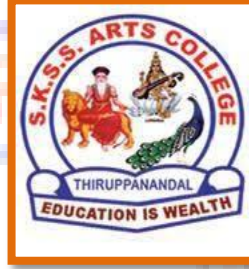ஸ்ரீ-ல-ஸ்ரீ காசிவாசி சுவாமிநாத சுவாமிகள் கலைக் கல்லூரி

திருப்பனந்தாள் – 612504

S.K.S.S ARTS COLLEGE, THIRUPPANANDAL - 612504

QUESTION BANK

Title of the Paper

DIGITAL ELECTRONICS AND MICROPROCESSOR

Course: III B.Sc. (CS)
Sub. Code: 16SCCCS5P
Semester: V

Prepared by

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DEPARTMENT OF COMPUTER SCIENCE

CORE COURSE VII
DIGITAL ELECTRONICS AND MICROPROCESSOR

Unit I : Number Systems and Codes: Binary Number System – Binary to Decimal Conversion – Decimal to Binary Conversion – Octal Numbers – Hexadecimal Numbers – Binary Codes – Logic Gates and Circuits: – AND, OR, NOT, NAND, NOR, Exclusive OR and Exclusive NOR Gates

Unit II : Boolean Algebra: Definitions – Fundamentals of Boolean Algebra – Boolean Functions – Minterms and Maxterms – Laws and Theorems of Boolean Algebra – DeMorgan's Theorem - Simplifying Logic Circuits – Sum of Products – AND-OR Networks – Sum of Products and Product of Sums Forms – Karnaugh Maps – Product of Sums Simplification – NAND and NOR Implementation - Don't Care Conditions – Overlapping Groups – Rolling the Map – Eliminating Redundant Groups.

Unit III : Combinational Logic Circuits: Introduction – Adders – The Half Adder – The Full Adder –Subtractors – BCD Adder – Multiplexers – Demultiplexers – Decoders – Encoders – Sequential Logic Circuits: Flip Flops – RS Flip Flop – Clocked RS Flip Flop – D Flip Flop – JK Flip Flop – T Flip Flop –Master Slave Flip Flop Registers: Counters – Asynchronous or Ripple Counter – Ring Counter – Shift Registers.

Unit IV : Evolution of Microprocessor – Single chip Microcomputer – Microprocessor Applications –Buses- Memory Addressing capacity and CPU – Microcomputers – Processor Architecture – Intel 8085 – Instruction cycle – Timing Diagram

Unit V : Instruction Set of Intel 8085 – Instruction and Data Format – Address Modes – Status Flags – Intel 8085 instruction - Programming Microprocessor – Assembly language – Assembler.

UNIT – I

Choose the Correct Answer

1.Which of the following is not a positional number system?

a)Roman Number System

b) Octal Number System

c) Binary Number System

d) Hexadecimal Number System

2. The value of radix in binary number system is _____

a) 2

b) 8

c) 10

d) 1

3. The binary equivalent of the decimal number 10 is _____

a) 0010

b) 10

c) 1010

d) 010

4. The octal equivalent of 1100101.001010 is _____

a) 624.12

b) 145.12

c) 154.12

d) 145.21

5. The input hexadecimal representation of 1110 is _____

a) 0111

b) E

c) 15

d) 14

6. Electronic circuits that operate on one or more input signals to produce standard output _____

a) Series circuits

b) Parallel Circuits

c) Logic Signals

d) Logic Gates

7. A _____ gate gives the output as 1 only if all the inputs signals are 1.
a) AND
b) OR
c) EXOR
d) NOR

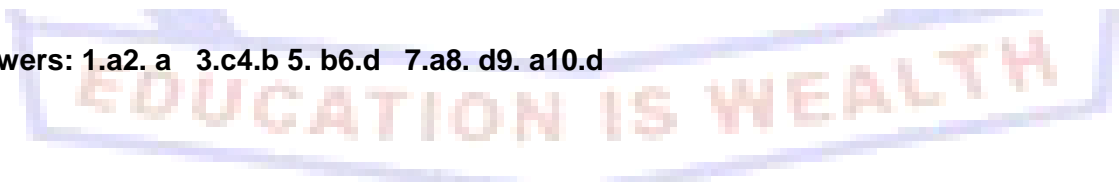8. The gate which is used to reverse the output obtained is _____
a) NOR
b) NAND
c) EXOR
d) NOT

9. The universal gate that can be used to implement any Boolean expression is _____
a) NAND
b) EXOR
c) OR
d) AND

10. The gate which is called an inverter is called _____
a) NOR
b) NAND
c) EXOR
d) NOT

Answers: 1.a2. a 3.c4.b 5. b6.d 7.a8. d9. a10.d

EDUCATION IS WEALTH

Short Questions (2 Marks)

11. What is BCD system?
12. What is hexadecimal number system?
13. What is octal number system?
14. What is decimal number system?
15. Why does a computer use binary numbers for its internal processing
16. What is gray code?
17. What is EBCDIC code?

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18. What is logic gates?
19. What is tristate logic gate?
20. Whatis a Boolean variable?

Paragraph Questions (5 Marks)

21. Convert the following decimal numbers to equivalent binary numbers: a)27 b) 41 and c) 89.
22. Convert the following binary numbers to equivalent decimal numbers: a) 101011 b) 1101 and c) 1001011.
23. Convert the following hexadecimal numbers to equivalent decimal numbers: a) 5C b) F9 and c) 5A2.
24. What is 1's complement of a binary numbers? Find 1's complement of the following binary numbers. a)0101   b) 11011 c) 1111.
25. What is 2's complement of a binary number? Find 2's complement of the following binary numbers. a) a)1101   b) 0100 c)1100.
26. What are EBCDIC codes? Discuss their areas of applications.
27. What are logic gates? Discuss AND, OR and NOT gates with their truth tables.
28. Define NAND and NOR gates. Discuss them with their truth tables.
29. What is a tri-state logic? Discuss its features and applications.
30. What do you understand by ASCII and ISSCII? Discuss its areas of applications.

Essay Type Questions (10 Marks)

31. Convert the following decimal numbers to equivalent binary numbers. a) 2 b) 8 c) a d) e e) f.
32. Convert the following binary numbers to equivalent hexadecimal numbers. a) 101010 b) 1101101 c) 10110000 d) 10010111 e) 11101101
33. Discuss about octal and hexadecimal number system with examples.
34. List out the advantages of the octal number system with hexadecimal number system.
35. Describe about ASCII, ISCII and EBCDIC code with examples.
36. Discuss about the basic logic gates with truth table and diagram.
37. Briefly explain the universal building blocks with truth table.
38. Describe about XOR and XNOR gates with truth table and diagram.
39. Discuss about logic gates and its applications.
40. What is a tri-state logic gates? Discuss its features and applications.

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UNIT - II
Choose the Correct Answer

1.Boolean Function is of the form of _____
a) Truth values
b) K=f(X,Y,X)
c) Algebraic Expression
d) Truth Table

2. In the boolean function w=f(X,Y,Z), what is the RHS referred to as _____
a) right hand side
b) expression
c) literals
d) Boolean

3. The general form for calculating the number of rows in a truth table is _____
a) 2n
b) 2n+1
c) 2n
d) 2n+1

4. The complement term for X'.Y'.Z + X.Y will be _____
a) XYZ'+X'Y'
b) (X+Y+Z')(X'+Y')
c) (X+Y+Z')(X'+Y)
d) (X+Y+Z')(X'+Y)

5. The minterm of any expression is denoted by _____
a) Mt
b) m
c) M
d) min

6. A Karnaugh map (K-map) is an abstract form of _____ diagram organized as a matrix of squares.
a) Venn Diagram
b) Cycle Diagram
c) Block diagram
d) Triangular Diagram

7. There are _____ cells in a 4-variable K-map.

a) 12

b) 16

c) 18

d) 8

8. Each product term of a group, w'.x.y' and w.y, represents the _____in that group.

a) Input

b) POS

c) Sum-of-Minterms

d) Sum of Maxterms

9. Product-of-Sums expressions can be implemented using _____

a) 2-level OR-AND logic circuits

b) 2-level NOR logic circuits

c) 2-level XOR logic circuits

d) Both 2-level OR-AND and NOR logic circuits

10. Don't care conditions can be used for simplifying Boolean expressions in _____

a) Registers

b) Terms

c) K-maps

d) Latches

Answers: 1.a   2. b   3. c   4. b   5. b   6. a   7.b   8. c   9. d   10.c

Short Questions (2 Marks)

11**.** What is Boolean algebra?

12. List out the OR laws.

13. List out the laws of complementation.

14. What are commutative laws?

15. What are Associative laws?

16. What are distributive laws?

17. Define min terms.

18. Define max terms.

19. What is SOP form?

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20. What is the purpose of Don't Care conditions?

Paragraph Questions (5 Marks)

21. State and explain DeMorgan's theorem.
22. State and explain commutative laws and distributive laws.
23. State and explain OR, AND and laws of complementation.
24. Discuss about simplifying logic gates with own example and explain POS form.
25. Describe about SOP and POS forms with example.
26. Explain the purpose of K-Map and its advantages.
27. Simplify the form F(ABC) = $\sum$(0, 1, 3, 4,6, 7) and draw the logic diagram.
28. Simplify the equation F(WXY") = $\sum$(1, 2, 4, 7) , d(WYZ) =$\sum$(0, 3,6), find SOP and POS forms.
29. Discuss about rolling the map with example.
30. Describe about eliminating redundant groups with example.

Essay Type Questions (10 Marks)

31. State and prove the DeMorgan's theorem with diagram.
32. List out important Boolean theorems with diagram.
33. Simplify the equation a) F(x, y, z) = x' y' z' + x y' z + x y z' + x y z

b) F(x, y, z) = x' y z' + x y' z + x y z' + x' y z' + x' y' z'

c) F(x, y, z) = x' y' z + x y' z + x y' z' + x y z' + x' y z (using basic laws).

34. Draw the logic diagram for the above expression and reduced expression (SOP and POS forms).

35. List out the maxterm and minterms for three binary variables and explain.
36. How do you simplify Boolean expression using K-map with example?
37. Discuss the advantages and disadvantages of K-maps.
38. Simplify the equation f(a,b,c,d) =$\sum$m(3,7,11,12,13,14,15) and draw the SOP & POS form.
39. Minimize the following function in SOP minimal form using K-Maps: F (A, B, C, D) =$\sum$ m (1, 2, 6, 7, 8, 13, 14, 15) + d (3, 5, 12)
40. Discuss the various rules of simplification using K- map with example.

UNIT –III

Choose the Correct Answer

1. Which of the following combinations of logic gates can decode binary 1101?

a) One 4-input AND gate

b) One 4-input AND gate, one inverter

c) One 4-input AND gate, one OR gate

d) One 4-input NAND gate, one inverter

2. The carry propagation can be expressed as _____

a) Cp = AB

b) Cp = A + B

c) All but Y0 are LOW

d) All but Y0 are HIGH

3.3 bits full adder contains _____

a) 3 combinational inputs

b) 4 combinational inputs

c) 6 combinational inputs

d) 8 combinational inputs

4. Following flip flop used as latch

a) JK flip flop

b) Master slave JK flip flop

c) T flip flop

d) D flip flop

5. D flip flop is used as

a) differentiator

b) divider circuit

c) delay switch

d) all of these

6. T flip flop is used as

a) transfer data circuit

b) toggle switch

c) time delay switch

d) none of the above

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7. Race condition occurs in

a) Synchronous circuit

b) Asynchronous circuit

c) Combinational circuit

d) all of the digital circuit

8. A basic S-R flip-flop can be constructed by cross-coupling of which basic logic gates?

a) AND or OR gates

b) XOR or XNOR gates

c) NOR or NAND gates

d) AND or NOR gates

9. How many types of sequential circuits are?

a) 2

b) 3

c) 4

d) 5

10. The sequential circuit is also called _____

a) Flip-flop

b) Latch

c) Strobe

d) Adder

Answers: 1. b   2. b   3. d   4.d   5. c   6. b   7.b   8. c   9. a   10. b

Short Questions (2 Marks)

11**.** What is combination circuit?

12. What is adder?

13. What is half adder?

14. What is full subtractor?

15. What is multiplexer?

16. What is encoder?

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17. What is Flip flop?

18. What is counter?

19. What is race condition?

20. What is the purpose of shift registers?

Paragraph Questions (5 Marks)

21.What is adder? Explain the full adder circuit with its table.

22. What is the purpose of subtractor? Explain the half subtractor with its table.

23. Draw and explain 8 to 1 line multiplexer.

24. Draw and explain 1 to 8 demultiplexer.

25. Explain the concept of encoder with example.

26. What is a flip flop? Discuss its function and application.

27. What is J-K flip flop? What are its advantages over S-R flip flop?

28. What is demultiplexer? What is the difference between a decoder and a demultiplexer?

29. What is the function of a counter? Discuss the principle of a binary counter with diagram.

30. What is a shift register? Discuss its types and applications.

Essay Type Questions (10 Marks)

31. Discuss about adder and its types with diagram and its table.

32. Discuss about subtractor and its types with diagram.

33. Explain the concept of BCD adder with circuit.

34. Discuss the function of a multiplexer / data selector with example.

35. What are encoders and decoders? Discuss their applications.

36. What is D flip flop? Discuss its applications. What is the difference between a D flip flop and a D latch?

37. Describe about master slave J-K flip flop with diagram.

38. What is the function of a counter? Discuss about asynchronous ripple counter with diagram.

39. What is SR flip flop? Discuss the disadvantages over JK flip flop.

40. Discuss the concept of shift register and its types with diagram.

UNIT – IV
Choose the Correct Answer

1.The number of output pins of a 8085 microprocessor are

a) 40

b) 27

c) 21

d) 19

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2. Following is a 16 bit register for 8085 microprocessor

a) stack pointer

b) accumulator

c) register b

d) register c

3. A set of registers which contain are

a) data

b) memory addresses

c) result

d) all of these

4. There are primarily two types of register

a) general purpose register

b) dedicated register

c) A & B

d) none of these

5. Name of the dedicated register is

a) Program counter

b) instruction register

c) stack pointer

d) all of these

6. The external system bus architecture is created using from _____ architecture.

a) PASCAL

b) Dennis Ritchie

c) Charles Babbage

d) Von Neumann

7. In 8085 microprocessor, how many interrupts are maskable.

a) two

b) three

c) four

d) five

8. In an instruction of 8085 microprocessor, how many bytes are present?

a) one or two

b) one, two or three

c) one only

d) two or three

9. Which of the following register of 8085 microprocessor is not a part of programming model?

a) instruction register

b) memory address register

c) status register

d) temporary data register

10. The program counter in 8085 microprocessor is a 16 bit register because,

a) it counts 16 bits at a time

b) there are 16 address lines

c) it facilitates the users storing 16 bit data

d) it has fetch two 8 bit data at a time

Answers: 1. b   2.a   3. d   4. c   5. d   6. d   7. c   8. b   9. c   10. b

Short Questions (2 Marks)

11. Define the terms LSI and VLSI.
12. What is Artificial intelligence?
13. What is IC?
14. Define firmware.
15. What is general purpose register?
16. What is a microcomputer?
17. What is the purpose of flags?
18. What is PSW?
19. Define machine cycle.
20. What is fetch cycle?

Paragraph Questions (5 Marks)

21. Write notes about evolution of digital computers.
22. Discuss about single chip microcomputers.
23. Describe the terms a) hardware b) software c) firmware.

24. Draw the schematic diagram of a CPU and explain it.

25. What is the various status flags provided in 8085? Discuss their roles.

26. Discuss the function of ALU of 8085.

27. Discuss the instruction cycle, machine cycle and state.

28. Discuss fetch operation and execute operation.

29. Draw and explain the timing diagram for the MVI r, data.

30. Discuss about opcode, operands and instruction word size.

Essay Type Questions (10 Marks)

31. What are the various computer generations? Discuss main features of each generation. Give examples of computers of each generation?

32. What are the essential elements of a CPU? Discuss the function of each element, and describe the important applications of microprocessors.

33. Discuss about block diagram of Intel 8085.

34. What are the various registers of 8085? Discuss their function.

35. Draw and explain the timing diagram for fetch operation.

36. Draw and explain the pin configuration of Intel 8085.

37. Draw and explain the timing diagram of memory write operation.

38. Draw and explain the flow of instruction word, instruction cycle.

39. Draw and explain the timing diagram for i/o read and write operation.

40. Explain the requirement of a program counter, stack pointer and status flags in the architecture of Intel 8085 microprocessor.

UNIT – V
Choose the Correct Answer

1. Which one of the following addressing technique is not used in 8085 microprocessor?

a) Register

b) Immediate

c) Register indirect

d) Relative

2. XCHG instruction of 8085 exchanges the content of _____

a) Top of stack with contents of register pair

b) BC and DE register pair

c)HL and DE register pair

d) None of the above

3. A machine language instruction format consists of
a) Operation code
b) Operation code field and operand field
c) Operand field
d) None of these

4. The instruction MOV Ax, 13H is an example of
a) Register addressing mode
b) Immediate addressing mode
c) Based indexed addressing mode
d) Direct addressing mode

5. What is SIM?
a) Set interrupt mask
b) Sorting interrupt mask
c) Select interrupt mask
d) None of these

6. Output of the assembler in machine codes is referred to as
a) Source program
b) Macro instruction
c) Object program
d) Symbolic addressing

7. The technique of assigning a memory address to each i/o device in the computer system is called
a) Memory mapped i/o
b) Ported i/o
c) Dedicated i/o
d) Wired i/o

8. The register in the 8085A that is used to keep track of the memory address of the next opcode to be run in the program is the
a) Stack pointer
b) Program counter
c) Instruction pointer

d) Accumulator

9. What is the difference between a mnemonic code and machine code?
a) There is no difference
b) Machine code is in binary, mnemonic codes are in shorthand English
c) Machine code are in shorthand English, mnemonic codes are in binary
d) None of these

10. What kind of computer program is used to convert mnemonic code to machine code?
a) Debug
b) Assembler
c) C++
d) FORTRAN

Answers:1. d   2. c   3. b   4.b   5.a   6.c   7.a   8.b   9. b   10. b

Short Questions (2 Marks)

11**.** What is an instruction?
12. What is an instruction set?
13. What is the purpose of data transfer group?
14. What is the purpose of branch control group?
15. What is the purpose of i/o and machine control group?
16. What is addressing modes?
17. How many types of Intel 8085 instruction are classified?
18. Explain the command MVI A, 05.
19. What is implicit addressing?
20. What is disassembler?

Paragraph Questions (5 Marks)

21**.** Classify 8085 instructions in various groups. Give examples of instructions for each group.
22. What are the various types of data formats for Intel 8085 instructions? Give examples for each type of data format.
23. Discuss about direct addressing and register indirect addressing with example.
24. Describe about Intel 8085 instructions with example.

25. Discuss the features of assembly language.

26. Write an assembly language program for 8 bit addition.

27. Write an assembly language program for 8 bit subtraction.

28. Discuss the areas of applications of machine language, assembly language and high level language.

29. What are source language and object language? Explain it.

30. Explain the functions of compiler, assembler and interpreter.

Essay Type Questions (10 Marks)

31. Discuss the importance of groups of instructions with example.

32. Explain the concept of instruction and data formats with example.

33. Briefly explain the various addressing modes with example.

34. List out the Intel 8085 instructions with example.

35. Explain what operation will take place when the following instructions are executed; LXI rp, data; LDA addr, LHLD addr, STA addr, and SHLD addr.

36. Explain what operation is performed when the following instructions are executed: DAD rp, DAA, CMP r,   CMP M, CMA, RAL, PUSH rp and POP rp.

37. Discuss about assembly language, one-pass and two-pass assembler with example.

38. Write an assembly language program to add two 8 bit numbers, the sum may be of 16bits.

39. Write an assembly language program to find the sum of a series of 8 bit numbers.

40. Write an assembly language program to arrange a series of numbers in ascending order.

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