

Time: 2 Hours

Marks: 60

NOTE:

Question No 01 is compulsory.

Attempt any THREE questions from the remaining five questions.

Each question carries 15 marks.

Figure to the right indicates full marks.

Q. 1. Answer **any Three**.

- i. Draw symbol and truth table of basic logic gates. (05)
- ii. Design the half adder logic circuit and realize using logic gates. (05)
- iii. Explain the VI characteristics of PN junction diode and mention the applications. (05)
- iv. Differentiate between RISC and CISC architectures. (05)
- v. Explain the Program Counter (PC) of 8051 microcontroller. (05)

Q. 2 A] Solve the following equation using k-map and realize using logic gates: $f(A,B,C,D) = \sum m(0,1,2,3,8,9,14,15)$. (07)

Q. 2 B] Explain working of SR flip flop with neat diagram and truth-table (08)

Q. 3 A] Design and discuss a 10V voltage regulator circuit using LM317. (07)

Q. 3 B] Explain the operation of an n-channel JFET with the help of characteristics. (08)

Q. 4 A] Discuss the concept of pipelining along with the stages, also mention the advantages. (07)

Q. 4 B] Classify the instruction set used in 8051 microcontroller, mention 02 examples of each. (08)

Q. 5 A] Prove the following using Boolean algebra theorem. (07)

$$\bar{A}BC + A\bar{B}C + ABC + \bar{A}\bar{B}C = AB + BC + CA$$

Q. 5 B] Discuss the Program Status Word (PSW) of 8051 microcontroller. (08)

Q. 6. Write short notes on **any Three**

- A] Types of ROM memory. (05)
- B] Zener Diode as voltage regulator. (05)
- C] Ideal and Practical characteristics of Op-amp IC741. (05)
- D] MCS-51 family and features. (05)