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TED (15) – 3133

(REVISION — 2015)

Reg. No. .....

Signature .....

THIRD SEMESTER DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY — APRIL, 2017

DIGITAL COMPUTER PRINCIPLES

(Common for CT and CM)

[*Time* : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I Answer the following questions in one or two sentences. Each question carries 2 marks.

1. List two universal gates.
2. Write two examples for non-weighted code.
3. Define a multiplexer.
4. List two types of sequential circuit based on timing of signals.
5. A group of 4 bits is called a ..... and group of 8 bits is called a .....

(5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. Convert the following SOP into Standard SOP.

   $Y = A + B'C$

2. Implement an X-OR gate using NAND gates.
3. Design and implement a 3-bit Binary to Gray code converter.
4. Write short note on D flip flop, draw the logic symbol and truth table for a D FlipFlop.
5. Draw a 3 bit asynchronous counter using T FlipFlop.
6. Describe the need of DAC and ADC in digital systems.
7. List and explain different types of ROMS.

(5×6 = 30)

Marks

PART — C

(Maximum marks : 60)

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

UNIT — I

III (a) Perform the following conversions.

(i) $(10110.0101)_2$ to hexadecimal (ii) $(F4B.11)_{16}$ to binary

(iii) $(26.24)_8$ to decimal (iv) decimal 85.25 to octal 8

(b) Draw the logic symbol and truth table for universal gates. 7

OR

IV (a) State any four theorems of Boolean algebra. Using the theorems of Boolean algebra, proove the following :

$(A+B).(A+C) = A+BC$ 8

(b) State the advantage of performing subtraction by complement method. Perform 2's complement subtraction for the following binary numbers.

(i) 110000-10101 (ii) 1001-101000 7

UNIT — II

V (a) Design and implement circuit for a single bit magnitude comparator. 8

(b) List the merits and demerits of K-map. 7

OR

VI (a) Simplify the following function using K-map and draw the logic circuit for the simplified function.

$F(A, B, C, D) = \Sigma(2, 4, 6, 10, 12) + \Phi(0, 8, 9, 13)$ 8

(b) Illustrate the working of a serial adder. 7

UNIT — III

VII Explain different types of shift registers with data shifting diagrams. 15

OR

VIII Design and implement a mod-10 asynchronous counter using T flipflops and explain its working. 15

UNIT — IV

IX (a) Explain a 4-bit DAC with neat block diagram. 8

(b) Explain the technique of error detection and correction using hamming code with example. 7

OR

X (a) List and explain various DAC specifications. 8

(b) Draw and explain two-dimensional decoding structure for a 1K-memory. 7
