9. In a traffic light [illegible] SR flip-flop may lead to an unpredictable state, a [illegible] JK flip-flop handle this scenario differently, ensuring reliable traffic [illegible] CLO-3

10. Compute the reverse polish notation (RPN) from given arithmetic expressions: CLO-1
    i. (A+B)*[C*(D+E)+F]
    ii. 3*4+5*6+7*2

11. Explain how the direct address and indirect address are different from each other?

SECTION – C

(Attempt any 3 questions, each question carries 5 marks) ***(3x5=15)***

12. Complete the following table by determining control word, corresponding source registers (SEL A, SEL B), a destination register (SEL D), and an operation code (OPR) necessary for the processor to execute the given micro-operations. CLO-3

Micro-operation	SEL A	SEL B	SEL D	OPR	Control Word
R4 ← R4+1					
Output ← Input					
R5← 0					
R4← shl R4					
R7←R1					

13. In a system with limited cache size, the performance of data retrieval depends on the efficiency of the cache mapping technique. A processor needs to quickly access frequently used data. Based on this scenario, explain the cache mapping techniques CLO-4

14. Compose the sequence of instructions to evaluate the expression X = (A+B)*(C–D) using the following instruction formats: CLO-3
    i. One-address instruction format
    ii. Zero-address instruction format

15. Illustrate the register configuration along with a memory bank in basic computer and explain the function of each computer register. CLO-3

SECTION – D

(Attempt any one question, each question carries 10 marks, subparts (if any) carry equal weightage) ***(1x10=10)***

16. A company is developing a high-performance computing system for diverse applications such as data analysis, artificial intelligence, graphics processing, and system reliability. As the system architect, your goal is to examine a few practical examples and determine which Flynn's category (SISD, SIMD, MISD, or MIMD) best describes each scenario. For each example, select the appropriate category and provide a brief explanation for your choice.

    i. Weather Forecasting Supercomputer: A supercomputer is employed for weather forecasting. It performs many operations simultaneously on huge datasets using multiple processors. CLO-4
    ii. Gaming Console Graphics: A modern gaming console carries out identical graphical computations on numerous pixels or image segments at the same time to ensure fast rendering.