

08/12/2025

Marks: 60

Time: 2 Hours

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)

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

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)