

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

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

PHYSICS

(3rd Semester)

Course No. : PSHCC-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.

(2)

- (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) Describe 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-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?

(3)

- (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

(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

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

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

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

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

(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
