* V K - 3 0 0 8 / 1 5 0 *

Printed Pages : 3 EC-507

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 3008 Roll No. | | | | | | | | | | |

B. Tech.

(SEM. V) EXAMINATION, 2007-08

DIGITAL CIRCUITS

Time : 2 Hours] *[Total Marks : 50*

*Note : Attempt **all** questions.*

1. Answer any **four** parts from the following **six** : 4×4

   (a) Explain with the help of wave forms, how a high pass circuits can be used to trigger flip-flop.

   (b) A square wave with peak to peak amplitude of 2V is applied to integrator. The time constant is equal to half time period of input wave. Find peak to peak value of output waveform. Draw the suitable circuit diagram and output waveform.

   (c) Explain the switching characteristic of a semi-conductor diode. If the current flowing through a p-n junction diode increases ten times, what is the increase in diode voltage ? Assume forward biased silicon diode operating at room temperature.

   (d) Why switching speed of a BJT is limited ? How a Scottkey transistor can improve it ?

   (e) Define the threshold voltage of an MOS device. Why CMOS use in digital circuit is advantageous ?

   (f) What is tristate logic ? Explain the working of Tristate logic with the help of circuit diagram of TSL invertor.

2. Answer any **two** parts from the following **three** : 6×2

(a) Draw the circuit diagram of three input TTL NAND gate to drive N similar gate and explain the working.

(b) Draw the circuit diagram of a 4 bit bidirectional shift register and explain the working operation.

(c) Design a synchronous counter for a given count sequence with the help of J-K flip-flop. The count sequence is as follows :

0, 5, 3, 4, 7, 1, 6 and repeats.

3. Answer any **two** parts from the following **three** : 5×2

(a) Implement the Boolean function F (A,B,C,D) = $\sum m$ (0,2,4,5,7,9,11,12,14) with an 8×1 multiplexer with A,B,D connected to selection lines S_2, S_1 and S_0 respectively and variable C is connected as input.

(b) What is the difference between RAM and ROM ? What function does each serve in a computer system ?

(c) With the help of circuit diagram explain the working of monostable multivibrator circuit. Give its waveform. What is the function of commutating capacitors?

4. Answer any **two** parts from the following **three** : 6×2

(a) Determine the frequency of oscillation for the 555 timer in given fig. 1, given $R_A = R_B = 47\ k\Omega$ and C=1000 pf. Calculate the ON time and OFF time of the output waveform. Also find out the duty cycle of the output waveform.

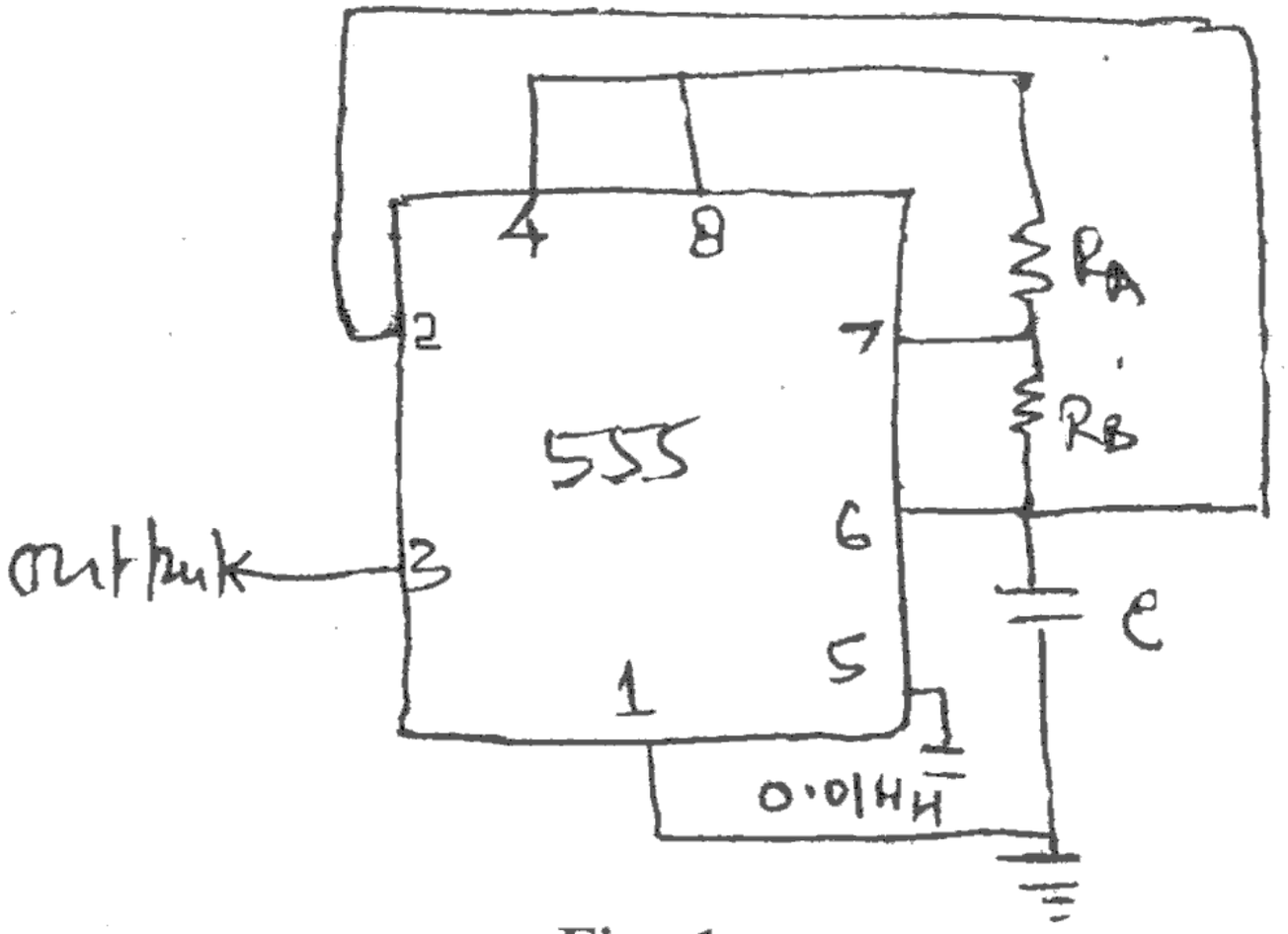

Fig. 1

(b) Draw the circuit and through table of a normally open Tristate switch. Compare the characteristics of ECL with TTL and give their area of application.

(c) Write short notes on the following :

(i) Schmitt trigger

(ii) Integrator and compensated attenuator.