

# GATE 2023 Computer Science and Information Technology(CS)

November 2, 2023

1. Consider the given C-code and its corresponding assembly code, with a few operands U1-U4 being unknown. Some useful information as well as the semantics of each unique assembly instruction is annotated as inline comments in the code. Which one of the following options is a CORRECT replacement for operands in the position (U1,U2,U3,U4) in the above assembly code?
  - (A) (8,4,1,L02)
  - (B) (3,4,4,L01)
  - (C) (8,1,1,L02)
  - (D) (3,1,1,L01)

//C-code	;assembly-code (; indicates comments) ;r1-r5 are 32-bit integer registers ;initialize r1=0, r2=10 ;initialize r3, r4 with base address of a, b
int a[10], b[10], i; // int is 32-bit for (i=0; i<10;i++) a[i] = b[i] * 8;	L01: jeq r1, r2, end   ;if(r1==r2) goto end L02: lw  r5, 0(r4)     ;r5 <- Memory[r4+0] L03: shl r5, r5, U1   ;r5 <- r5 << U1 L04: sw  r5, 0(r3)     ;Memory[r3+0] <- r5 L05: add r3, r3, U2   ;r3 <- r3+U2 L06: add r4, r4, U3 L07: add r1, r1, 1 L08: jmp U4           ;goto U4 L09: end

Figure 1: code