2020/TDC(CBCS)/ODD/SEM/ PHSHCC–303T/152

TDC (CBCS) Odd Semester Exam., 2020 held in March, 2021

PHYSICS

(3rd Semester)

Course No. : PHSHCC–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

SECTION—A

1. Answer any *ten* of the following questions :

$$2×10=20$$

(a) What is the function of electron gun in a CRO?

(b) Write various advantages and disadvantages of ICs.

10-21**/81**

(*Turn Over*)

(c) Write two examples each of active and passive components of electrical circuits.

(d) Convert 73 and 0·8125 to their binary equivalents.

(e) What are minterms and maxterms?

(f) Discribe briefly about digital demultiplexers.

(g) Draw the symbols of XOR and NAND gates.

(h) Why are parity checkers used in transmitting digital signals?

(i) Subtract 13 from 19 by 1's complement method.

(j) What do you mean by half-adder circuit? Write its truth table and block circuit diagram.

(k) Draw a detailed circuit diagram of an M/S $J\text{-}K$ flip-flop.

(l) Write the basic block diagram of internal organization of an IC 555.

(m) What is the use of shift register? How many types of shift register are there?

(*Continued*)

(n) What is a stack memory and why is it used in microprocessors?

(o) Write briefly about a decade counter.

(p) How are various blocks of memory organized in digital computers?

(q) Draw the pin-out diagram of an 8085 microprocessor.

(r) What do you mean by an instruction cycle of an 8085 microprocessor?

(s) What are MOV and MVI instructions of an 8085 microprocessor?

(t) Write an example each of 1-byte and 2-byte instructions.

SECTION—B

Answer *any* **five** questions

2. Draw the block diagram of a CRO and describe the functions of its various units.   6

3. Realize a two-input AND gate using diodes and explain its working with the help of its truth table.   6

(*Turn Over*)

(4)

4. (a) State and prove De Morgan's theorems. 4

   (b) Convert the following into CSOP form : 2

   $$Y = A + AB + ABC$$

5. Using Boolean algebra, verify the following :

   2×3=6

   (i) $\overline{A + B} + \overline{\overline{A} + \overline{B}} = A$

   (ii) $(A + B)(\overline{A} + C) = AC + \overline{A}B$

   (iii) $AB + \overline{A}C = (A + C)(\overline{A} + B)$

6. (a) Using block diagram, explain the working of a 4-bit binary adder. 3

   (b) Draw the circuit diagram of an astable multivibrator using IC 555 and discuss its operation. 3

7. (a) What do you mean by (i) race-around conditions, (ii) preset and clear operations in J-K flip-flop? 1½×2=3

   (b) Draw the block circuit diagram of a full-adder and describe its working. 3

(Continued)

(5)

8. Write short notes on any *two* of the following : 3×2=6

   (a) RAM and ROM

   (b) Input/Output devices

   (c) Parallel-in-parallel-out shift registers

9. What is a digital counter? Explain a 4-bit asynchronous counter. 6

10. What is the full form of ALU? Describe its operation in a digital computer and microprocessor. 6

11. Along with a block diagram, discuss the main features of an 8085 microprocessor. 6

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