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(Revision – 2015/19)

A24 - 8631

Reg. No……
Signature …….

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, APRIL – 2024

DIGITAL CIRCUITS

[Maximum Marks: **100**] [Time: **3** Hours]

PART-A

[Maximum Marks: **10**]

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

1. Define radix of a number system.
2. Define speed power product.
3. Define modulus of counter.
4. Define sensitivity of digital meters.
5. Define the resolution of a DAC. (5 x 2 = 10)

PART-B

[Maximum Marks: **30**]

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

1. Perform the subtraction using 2' s complement method.

   i) 10110110 -11010110 ii) $(BC)_{16}$ - $(AD)_{16}$

2. Solve- i) 1101.11 x 101.1 ii) Divide 110101 by 101
3. Explain the operation of 4-bit parallel binary adder.
4. Describe the operation of a 1-bit magnitude comparator.
5. Explain the operation of SR flip-flop.
6. Describe a serial-in- parallel-out shift register.
7. Compare RAM and ROM. (5 x 6 = 30)

PART-C

[Maximum Marks: **60**]

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

UNIT – I

III. a. Convert the following.

i) $(110110111.01111)_2 = (\ )_{16}$ ii) $(2EB7)_{16} = (\ )_{10}$

iii) $(2035)_8 = (\ )_{16}$ I v) $(205.5)_{10} = (\ )_2$ (8)

b. State and prove Demorgan's theorems. (7)

OR

IV. a. Minimize the expression f=Σ m(0,l,4,5,6,7,11,15)+d(10,14) using K-map and implement them in universal logic. (9)

b. Convert

i) 11011010 to GRAY code ii) 10101101 to BINARY iii) $(2314)_{10}$ to XS-3 code. (6)

UNIT – II

V. a. Explain the operation of TTL-NAND gate. (8)

b. Define a Half adder .Design a half adder and implement using NAND gate only. (7)

OR

VI. a. Describe the operation of Decimal to BCD encoder with logic circuit. (8)

b. Explain a 1:4-Demultiplexer with diagram. (7)

UNIT- III

VII. a. Explain the operation of Master-Slave JK flip-flop. (8)

b. Discuss a 4-bit Ring counter with timing diagram. (7)

OR

VIII. a. Design and implement a Decade asynchronous counter. (9)

b. List the applications of Flip-Flops. (6)

UNIT - IV

IX. a. Discuss about Successive Approximation type ADC. (8)

b. Explain briefly about various types of ROM. (7)

OR

X. a. Explain the operation of R-2R ladder type DAC. (9)

b. List various displays in digital meters and define sensitivity and resolution of digital meters. (6)

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