

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2018**

DIGITAL CIRCUITS

[Time : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I Answer *all* questions in one or two sentences. Each question carries 2 marks.

1. What is meant by base of a number system.
2. Define power dissipation.
3. How does a flip flop acts as a memory element.
4. Define Resolution of Digital instrument.
5. Define monotonicity of D/A converter. (5×2 = 10)

PART — B

(Maximum marks : 30)

II Answer any *five* of the following questions. Each question carries 6 marks.

1. Convert
 - (a) $(55.3125)_{10} = (\text{-----})_2$
 - (b) $(4657)_8 = (\text{-----})_{16}$
 - (c) $(25F)_{16} = (\text{-----})_{10}$
2. Explain with the help of circuit diagram the operation of a TTL inverter.
3. What are sequential logic circuits ? Distinguish between asynchronous and synchronous sequential logic circuits.
4. Explain the operation of serial in parallel out shift registers with logic block symbol.
5. What is a half adder ? Give its truth table and realise it using NAND gate alone.
6. Define the terms :

(a) byte	(b) nibble
(c) capacity of a memory	(d) non-volatile memory
7. Explain the operation of single slop A/D converter. (5×6 = 30)

PART — C

(Maximum marks : 60)

(Answer one full question from each unit. Each full question carries 15 marks.)

UNIT — I

- III (a) Solve the following.
- (i) $1000 - 1010$ (using 2s compliment method)
 - (ii) $110011 \div 1100$
 - (iii) 11.01×11.1 (3 × 2 = 6)
- (b) Simplify the expression $AB + \overline{AC} + \overline{ABC} (AB + C)$ 9
- OR
- IV (a) Simplify the Boolean function $F(A,B,C,D) = \Sigma_m (1, 3, 7, 9, 11, 13) + \Sigma_d (0, 6, 12)$. 7
- (b) (i) $84_{16} - 2A_{16} = (\dots\dots\dots)_{16}$ 2
 - (ii) State the demorgan's theorem. 2
 - (iii) Simplify $\overline{AB} (\overline{A} + C) + \overline{AB}(A + \overline{B} + \overline{C})$ 4

UNIT — II

- V (a) What is full adder ? Give its truth table and realize it using NOR Gate alone. 8
- (b) Explain the working of 4×1 multiplexer. Write its truth table and sketch its logic diagram. 7
- OR
- VI (a) What is an encoder ? Explain the working of decimal to BCD encoder. Write its truth table and sketch its logic diagram. 8
- (b) Explain the working of Look - Ahead carry adder (2bit). 7

UNIT — III

- VII (a) Explain edge triggered JK flipflop with help of truth table. 8
- (b) What is a shift registers ? List its various types. Explain the working of serial in serial out shift register with logic diagram. 7

OR

- VIII (a) What is modulus of counter ? Draw and explain mod-12 asynchronous counter. 8
- (b) Explain SR flipflop with help of truth table. 7

UNIT — IV

- IX (a) Distinguish between ROM and RAM. 8
- (b) Explain the working of successive approximation A/D Converter. 7

OR

- X (a) State the properties of RAM. Draw and explain the circuit of a typical RAM cell. 8
- (b) Explain the working of R-2R ladder DAC with a neat sketch. 7