Wave Shaping Techniques. 22/5/07.

Con/2653–07. (REVISED COURSE) ND–8172

Library (3 Hours) [Total Marks : 100

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from **Q. Nos. 2 to 7.**
(3) Assume **suitable** data wherever **necessary**.
(4) Draw **neat** sketches/circuits to support your answers.
(5) **Figures** to the **right** indicate **full** marks.

1. (a) Explain constant current sweep generator using BJT in CB configuration. Derive the sweep speed (ss) and sweep amplitude (Vs). **10**
   (b) Draw and explain the working of practical transistorised boot strap Time-base generator with its voltage and current waveform. **10**

2. (a) Draw the circuit of a schmitt trigger using 555 timer and explain its operation with the input output waveforms. **8**
   (b) In astable multivibrator using 555, for $R_A = 6.8\ k\Omega$; $R_B = 3.3\ k\Omega$ and $C = 0.1\ \mu f$ Calculate – (i) t_{High} (ii) t_{Low} (iii) free running frequency and (iv) Duty cycle 'D'. **4**
   (c) Derive the expression of time delay of a monostable multivibrator. Discuss any one application of timer in monostable mode. **8**

3. (a) Draw the block diagram of IC 566 VCO and explain it's operation. What is the range of modulating input voltage applied to VCO. **10**
   (b) Solve the following differential equation by analog computer simulation – **10**

$$\frac{d^2y}{dt^2} + 5{\cdot}4\frac{dy}{dt} + 0{\cdot}58y = u(t)$$

with initial conditions :

$y(0) = -4{\cdot}8$ and

$$\left.\frac{dy}{dt}\right|_{t=0} = \dot{y} = 2{\cdot}3$$

4. (a) What are the limitations of three terminal regulator. How those can be overcome by IC 723 ? Explain the remedies with functional diagram of IC 723. **10**
   (b) How fixed three terminal regulator can be used as adjustable regulator ? Specify suitable component values to get $V_0 = 7.5V$ in adjustable regulator circuit using IC 7805; where $I_Q = 4{\cdot}2$ mA and $I_{R_1} = 25$ mA. **10**

5. (a) Explain with circuit diagram, working of OP– Amp as monostable multivibrator with the waveforms of triggering signal, capacitor waveform and output waveform. **10**
   (b) State the types of DACs depends on resistive techniques. Explain the working of one of them in details. **10**

6. (a) Draw the functional diagram of IC 8038. Explain and give it's frequency of oscillation at output. **10**
   (b) Explain the operation of Dual–slope ADC. Give the conversion time for the Dual–slope ADC. **10**

7. Short notes on any **four** : **20**
   (a) Analog MUX and D EMUX
   (b) XR – 2206
   (c) UJT sweep generator circuit
   (d) SMPS
   (e) Sample and Hold circuit
   (f) Frequency Divider using 555.