Code: 13A04401

R13

B.Tech II Year II Semester (R13) Regular & Supplementary Examinations May/June 2016
PULSE & DIGITAL CIRCUITS
(Common to ECE and EIE)

Time: 3 hours   Max. Marks: 70

PART – A
(Compulsory Question)
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1   Answer the following: (10 X 02 = 20 Marks)
   (a)   What is meant by linear wave shaping?
   (b)   How can an uncompensated attenuator be modified as a compensated attenuator?
   (c)   List the applications of voltage comparators.
   (d)   State Clamping circuit theorem.
   (e)   What is the main advantage of an emitter-coupled monostable multivibrator over collector-coupled monostable multivibrator?
   (f)   What is meant by loading in a bistable multivibrator?
   (g)   Draw a current sweep circuit.
   (h)   Define the terms phase delay and phase jitter.
   (i)   List the applications of sampling gates.
   (j)   List the disadvantages of ECL.

PART – B
(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2   (a)   A ramp $V_i = \alpha t$ is applied as input to a low-pass RC circuit. Derive the expression for the output voltage. And also draw the typical waveforms.
   (b)   A 20 KHz square wave is applied to a RC differentiating circuit, with R = 4 KΩ, it produces the output with a tilt of 5%. Calculate the value of the capacitor and lower 3-dB frequency.

OR

3   (a)   Derive the expression for percentage tilt, 'P' when a square wave is input to a high-pass RC circuit.
   (b)   An oscilloscope test probe shown below has a cable capacitance of 50pF. The input impedance of oscilloscope is 1 MΩ in parallel with 5pF. Find the value of the capacitor for better performance.

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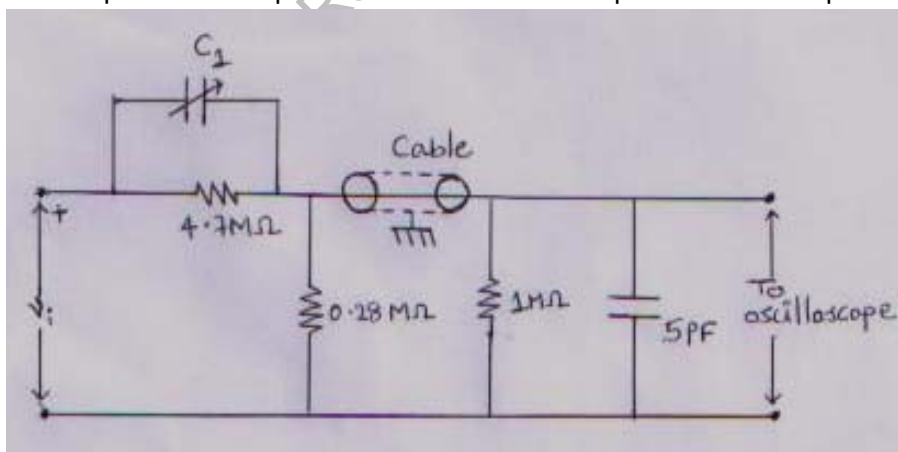
UNIT – II

4 (a) For the two-level clipper in Figure below, the input varies linearly from 0 to 150 V. Plot the transfer characteristic and obtain the output voltage. Assume ideal diodes.
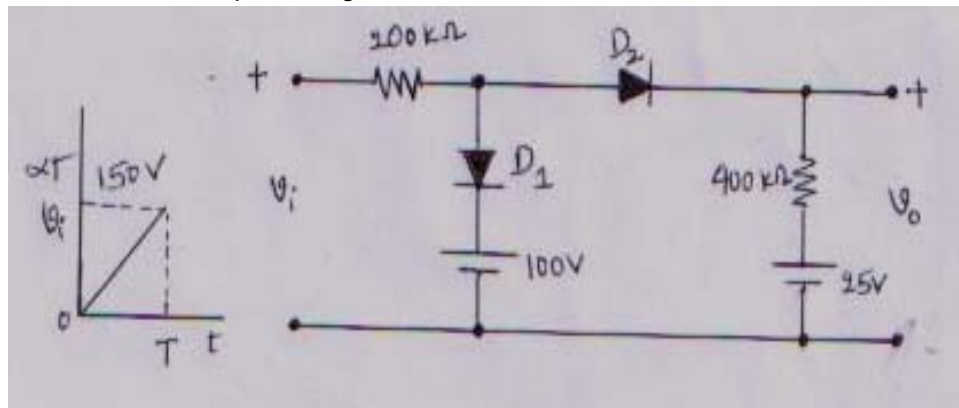

(b) What is meant by synchronized clamping?

OR

5 (a) Explain the effect of diode characteristics on clamping voltage.
   (b) Discuss any two applications of voltage comparators.

UNIT – III

6 In a Schmitt trigger circuit shown below, with two 7N4418 n-p-n epitaxial planar silicon transistors, the h_{FE} of the transistors is 70. The circuit is energized from a power supply voltage V_{CC} = 10 V. The resistors in the circuit are R_s = 3.3 KΩ, R_{c1} = 2.2 KΩ, R_{c2} = 820 Ω, R_1 = 1.8 KΩ, R_2 = 6.8 KΩ and R_e = 4.7 KΩ. Determine the two voltages associated with upper-tripping point and lower-tripping point.
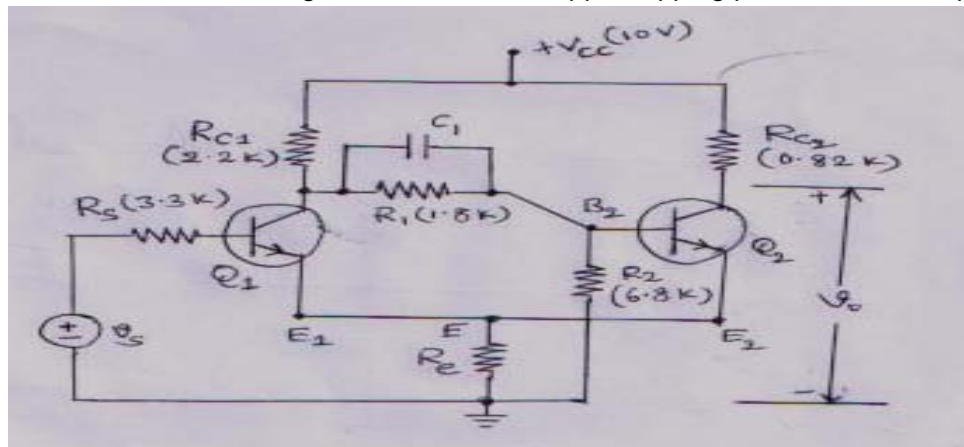
OR

7 (a) Draw and explain the operation of collector-coupled astable multivibrator.
   (b) Distinguish between symmetrical triggering and unsymmetrical triggering.

UNIT – IV

8 (a) Define the three errors that specify deviation from linearity.
   (b) Explain the basic principle of a bootstrap sweep generator. Draw the circuit and explain its operation.

OR

9 (a) Explain the synchronization of a sweep circuit with symmetrical signals.
   (b) Write a brief note on frequency division in a sweep circuit.

UNIT – V

10 (a) Draw the circuit of a bidirectional sampling gate and derive the expression for its gain.
    (b) Explain about reduction of pedestal in a gate circuit.

OR

11 (a) With a neat sketch explain the working of a DTL NAND gate.
    (b) Compare various logic families.

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