B.Tech. – VIEP – ELECTRONICS AND COMMUNICATION ENGINEERING (BTECVI)

Term-End Examination

OO153   June, 2018

BIELE-012 : ELECTRONIC SWITCHING CIRCUITS

Time : 3 hours   *Maximum Marks : 70*

Note : *Attempt any* ***seven*** *questions. All questions carry equal marks. Assume missing data, if any. Use of scientific calculator is permitted.*

1. A sequential circuit has one flip-flop, Q; two inputs, x and y; and one output, S. It contains a full adder circuit connected to a D flip-flop, as shown in Figure 1.
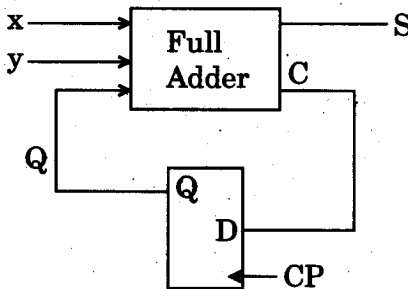

Figure 1

   Derive the state table and state diagram of the sequential circuit.   *10*

2. What is the difference between a serial and a parallel transfer ? Explain how you can convert serial data to parallel and parallel data to serial. What type of register is needed in each case ?   *10*

3. Draw the logic diagram of a 4-bit binary ripple down counter using the following :

   (a) Flip-flops that trigger on the positive-edge transition of the clock.   *5*

   (b) Flip-flops that trigger on the negative-edge transition of the clock.   *5*

4. (a) Explain the operation of A-D converter.   *5*

   (b) What do you understand by universal shift register ? Explain the working principle of a 4-bit universal shift register.   *5*

5. What is meant by pulse mode sequential circuit ? Give an example of the same. How is it different from fundamental mode sequential circuit ?   *10*

6. (a) Explain the difference between asynchronous and synchronous sequential circuits.   *5*

   (b) Define fundamental-mode operation.   *5*

7. Draw the logic diagram of the Product of Sum expression :

   $$y = (x_1 + x'_2)(x_2 + x_3).$$

   Show that there is a static 0-hazard where x_1 and x_3 are equal to 0 and x_2 goes from 0 to 1. Find a way to remove the hazard by adding one more OR gate.   *10*

8. (a) Write the properties of symmetric functions. *5*

(b) What do you mean by static hazard ? Explain with suitable example. *5*

9. Write short notes on any *two* of the following : *2×5=10*

(a) Analysis and Synthesis of Contact Networks

(b) FSM

(c) Generation of Spikes