V Semester B.C.A. Degree Examination, Nov./Dec. 2018
(CBCS) (F + R)
(2016-17 and Onwards)
COMPUTER SCIENCE
BCA-503 : Computer Architecture

Time : 3 Hours
Max. Marks : 100

**Instruction : Answer all Sections.**

**SECTION – A**

I: Answer any **ten** questions :

1) Explain Full adder.
2) Define universal gates with logic circuit.
3) Explain BSA instruction.
4) State De-Morgan's theorem.
5) Define Flip-Flop.
6) Why we use shift register ?
7) Explain Hamming code ?
8) Define Indirect Address Mode.
9) What is meant by Memory-Mapped I/O ?
10) Define virtual memory.
11) What is Parity bit ?
12) Define types of RAM.

**SECTION – B**

II. Answer any **five** questions :

13) Explain the steps involved in design of combinational circuit.
14) Write a note on program counter and stack memory.
15) What is a Karnaugh Map ? Explain different types of Karnaugh Maps.
16) Explain any five register reference instructions.

P.T.O.
17) Write a note on Cache memory.
18) Compare CISC and RISC processors.
19) What are the important characteristics of memory?
20) Explain timing signals.

SECTION – C

III. Answer any three questions. Each question carries fifteen marks. \((3 \times 15 = 45)\)

21) Explain the types of program interrupts.
22) a) Simplify \(F(A, B, C, D) = \Sigma m(1, 2, 4, 6, 8, 10, 12, 14)\) and draw a circuit diagram.
   b) What is a parity bit? Explain in brief.
23) Explain types of CPU organization.
24) a) Explain I/O commands.
   b) Explain common BUS organization of a Basic computer.
25) a) Explain Memory hierarchy.
   b) Explain different Addressing Modes.

SECTION – D

IV. Answer any two questions. \((1 \times 10 = 10)\)

26) a) Explain direct Address and Indirect Address Modes.
   b) Explain the working of R-S flip-flop.
27) a) Explain 8 to 3 Encoder.
   b) Discuss error detection and correction codes.
V Semester B.C.A. Degree Examination, Nov./Dec. 2017
(CBCS) (F + R) (2016-17 and Onwards)
BCA 503 : COMPUTER ARCHITECTURE

Time : 3 Hours
Max. Marks : 100

Instruction: Answer all Sections.

SECTION – A

I. Answer any ten questions. Each carries two marks. (10×2=20)
1) Write the symbol, logical expression and truth table of NAND gate.
2) Give the classification of integrated circuits.
3) Distinguish between RAM and ROM.
4) Define Multiplexer and Demultiplexer.
5) What are the types of binary codes?
6) Subtract 24\text{_{10}} from 13\text{_{10}} using 2's complement method.
7) Define opcode and operand.
8) What is BUN instruction?
9) What are the two types of computer architecture based on registers?
10) What are the different types of interrupts?
11) Define access time and transfer rate.
12) Define Baud rate.

SECTION – B

II. Answer any five questions. Each question carries five marks. (5×5=25)
13) Explain the steps involved in the design of the sequential circuits.
14) Explain synchronous binary counter with logic diagram.
15) Discuss on error detection and correction codes briefly.
16) Explain any five register reference instructions.
17) With a block diagram, explain how BSA instruction executes.
18) Explain the addressing modes.
19) Explain DMA controller with a block diagram.
20) Write a note on virtual memory.

P.T.O.
SECTION – C

III. Answer any three questions. Each question carries fifteen marks. \( (3\times15=45) \)

21) a) Simplify \( F(ABCD) = \Sigma m (1, 3, 7, 11, 15) + \Sigma d (0, 2, 5) \) using K-map. 7
   b) What is a half adder? Design a half adder using only NAND gates. 8

22) a) Explain decoder expansion with neat diagram. 7
   b) Discuss the parity generator and parity checker. 8

23) a) Explain common bus organization of basic computer with neat diagram. 8
   b) Distinguish between FG1 and FG0. 7

24) a) What is a sub-routine? Explain CALL and RETURN instructions. 8
   b) Explain the arithmetic logic shift with a neat diagram. 7

25) a) Explain I/O interface unit with a neat diagram. 8
   b) Write a note on isolated vs memory mapped I/O. 7

SECTION – D

IV. Answer any one question. Question carries ten marks. \( (1\times10=10) \)

26) a) Explain 4-bit shift register. 5
   b) Explain the working of J-K flip-flop. 5

27) a) Explain interrupt cycle with suitable example. 6
   b) List the applications of EEPROM. 4
(CBCS – Fresh – 2016 – 17 & Onwards)
BCA – 503 : COMPUTER ARCHITECTURE

Time : 3 Hours

Max. Marks : 100

Instruction: Answer all Sections.

SECTION – A
I. Answer any ten questions. Each carries two marks. (10×2=20)
1) What is Computer Architecture?
2) State and prove DeMorgan’s theorem.
3) Mention the different logic families of IC.
4) Distinguish between RAM and ROM.
5) What is Parity bit?
6) Write the BCD code for decimal number 8745.4210.
7) What are the two types of control organization?
8) Define program counter.
9) Mention the major components of CPU.
10) What is PSW?
11) What is Polling?
12) What is memory management system?

SECTION – B
II. Answer any five questions. Each carries five marks. (5×5=25)
13) Prove NAND and NOR gates as universal gates.
14) Explain PIPO shift Register with a diagram.
15) Discuss the Parity generator and Parity checker.
16) Explain the operation of interrupt cycle with a flow chart.

P.T.O.
17) Explain input-output instructions. 5
18) Explain the three types of CPU organization. 5
19) Explain the source initiated data transfer using handshaking with a block diagram and timing diagram. 5
20) Write a note on memory hierarchy in a computer system. 5

SECTION – C

III. Answer any three questions. Each carries fifteen marks. (3x15=45)
21) a) Define K-Map ? Simplify the following Boolean function using K-Map:
   \[ F(A, B, C, D) = \Sigma(0, 2, 4, 6, 10, 11, 12, 13, 14, 15) \]
   b) Explain different binary codes. 7
22) a) Define counter. With a neat diagram explain 4-bit synchronous binary counter. 8
   b) Explain octal to binary encoder with diagram. 7
23) Explain the design of basic computer with flow chart. 15
24) What is addressing mode ? Explain the different types of addressing modes with examples. 15
25) a) Explain DMA controller with a block diagram. 7
   b) Explain the working of associative memory. 8

SECTION – D

IV. Answer any one question. Each carries ten marks. (1x10=10)
26) a) Explain the working of full adder. 5
    b) Write a note on modes of data transfer. 5
27) a) Explain the common bus system. 5
    b) Write a note on RISC and CISC. 5
V Semester B.C.A. Degree Examination, November/December 2015
(Y2K8 Scheme) (F + R)
Computer Science
BCA – 502 : COMPUTER ARCHITECTURE
(100 – 2013-14 & Onwards) (90 – Prior to 2013-14)

Time : 3 Hours
Max. Marks : 90/100

Instructions: 1) Section A, B, C is common to all. Section D is applicable to the students of 2011-12 and Onwards.
2) 100 marks for students of 2011-12 and onwards. 90 marks for Repeaters prior to 2011-12.

SECTION – A

I. Answer any ten questions. Each carries two marks. (10x2=20)

1) State and prove Demorgan’s law.

2) Draw the logic diagram of the Boolean function \( F = AB + A'B \) using NAND gates only.

3) What is Decoder Expansion ?

4) What is unidirectional and bidirectional shift register ?

5) Convert (736.4)_8 to decimal and binary.

6) What is self complementing code and weighted code ?

7) What are the two types of control organization ?

8) How many bits are needed to specify an address for a memory unit of 4096 words ?

9) What is PSW ?

10) What is an external interrupt ? Give an example.

11) What are peripherals ?

12) What is memory management system ?

P.T.O.
II. Answer **any 4** full questions. **Each** full question carries 14 marks: \(14 \times 4 = 56\)

11) Design a combinational logic circuit with 3 input \(x, y, z\) and the three output \(A, B, C\). When the binary input 0, 1, 2 or 3, the binary output is one greater than the input? When the binary input is 4, 5, 6 or 7 the binary output is one less than the input? \(14\)

12) a) List all the unused combinations in BCD, 2421, Excess – 3 and Excess – 3 gray code. \((4 + 10)\)
   b) Derive a circuit for a 3 bit parity generator and a 4-bit parity checker using an even parity. \(14\)

13) Explain with a neat block diagram how the basic computer registers are connected to a common bus. \(14\)

14) a) Explain 3 types of data manipulation instructions. With an example for each. \((6 + 8)\)
   b) What are addressing modes? Explain the different types of addressing modes. \(14\)

15) Explain the working of a basic computer with a neat flow chart. \(14\)

16) a) Explain the working of a DMA controller with a block diagram. \((7 + 7)\)
   b) Explain associative memory with a neat block diagram.