BCA/3/CC/16

Student's Copy

Professional Course (Odd) Examination, 2024

(CBCS)

(3rd Semester)

BACHELOR OF COMPUTER APPLICATIONS

(Computer Organization and Architecture)

Full Marks: 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

(PART : A-OBJECTIVE)

(Marks: 25)

SECTION-I

(Marks: 15)

I. Tick (1) the correct answer in the brackets provided : 1×10=10

- 1. How many full adders are needed to add two 4-bit numbers?

 - (c) 4 () (d) 16 (
- 2. An n-bit microprocessor has
 - (a) n-bit instruction register ()
 - (b) n-bit address register ()
 - (c) n-bit program counter ()
 - (d) None of the above ()

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| 3. | How many bits are required in operation code of an instruction to perform 30 distinct operations? |
|----|---|
| | (a) 15 () (b) 5 () |
| | (c) 30 () (d) 6 () |
| 4. | Which register has only 8 numbers of bits? |
| | (a) TR () (b) INPR () |
| | (c) DR () (d) AR () |
| 5. | What is the content of stack pointer (SP)? |
| | (a) Address of the top element in the stack () |
| | (b) Address of current instruction () |
| | (c) Address of next instruction () |
| | (d) None of the above () |
| 6. | The addressing mode, where you directly specify the operand value is |
| | (a) immediate () (b) direct () |
| | (c) definite () (d) relative () |
| 7. | The registers of the DMA controller are |
| | (a) 64 bits () (b) 24 bits () |
| | (c) 32 bits () (d) 16 bits () |
| 8. | In memory mapped I/O |
| | (a) the I/O devices have separate address space () |
| | (b) the memory and I/O devices have an associated address space () |
| | (c) a part of the memory is specifically set aside for the I/O operation () |
| | (d) the I/O devices and the memory share the same address space () |

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2

- 9. The memory that communicates directly with CPU is called
 - (a) auxiliary memory ()
 - (b) USB storage ()
 - (c) main memory ()
 - (d) microprogram memory (
- 10. Which of the following refers to the associative memory?
 - (a) The address of the data is generated by the CPU ()
 - (b) There is no need for an address, i.e., the data used as an address ()
 - (c) The address of the data is supplied by the users()
 - (d) More than one of the above ()
- II. Indicate whether the following are True (T) or False (F) by putting a Tick (✓) mark in the brackets provided : 1×5=5
 - Bus is dedicated transmission media.

(T / F)

2. Fetch cycle is executed after execution cycle.

(T / F)

PUSH is a zero-address instruction.

(T / F)

Handshaking is simple timing mechanism.

(T / F)

5. Virtual memory allows for very effective multiprogramming.

3

(T / F)

SECTION-II

(Marks: 10)

III. Answer the following questions :

- 1. What is the computer instruction?
- 2. What is the difference between counters and registers?
- What are peripheral devices? Give examples. 3.
- 4. What is auxiliary memory?
- What is stack organization? 5.

(PART : B-DESCRIPTIVE)

(Marks : 50)

IV. Answer the following questions :

(a) What is register transfer? Explain the operation of three-state 1. buffer and show its use in design of a common bus.

OR

| | (Ь) | What is micro-operation? Explain the four types of micro- | |
|----|-----|--|-----|
| | | 2+8 2+8 | =10 |
| 2. | (a) | Explain all the phases of instruction cycles. | 10 |
| | | OR | |
| | (b) | Briefly explain common bus system of basic computer with a neat diagram. | 10 |
| 3. | (a) | What is stack? Give the organization of register stack with all necessary elements and explain the working of PUSH and POP operations. | |
| | | | 10 |
| | | OR | |
| | (b) | Explain the different types of addressing mode. | 10 |

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Contd.

 $2 \times 5 = 10$

10×5=50

10

 (a) What is DMA? Explain in brief DMA controller by giving a suitable block diagram. 2+8=10

OR

- (b) Discuss the different techniques used for interfacing I/O units with the process.
 10
- 5. (a) Explain direct mapping of cache memory system. 10

OR

(b) What is virtual memory? Explain memory hierarchy in detail.

3+7=10

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(PART : A-OBJECTIVE)

(Marks: 25)

SECTION-I

(Marks: 15)

I. Tick (\checkmark) the correct answer in the brackets provided :

1. How many full adders are needed to add two 4-bit numbers?

- (a) 8
 (b) 2
 (c) (d)

 (c) 4
 (c) (d) (c) (d)
- 2. An n-bit microprocessor has
 - (a) n-bit instruction register ()
 - (b) n-bit address register ()
 - (c) n-bit program counter ()
 - (d) None of the above ()

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 $1 \times 10 = 10$

| 3. | How many bits are required in operation code of an instruction to perform 30 distinct operations? |
|----|---|
| | (a) 15 () (b) 5 () |
| | (c) 30 () (d) 6 () |
| 4. | Which register has only 8 numbers of bits? |
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| 5. | What is the content of stack pointer (SP)? |
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| 6. | The addressing mode, where you directly specify the operand and |
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| 7. | The registers of the DMA controller are |
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9. The memory that communicates directly with CPU is called

- (a) auxiliary memory ()
- (b) USB storage ()
- (c) main memory ()
- (d) microprogram memory ()

10. Which of the following refers to the associative memory?

- (a) The address of the data is generated by the CPU ()
- (b) There is no need for an address, i.e., the data used as an address ()
- (c) The address of the data is supplied by the users ()
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- II. Indicate whether the following are True (T) or False (F) by putting a Tick (✓) mark in the brackets provided : 1×5=5
 - 1. Bus is dedicated transmission media.

(T / F)

2. Fetch cycle is executed after execution cycle.

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PUSH is a zero-address instruction.

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Handshaking is simple timing mechanism.

(T / F)

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SECTION-II

(Marks: 10)

III. Answer the following questions :

- What is the computer instruction? 1.
- 2. What is the difference between counters and registers?
- 3. What are peripheral devices? Give examples.
- What is auxiliary memory? 4.
- 5. What is stack organization?

(PART : B-DESCRIPTIVE)

(Marks : 50)

IV. Answer the following questions :

1. (a) What is register transfer? Explain the operation of three-state buffer and show its use in design of a common bus. 10

OR

| | (b) | What is micro-operation? Explain the four types of micro- operation. | |
|----|-----|--|------|
| 2 | (0) | Explain all the share of the | 8=10 |
| 2. | (4) | Explain all the phases of instruction cycles. | 10 |
| | | OR | |
| | (b) | Briefly explain common bus system of basic computer with a neat diagram. | |
| 3. | (a) | What is stack? Give the organization of register stack with all necessary elements and explain the working of PUSH and POP operations. | 10 |
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| | (b) | Explain the different types of addressing mode. | 10 |

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Contd.

10

 $2 \times 5 = 10$

10×5=50

 (a) What is DMA? Explain in brief DMA controller by giving a suitable block diagram. 2+8=10

OR

| | (b) | Discuss the different techniques used for interfacing I/O units | |
|----|-----|---|----|
| | | with the process. | 10 |
| 5. | (a) | Explain direct mapping of cache memory system. | 10 |

OR

(b) What is virtual memory? Explain memory hierarchy in detail.

3+7=10

* * *

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(3rd Semester)

BACHELOR OF COMPUTER APPLICATIONS

(Database Management Systems)

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(PART : A-OBJECTIVE)

(Marks: 25)

SECTION-I

(Marks: 15)

I. Tick (1) the correct answer in the brackets provided : 1×10=10

- Information is _____ data.
 - (a) processed ()
 - (b) meta- ()
 - (c) storage ()
 - (d) raw ()

2. Data about data is normally called as

- (a) directory ()
- (b) databank ()
- (c) metadata ()
- (d) data dictionary ()

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- 3. The set of all possible values of a data item is
 - (a) tuples ()
 - (b) attribute ()
 - (c) domain ()
 - (d) entity ()
- 4. Which of the following is a bottom-up approach?
 - (a) Specialization ()
 - (b) Generalization ()
 - (c) Categorization ()
 - (d) All of the above ()
- 5. If A1 and A2 are relational algebraic expressions, then which of the following is not a relational algebraic expression?
 - (a) $A1 \times A2$ () (b) A1 - A2 () (c) A1 / A2 () (d) $A1 \cup A2$ ()
- 6. The process of taking a normalized schema and making it nonnormalized is
 - (a) domain key normal form ()
 - (b) denormalization ()
 - (c) Boyce-Codd normal form ()
 - (d) first normal form ()
- 7. Which of the following is not a DML statement?
 - (a) UPDATE ()
 - (b) ALTER ()
 - (c) INSERT ()
 - (d) DELETE ()

/387

- 8. What will be the result of statement such as SELECT * FROM EMPLOYEE WHERE SALARY IN (4000, 8000)?
 - (a) All employees whose salary is 4000 and 8000 (
 - (b) All employees whose salary is between 4000 and 8000 (
 - (c) All employees whose salary is not between 4000 and 8000 ()
 - (d) All employees whose salary is not 4000 and 8000
- 9. ____ can add or delete new users to the system.
 - (a) System administrator ()
 - (b) Software developer ()
 - (c) Database administrator ()
 - (d) Programmer ()
- 10. Software failures may include failures related to software such as
 - (a) operating system ()
 - (b) DBMS software ()
 - (c) application programs ()
 - (d) All of the above ()
- **II.** State whether the following are *True* (*T*) or *False* (*F*) by putting a Tick (\checkmark) mark in the brackets provided : $1 \times 5 = 5$
 - 1. A relationship is an association among several entities.

(T / F)

)

)

(

 Overall logical structure of a database can be expressed graphically by an ER diagram.

(T / F)

3. If two sets of functional dependencies A and B are equivalent, then either A is a subset of B or B is a subset of A.

(T / F)

GROUP BY clause is used for summarizing the content of the column.
 (T / F)

 Backward recovery is the recovery procedure which is used in case of physical damage.

(T / F)

 $2 \times 5 = 10$

SECTION-II

(Marks: 10)

III. Answer the following questions (short answer-type) :

- Differentiate between database approach and file-oriented approach.
- 2. How does attribute inheritance help in developing a system?
- 3. Define composite key.
- 4. What are the advantages of SQL?
- 5. Define archival backup.

(PART : B-DESCRIPTIVE)

(Marks : 50)

IV. Answer the following questions :

Describe the three-tier ANSI-SPARC architecture in DBMS.
 10

OR

Discuss the basic features of object-oriented data model with advantages and disadvantages. 6+4=10

- (a) Explain any five rules formulated by E. F. Codd for RDBMS.
 (b) What are the different types of attributes?
 - 5

10×5=50

OR

- (a) What do you understand by specialization? Explain with an example. 2+4=6
- (b) What are the symbols for displaying an ER model databases schema as an ER diagram?

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 What is normalization? Explain the third normal form (3NF) with an example. 2+8=10

OR

Describe the various operations used in relational algebra along with their syntaxes.

 What are the different arithmetic operators in SQL? Explain with examples. 2+8=10

OR

| | (a) Explain how views are created using an example. | | |
|----|--|---------|--|
| | (b) Give the syntax of the UPDATE statement. Explain with example. | an 4 | |
| 5. | What is shadow paging? Explain how it is performed. | 3+7=10 | |
| | OR | | |
| | (a) Discuss the different dimensions of database security. | 6 | |
| | (b) What are the different causes of failure? | 4 | |

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- (T / F)
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/387

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SECTION-II S. 19 (Marks: 10)

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III. Answer the following questions (short answer-type) : $2 \times 5 = 10$

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