2021
B.A./B.Sc.
Third Semester
CORE – 7
PHYSICS
Course Code: PHC 3.31
(Digital Systems & Applications)

PART–B
Total Mark: 30

Answer the following questions.

1. (a) Explain the transistor as a switch. Design an OR gate by using the transistors as a switch. 2
   (b) Show that NOR gate is a universal building block. 2
   (c) Construct a 3 input EX-OR gate and show it as an odd and even parity checker. 2

2. (a) Reduce the following Boolean expression using the K-Map:
   $F(A,B,C,D) = \sum(1,3,4,5,6,7,12,13)$ 3
   (b) Explain a circuit diagram of a 4-bit binary adder. Verify the circuit for the following operation: 1110 + 1001 2+1=3

3. (a) Define the term "race around condition". Explain how this condition is avoided with the help of master-slave J-K flip flop. For a given clock, draw the output waveform for a J-K flip flop in a toggle mode. 2+1=3
   (b) With the help of a circuit diagram explain how a 3-bit data in a serial mode is transferred serially. 3

4. (a) What is the difference between synchronous and asynchronous counter? 2
   (b) Design a 4-bit asynchronous (ripple) counter. Show the output waveform of each stage. Construct a truth table for counting the clock pulse. 4

5. (a) What are the various registers in 8085? Explain the function of Program Counter and Stack Pointer. 2
   (b) Explain 1-byte, 2-byte and 3-byte instruction for 8085 μP, with one example each. 2
   (c) What are the different modes of data addressing? Give example of each mode. 2