

**End Semester Examinations - 2015-16 Even Semester - May 2016**

**14EC2012 Pulse and Wave Shaping Circuits**

**Set A**

**Time : 3 hrs**  
**Total Marks: 100**

1. a) With neat circuit diagram and waveforms, explain the response of high pass filter to square wave input and find out the percentage of tilt. (15)
- b) A 10 kHz square wave is applied to a high pass RC circuit produces the output with a tilt of 3.8%. Calculate the lower 3dB frequency of the circuit. Determine the value of the resistance if the circuit uses a capacitor of 0.47 MicroFarad. (5)

**OR**

2. a) Justify that a High Pass RC circuit acts as a Differentiator. Derive the necessary conditions for the same. (6)
- b) Obtain the response of a RC low pass filter for a step input and derive the expression for rise time  $t_r$  in terms of upper 3-dB frequency  $f_2$ . (14)
3. a) Sketch and describe the operation of the following clipping circuits. (12)
- i) Series Positive Clipper with bias
- ii) Parallel Negative Clipper with bias
- b) Describe the issues of an uncompensated attenuator. How does the response of this circuit differ from that of an ideal attenuator? Find the condition for compensating the attenuator? (8)

**OR**

4. a) State and mathematically prove clamping-circuit theorem. (8)
- b) With an example, explain the working of positive and negative clamper. (12)
5. a) Calculate the stable state currents and voltages for the fixed bias bistable multivibrator circuit which uses npn silicon transistors. The component values of the circuit are  $V_{CC} = +12\text{ V}$ ,  $-V_{BB} = -8\text{ V}$ ,  $R_1 = 10\text{ K}\Omega$ ,  $R_2 = 50\text{ K}\Omega$ ,  $R_C = 2.2\text{ K}\Omega$  and  $h_{FE} = 30$ . Assume  $V_{CE(sat)} = 0.2\text{ V}$  and  $V_{BE(sat)} = 0.7\text{ V}$ . (14)
- b) Write short notes on Commutating Capacitor. (6)

**OR**

6. a) Discuss the operation of Schmitt trigger with neat circuit diagram and explain how it is used as a sine to square wave converter. (12)
- b) Write short notes on different triggering of Bistable Multivibrator. (8)
7. a) Derive the expression for the gate width of a collector coupled monostable multivibrator when the transistor  $Q_1$  is in saturation. (7)
- b) Explain the operation of free running multivibrator with neat circuit diagram and waveforms. (13)

**OR**

8. a) Define voltage timebase generator. List the different methods used to generate voltage timebase waveform and mention its applications. (6)
- b) Describe the exponential Sweep circuit with neat circuit diagram and derive the mathematical relationship between slope error, displacement error and the transmission error for an exponential waveform. (14)
9. a) How is a pulse transformer different from a conventional transformer? Write some of the important

features and applications of Blocking Oscillator. (6)

b) With neat diagrams, explain bootstrap sweep circuit and obtain the expressions for slope error. (14)

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**Wishing you All the Best**

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