



**2019/TDC/ODD/SEM/
PHSHCC-303T/074**

TDC (CBCS) Odd Semester Exam., 2019

PHYSICS

(3rd Semester)

Course No. : PSHHCC-303T

(Digital Systems and Applications)

Full Marks : 50

Pass Marks : 20

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

UNIT—I

1. Answer any *two* of the following : 2×2=4

(a) How the intensity of electron beam and the intensity of image are controlled in a CRO?

(b) Find 2's component of 1101001.

(c) Determine the decimal number represented by the binary number 101101.10101.



(2)

2. Answer either (a) or (b) :

(a) Draw the block diagram of a CRO. How can the phase difference between two AC signals of same frequency and amplitude be measured using a CRO?

2+4=6

(b) Explain the operation of a NOT gate with the help of a transistor. Write down the truth table of an XOR gate.

4+2=6

UNIT—II

3. Answer any two of the following :

2×2=4

(a) State De Morgan's theorem.

(b) Show that

$$A \cdot (B + \bar{B}C) = A \cdot (B + C)$$

(c) What is the use of a multiplexer circuit?

4. Answer either (a) or (b) :

(a) Design a circuit to realize the function

$$Y = (A + BC) (B + \bar{C}A)$$

(i) using NAND gate only

(ii) using NOR gate only

(Complementary form of the literal can be taken as inputs.)

3+3=6

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(Continued)

(3)

(b) Minimize the following four-variable logic function using K-map : 6

$$f(A, B, C, D) = \sum m(0, 1, 2, 3, 5, 7, 8, 9, 11, 14)$$

UNIT—III

5. Answer any two of the following : 2×2=4

(a) Find 48-23 using 2's complement method. You can use 8-bit representation of numbers.

(b) What do you mean by toggling in a J-K flip-flop?

(c) Draw the block diagram of IC555.

6. Answer either (a) or (b) :

(a) Explain how 555 timer can be used as an astable multivibrator. Realize a full-adder with NAND gate. 4+2=6

(b) What is an adder? Explain full-adder operation with logic gates giving the truth table. 1+5=6

UNIT—IV

7. Answer any two of the following : 2×2=4

(a) Name one input and one output device of a computer.

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(Turn Over)



(b) What do you mean by a 'counter'?

(c) What is a 'cache memory'?

8. Answer either (a) or (b) :

(a) Explain the operation of mod-3 counter using block diagram, truth table and waveform chart.

(b) Write a short note on ROM.

UNIT—V

9. Answer any two of the following :

2×2=4

(a) Give an example each of 1-byte and 2-byte instructions.

(b) Define 'bus'.

(c) What is the difference between MOV and MVI instructions of a an 8085 microprocessor?

10. Answer either (a) or (b) :

(a) Draw the architecture of μ P8085 and mention its various blocks. List the various registers of 8085.

4+2=6

(b) Write down the program to add two sixteen-bit numbers. Draw the corresponding flow chart.

4+2=6
