25CAU102

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BCA DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Branch – **COMPUTER APPLICATIONS**

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.	Q.No	Question	K Level	CO
1	1	What is the binary equivalent of decimal 25? (a) 11001 (b) 10101 (c) 11100 (d) 10011	K1	CO1
1	2	Explain how floating-point numbers are represented in computer systems? (a) Sign and magnitude (b) Exponent and Mantissa (c) Excess-3 code (d) Gray code	K2	CO1
2	3	Identify the logic gate that gives output 1 only if all inputs are 1. (a) OR (b) XOR (c) AND (d) NAND	K1	CO2
2	4	Determine the minimum number of variables needed to design a 4×1 multiplexer. (a) 2 (b) 3 (c) 4 (d) 5	K2	CO2
3	5	Which interconnection structure is most common in computer systems? (a) Mesh (b) Bus (c) Ring (d) Tree	K1	CO3
3	6	Explain which level of the memory hierarchy has the highest speed? (a) Cache (b) Main memory (c) Magnetic disk (d) Optical storage	K2	CO3
4	7	State the 2 main components between which Cache memory is located. (a) CPU and Main Memory (b) CPU and I/O (c) Main Memory and Secondary Storage (d) None	K1	CO4
4	8	Explain the main drawback of programmed I/O in computer system. (a) CPU overhead (b) No CPU involvement (c) Faster throughput (d) Reduced latency	K2	CO4
5	9	Name the register that holds the address of the next instruction. (a) MAR (b) MDR (c) PC (d) IR	K1	CO5
5	10	Explain in the instruction cycle, decoding happens after_____. (a) Execution (b) Fetch (c) Store (d) None of the above	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a	Explain integer and floating-point Arithmetic representation with examples.	K2	CO1
		(OR)		
	11.b	i) Convert $(41.6875)_{10}$ into binary. ii) Convert $(0.513)_{10}$ to octal. iii) Convert $(673.124)_8$ to hexa decimal.		
2	12.a	Solve & Simplify the Boolean expression using Karnaugh map: $F(A,B,C,D) = \Sigma(0,1,2,5,8,9,10,14)$.	K3	CO2
		(OR)		
	12.b	Construct a 3-bit binary counter using T flip-flops and explain its working.		
3	13.a	Describe the characteristics of memory systems.	K3	CO3
		(OR)		
	13.b	Illustrate the working of bus interconnection structure in computer systems.		
4	14.a	Explain the principles of cache memory organization with block diagram.	K4	CO4
		(OR)		
	14.b	Compare programmed I/O, interrupt-driven I/O, and DMA with example.		
5	15.a	Illustrate the instruction cycle in detail with a flow diagram	K4	CO5
		(OR)		
	15.b	Examine the performance trade-offs between RISC and CISC architectures.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions
ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16.	Apply integer arithmetic operations to solve problems using binary examples.	K4	CO1
2	17.	Demonstrate the use of Boolean algebra in designing a 4-bit parallel adder. Explain it.	K4	CO2
3	18.	Analyze the characteristics and performance of different levels in the memory hierarchy.	K4	CO3
4	19.	Explore the working of cache memory with reference to hit ratio, mapping techniques, and initialization policies.	K4	CO4
5	20.	Evaluate processor organization with focus on register organization and control signals.	K4	CO5

Z-Z-Z END