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**SS**

B.Tech III Year I Semester (R09) Supplementary Examinations December 2015

**PULSE & DIGITAL CIRCUITS**

(Electronics and Communication Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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1 (a) A 10 Hz symmetrical square wave whose peak-to-peak amplitude is 2 V is impressed on a high-pass circuit whose lower 3dB frequency is 5 Hz. Calculate and sketch the output waveform.
(b) What is the peak to peak output amplitude of the above wave form?

2 (a) Give the circuits of different types of shunt clippers and explain their operation with the help of their transfer characteristics.
(b) Draw the diode comparator circuit and explain the operation of it when ramp input signal is applied.

3 (a) Explain the phenomenon of "Latching" in a transistor switch.
(b) A transistor has $f_T$ = 50 MHz, $h_{FE}$ = 40, $C_{b'c}$ = 3 pF and operates with $V_{CC}$ = 12 V and $R_C$ = 500 Ω. The transistor is operating initially in the neighborhood of the cut-in point. What base current must be applied to drive the transistor to saturation, in 1 μsec?

4 Design a collector-coupled monostable multivibrator to obtain an output pulse of amplitude 6 V and a gating time of 20 μsec, $I_{C(sat)}$ = 6 mA, the base drive required for the ON transistor is 2 times $I_{B(min)}$. Assume that $V_{CE(sat)}$ = 0, $V_{BE(sat)}$ = 0 & $h_{fe(min)}$ = 20.

5 (a) Why is bootstrap time base generator called so?
(b) What are the various methods of generating sweep voltage? Explain.

6 What is exponential sweep circuit? What are different types of exponential sweep circuits? Explain the operation of any one of the exponential sweep circuit.

7 (a) Define synchronization.
(b) A free running relaxation oscillator has sweep amplitude of 100 volts and a period of 1 msec synchronizing pulses are applied to the device such that break down voltage is lowered by 40 volts at each pulse. The synchronizing pulse frequency is 4 kHz. What is the amplitude and frequency of synchronized oscillator waveforms?

8 (a) Derive the expression for fan out in DTL.
(b) Compare TTL, MOS and CMOS.

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