

**B. Printing Engineering 2<sup>nd</sup> Yr. 1<sup>st</sup> Sem. Supplementary Exam – 2017**

Subject: Printing Electronics

Time: 3Hr.

Full Marks: 100

Answer any 4 questions

1. a) Discuss the binary, octal and hexadecimal number systems. Also convert  $(567)_{10}$  to those number system representations. 9  
 b) Add +39 and -20 using 2's complement method. 3  
 c) Realize the circuit diagram of a full adder using logic gates. 10  
 d) What are the universal gates and why are they called so? 3
  
2. a) Briefly write about Karnaugh map and simplify the following expression using the same.  

$$F(a, b, c, d) = \sum m(1, 3, 5, 7, 9, 12, 13, 15)$$
 15  
 b) Realize a JK Flip-flop using SR flip-flop and other necessary logic circuits. 10
  
3. a) Write about commutative, associative and distributive properties of Boolean algebra with suitable examples. 12  
 b) Simplify the following expression using laws of Boolean algebra.  

$$F = AB + \overline{AC} + \overline{ABC}(AB + C)$$
 8  
 b) Explain the principle of duality with suitable example. 5
  
4. a) Realize the function of a full subtractor using a suitable decoder. 12  
 b) Realize the following logic functions using PLAs 13  

$$f_1 = A.B.\overline{C} + \overline{A}.\overline{B}.\overline{C}.D$$
  

$$f_2 = A + \overline{B}.C.D$$
  

$$f_3 = \overline{A}.B + C.D + \overline{B}.\overline{D}$$
  

$$f_4 = f_1 + A.\overline{C}.D$$
  
5. a) Discuss different kinds of ROMs. 12  
 b) What is meant by sequential circuit? 3  
 c) Write the differences between a synchronous counter and an asynchronous counter. 5  
 d) What are fan in and fan out of logic gate? 5
  
6. a) Realize  $Y = A + BC\overline{D}$  using NAND gates. 5  
 b) Briefly write about working principle of 3-to-8 Decoder. 10  
 c) Briefly write on successive approximation type A/D converter. 10