Bangladesh Army University of Science and Technology

Department of Computer Science and Engineering

Final Examination, Fall 2018 — **Level-2 Term-II**

Course Code: CSE 2205 — **Course Title: Digital Electronics and Pulse Technique**

Time: 03 (Three) hours — **Full Marks: 210**

N.B. (i) Answer any three questions from each PART (ii) Use separate answer script for each PART
(iii) Marks allotted are indicated in the margin (iv) Symbols have their usual meanings

PART A

(Answer any three questions)

1. a) What is Digital Electronics? Write down five advantages of Digital Electronics. **5+10**

b) Define Transistor. How NPN Transistor can work as a Switches. Describe its Operation **5+10**

c) Draw the basic circuit of a 2-input diode AND gate, and explain why. **5**

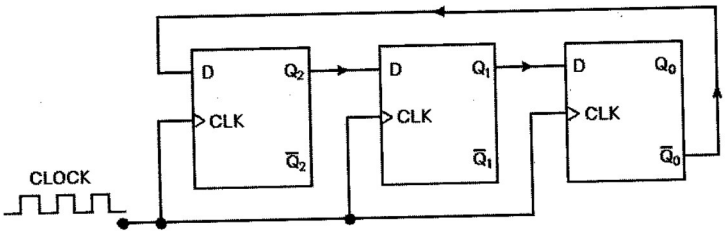
2. a) Write down classification of Digital logic families in a block diagram. **10**

b) Briefly explain the operation of TTL NOR gate and CMOS OR gate. **5+5**

c) What is Flip-flops? Differentiate latches from flip-flops? Why latches are introduced? **5+10**

3. a) Define the terms: (i) propagation delay, (ii) fan-in, (iii) fan-out and (iv) Noise margin **12**

b) Describe the operation of the following circuits diagram: **8**



c) What is a Counter? Design a 3-Bit Synchronous Counter from excitation and truth table of J-K flip-flop. **3+12**

4. a) What is Universal Shift Register? Why is it used? **5**

b) Describe 4-bit universal shift register operation with block diagram. **10**

c) Write short notes on : (i) ROM, (ii) PAL and (iii) PLA **15**

d) Draw the PLA circuit diagram for the following equations **5**

F1=AB+BC+AC

F2=(AB+A'B')'

PART B

(Answer any three questions)

5. a) State the purpose of ADC and DAC. **10**

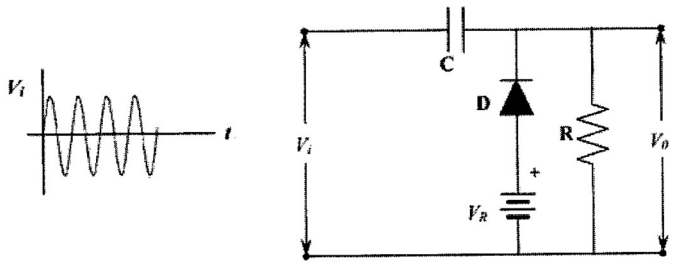
b) Why PCM is used? Describe the steps of PCM with appropriate diagram. **20**

c) Explain the operation of a 4-bit R-2R ladder DAC. **5**

6. a) Define and describe Clipper and Clamper with Circuit diagrams. **10**

b) What if filter? Describe operation of RC low pass filter where RC>>T and RC high pass filter where RC<<T with circuit diagrams and expected output wave shapes. **5+10**

c) Draw the output wave to the circuit shown in the figure below: **10**

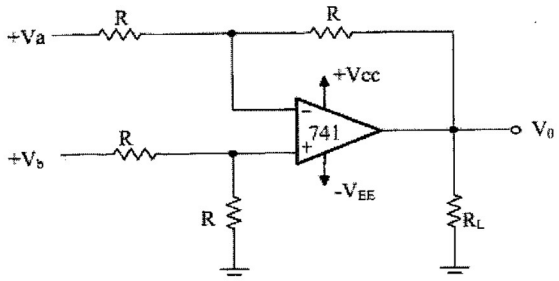


7. a) What do you mean by Multivibrator? Describe astable Multivibrator with circuit diagram. **5+10**

b) Define oscillator. Write its classification and application areas. **5+5**

c) What are the features of a Schmitt trigger? Represent a scenario where Schmitt trigger performs better than a normal comparator. **10**

8. a) What is Op-amp? Describe the operation of the following circuit diagram. **5+5**



b) What is V_{out} for summing amplifier and averaging amplifier if the input voltage are +5.0V, -3.0V and +4.5V and all resistors are 10kΩ. **10**

c) Calculate the input voltage V_{in} , if UTP=2.5, LTP=1.0 and V_{SAT}=12V. **9**

d) Write down uses and advantages of pulse transformer. **6**