NI-102

November-2013

B.Sc. Sem.-III

ELE-202 : Electronics

Time : 3 Hours] **[Max. Marks : 70**

Instructions : (1) **All** questions carry equal marks.

(2) Symbols used have their meanings as usual.

1. (a) If a T section is interposed between a generator having internal impedance Z_{1i} and a load impedance Z_{2i}, explain image impedance matching giving suitable circuit and show **7**

$$Z_{1i} = \sqrt{Z_{1oc}\, Z_{1sc}} \quad \text{and} \quad Z_{2i} = \sqrt{Z_{2oc}\, Z_{2sc}}$$

(b) Explain how magnetically coupled circuit can be replaced by equivalent impedance transforming T network. **7**

OR

(a) Explain reactance L-section for impedance transformation assuming $R < R_{in}$ and show values of C and L for desired R_{in} for L-section are **7**

$$C = \frac{1}{WR_{in}} \sqrt{\frac{R_{in}}{R} - 1} \quad \text{and } L = \frac{R}{W} \sqrt{\frac{R_{in}}{R} - 1}$$

R_{in} is desired load for generator

(b) With necessary circuit explain transformation of impedances using iron core transformer using ideal transformer properties and show, **7**

$$Z_{1in} + (R_L + jWL_L)\frac{L_1}{L_2} \quad \text{and hence } Z_{1in} + a^2 Z_L.$$

$$a = \text{turns ratio} = \frac{N_1}{N_2}$$

2. (a) What do you understand by wave shaping ? Explain : **3**

   (i) Linear wave shaping

   (ii) Non-linear wave shaping

   (b) Give high pass R.C. circuit response to square wave input. **7**

   (c) A 10 KHz square wave having T = 5μsec and overall amplitude of 10 volt is applied to a differentiating circuit in which R = 10 kΩ and C = 1000 μF. Determine the tip values V_1, V_2, $V_1{}^1$ and $V_2{}^1$ of the output wave form. **4**

<div align="center">OR</div>

   (a) What do you understand by filters ? Explain : **6**

   (i) neper and

   (ii) decibel

   (b) Suppose output of a network is 2 watt and under changed condition the output is 3.2 watt then by how many decibels will the output change to ? **3**

   (c) What is known as symmetrical network ? If a symmetrical T network is terminated into image impedance where characteristic impedance is Z_o then show **5**

$$Z_{OT} = \sqrt{Z_1 Z_2 \left(1 + \frac{Z_1}{4Z_2}\right)}$$

3. (a) Give circuit diagram and truth table for full adder. **7**

   (b) Give brief account on Adder-subtractor with necessary diagram. **7**

<div align="center">OR</div>

   (a) Give mono-stable operation of timer 555 with functional diagram and explain using timing pulses.

   In a monostable multibrator R = 100 kΩ and the time delay T = 100 ms. Calculate value of C. **7**

   (b) Give circuit diagram for pulse forming circuit using two monostables 74123. If input to the circuit is 100 KHz square wave and it is desired to produce a 1 μs pulse 2 μs after every positive transition of the input then find out proper timing capacitor values. Given that both timing resistors are set at 500 Ω. **7**

4. (a) Give traditional block diagram of a computer and explain function of each block in brief. **7**

(b) Define following terms : **7**

(i) instruction

(ii) machine language

(iii) assembly language

(iv) compiler

(v) interpreter

(vi) operating system

(vii) assembler

OR

(a) Give five functional categories of 8085 instructions. **7**

(b) Give example of each **7**

(i) 1-byte instruction

(ii) 2-byte instruction and

(iii) 3-byte instruction

5. Answer the following questions in **one** sentence : **14**

(1) What is meaning of positive edge triggered circuit ?

(2) What is dynamic input indicator ?

(3) What is meaning of hysteresis when applied to Schmitt trigger ?

(4) What is duty cycle ?

(5) What are the modes of operation of a timer ?

(6) What is full form of ALU ?

(7) How many bits are contained in a byte ?

(8) What is cut off frequency in terms of R and C in case of high pass R-C circuit ?

(9) What is a square wave ?

(10) Give full form of BCD.

(11) Is it true that instruction has two parts op-code and operands ?

(12) What do you understand by impedance transformation ?

(13) What is Weber-Fechner law ?

(14) Two voltages or currents differ by on neper when one of them is e times as large as the other. Is it true ?

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