

KATHMANDU UNIVERSITY
End Semester Examination
March, 2026

Level : B.E./B.Sc.
Year : III
Time : 2 hrs. 30mins.

Course : COMP 315
Semester : I
F. M. : 40

SECTION "B"

[6 Q. × 4 = 24 marks]

Attempt ANY SIX questions.

1. Discuss floating point representation with an example. What is a Universal Gate and implement an OR gate using only NAND gates. [2+2]
2. Compare different shifting approaches. What will be the final value when 11111011 is arithmetically shifted towards right? [3+1]
3. Define register transfer. Design a Common BUS system for 4 registers having 2 bits each. [1+3]
4. What do you mean by instruction cycle in a basic computer? Define Register. Explain 4:1 MUX with a logic diagram. [2+2]
5. What is asynchronous data transfer? How can you ensure the reliability in asynchronous data transfer between peripheral and CPU? Briefly discuss any two methods.
6. Discuss General Register Organization and Stack Organization of CPU.
7. Write short notes on: [2+2]
 - a. Cache Memory
 - b. Virtual Memory

SECTION "C"

[2 Q. × 8 = 16 marks]

Attempt ANY TWO questions.

8. Discuss DMA transfer process with necessary figures. Represent the expression $(A / B * C) + (D - E)$ as 3 address, 2 address, 1 address and zero address instruction. [3+5]
9. Explain multiplication algorithm of Booth's algorithm with the flowchart and the hardware requirements. Multiply (-5) by (-20) using Signed Magnitude algorithm. [4+4]
10. With reference to the given table, design the E and R flip-flops of a Basic Computer. Also, design the Accumulator of a Basic Computer. [2+2+4]