

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc(SS) DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Branch – SOFTWARE SYSTEMS(five years Integrated)

COMPUTER ORGANIZATION AND ARCHITECTURE

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Which of the following best describes the difference between signed and unsigned binary numbers? a) Signed numbers can only represent positive values b) Unsigned numbers use the most significant bit to represent the sign c) Signed numbers can represent both positive and negative values d) Unsigned numbers are represented in floating-point format	K1	CO2
	2	What is the 8-bit two's complement representation of +30? a) 00011110 b) 11100010 c) 01111110 d) 00111110	K2	CO2
2	3	Which of the following logic gates produces an output of '1' only when all of its inputs are '1'? a) AND gate b) OR gate c) NOT gate d) XOR gate	K1	CO2
	4	In a 4-to-1 multiplexer, how many control lines are required to select one of the four data inputs? a) 1 b) 2 c) 3 d) 4	K2	CO2
3	5	What is the basic function of the Arithmetic Logic Unit (ALU) in a computer system? a) To perform arithmetic and logic operations b) To store data temporarily c) To execute instructions from memory d) To manage communication between input and output devices	K1	CO2
	6	In the fetch-execute cycle, which of the following is the correct sequence of steps? a) Fetch instruction → Decode instruction → Execute instruction b) Decode instruction → Execute instruction → Fetch instruction c) Fetch instruction → Execute instruction → Decode instruction d) Execute instruction → Fetch instruction → Decode instruction	K2	CO2
4	7	What is the primary function of the memory unit in a computer system? a) To control the execution of instructions b) To store data and instructions temporarily or permanently c) To perform arithmetic and logic operations d) To manage communication between the CPU and peripherals	K1	CO2
	8	Which of the following is the function of a "multiplexer" in memory interfacing? a) To increase the data transfer speed between CPU and memory b) To select one of many memory locations for data transfer c) To convert digital data to analog signals d) To store the data temporarily	K2	CO2
5	9	Which of the following is a key advantage of using a multiprocessor system? a) Reduced power consumption b) Increased system reliability and fault tolerance c) Decreased system complexity d) Slower processing speed	K1	CO2
	10	Which of the following is a key feature of MIMD (Multiple Instruction, Multiple Data) systems? a) All processors execute the same instruction on different data b) Each processor has its own memory	K2	CO2

SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks $(5 \times 7 = 35)$

Module No.	Question No.	Question	K Level	CO
1	11.a.	Explain the IEEE 754 single-precision floating-point format and its components. How is a floating-point number represented using this format? (OR)	K4 K3	CO2
	11.b.	What is the difference between "fixed-point" and "floating-point" representation of real numbers? Discuss their advantages and disadvantages		
2	12.a.	Describe the representation of characters using ASCII code. How is the character 'A' represented in ASCII? (OR)	K4 K2	CO3
	12.b.	Explain the working of a D Flip-Flop with its truth table and circuit diagram. How is it used in registers?		
3	13.a.	Explain the concept of overflow and underflow in the context of ALU operations. How does the ALU handle these issues in binary arithmetic? (OR)	K2 K4	CO3
	13.b.	Explain the structure and functioning of a basic computer system. Discuss the role of the various components.		
4	14.a.	What is the role of registers in the CPU? Describe the different types of registers and their functions in the execution of instructions. (OR)	K4	CO4
	14.b.	Explain the concept of memory-mapped I/O. How does it differ from port-mapped I/O, and what are its advantages?		
5	15.a.	Describe the process of interrupt handling in a computer system. How does the CPU respond to an interrupt from a peripheral device? (OR)	K4	CO4
	15.b.	Explain the concept of a multiprocessor system. What are the different types of multiprocessor systems, and how are they classified?		

SECTION - C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks $(3 \times 10 = 30)$

Module No.	Question No.	Question	K Level	CO
1	16	Describe Arithmetic Operations in Signed Numbers.	K4	CO2
2	17	Explain about Decoders and Encoders.	K4	CO3
3	18	Explain how memory-mapped I/O works in interfacing memory and I/O devices. How does it differ from port-mapped I/O?	K4	CO4
4	19	Describe the interfacing of a $16K \times 8$ RAM with a microprocessor. Explain the address decoding and control signals used in the interfacing.	K4	CO4
5	20	Discuss the various memory architectures used in multiprocessor systems. Explain the difference between Shared Memory and Distributed Memory systems.	K4	CO4