB}$ = 4 V, $R_C$ = 1 kΩ, $R_1 = R_2 = R$ = 15 kΩ,     $h_{FE}$ =35,
       $r_{bb'}$ = 220 Ω and C = 1000 pF. Neglect $I_{CBO}$. (i) Show that in the stable state one Transistor
       is **ON** and the other is **OFF**. (ii) Calculate and plot to scale the wave shapes at each base and
       collector. (iii) Find the output pulse width.
    b) Explain how an astable multivibrator can be modified to operate as a voltage controlled
       oscillator. Derive the expression for its frequency of oscillation and plot    the wave forms.

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6.   a)  Draw the circuit of simple current time-base generator and explain its operation with the help of neat waveforms and necessary equations. Also derive expression for sweep speed error ($e_s$), by considering the effect of internal resistance of inductor ($R_L$) and collector saturation resistance ($R_{CS}$) of the transistor.
     b) Write the basic mechanism of transistor television sweep circuit.

7.   a) Illustrate the terms synchronization and frequency division of a sweep generator.
     b) Explain how monostable multivibrator is used as frequency divider?

8.   Explain the operation of,
     a) Monostable transistor blocking oscillator (base timing) with a circuit diagram and wave Forms. Derive an expression for pulse width. What are the applications of blocking oscillators?
     b)  Describe the operation of Bidirectional sampling gate using two diodes and derive the   expression for gain, $V_{c(min)}$ and $V_{n(min)}$