

2014

Time: 3 hours

Full Marks: 70

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer from **all** the Groups as directed.

Group – A**(Compulsory)**

1. Each question below gives a multiple-choice of answer. Choose the most appropriate one and write in the answer sheet: 1x15=15
- a) The _____ provides a path between the CPU and peripheral devices. Which are connected via interface cards.
- Computer
 - Expansion Bus
 - Memory
 - CPU
- b) Which of the following is the 1's complement of 10?
- 01
 - 110
 - 11
 - 10

c) The time required for the fetching and execution of one simple machine instruction is:

- i. Delay time
- ii. CPU cycle
- iii. Real time
- iv. Seek time

d) A program that converts computer data into some code system other than the normal one is known as:

- i. Encoder
- ii. Simulation
- iii. Emulator
- iv. Coding

e) A memory that does not change its contents without external causes known as:

- i. Dynamic memory
- ii. Static memory
- iii. RAM
- iv. EEPROM

f) Conversion of binary number 101110 to octal is:

- i. 35
- ii. 46
- iii. 56
- iv. 50

g) Which gate only sends one through if neither of its terminals receives a pulse?

- i. NOT
- ii. NOR
- iii. OR

- iv. NAND
- h) Conversion of an octal number 73_8 to binary number is:
 - i. 110111
 - ii. 111100
 - iii. 110010
 - iv. 111011
- i) An electrical inter-connection that permits 8 or more bits of data to be moved in the same instant of time is called:
 - i. Outline processor
 - ii. Page layout program
 - iii. Parallel interface
 - iv. None of the above
- j) An AND gate:
 - i. Implements logic addition
 - ii. Is equivalent to a series switching circuit
 - iii. Is an any or all gate
 - iv. Is equivalent to a parallel switching circuit
- k) The two main components of CPU is:
 - i. Control unit and registers
 - ii. ALU and bus
 - iii. Control unit and ALU
 - iv. Registers and main memory
- l) A full-adder can add:
 - i. Three nibble at a time
 - ii. Two nibble at a time
 - iii. Three bits at a time
 - iv. Two bits at a time
- m) A D flip flop is _____ flip flop.

- i. Digital
 - ii. Delayed
 - iii. Dial type
 - iv. Differential
- n) A ring counter is same as:
- i. Shift register
 - ii. Parallel counter
 - iii. Up-down counter
 - iv. None of the above
- o) The octal equivalent to the binary number 10111100 is:
- i. 274
 - ii. 188
 - iii. 192
 - iv. BC

Group – B

Answer any **five** questions of the following: 4x5=20

2. What is a full adder? How a full adder is built using half adder.
3. What is DMA controller? Explain in brief.
4. Discuss the role of the timing and control unit of a computer.
5. Which bus architecture are used today in a modern digital computer? Discuss in brief.
6. What is the dual of a Boolean expression? What is the difference between dual and complement?
7. What do you understand by real and virtual memory?
8. Convert the following:
 - a) Octal number to hexadecimal number
 - i. 1527

- ii. 134
- b) Hexadecimal to decimal number:
 - i. 6E
 - ii. 2B6D

Group – C

Answer any **five** questions of the following:

7x5=35

- 9. Discuss the working principle of a synchronous counter with its block diagram. What is the advantage of synchronous counter over serial counter?
- 10. What is a flip-flop? What is its function? Explain how an S-R flip-flop is realized employing?
 - a) NOR gate
 - b) NAND gate
- 11. What are:
 - a) Sum of Product Form and
 - b) Product of Sum Form of logic expression?Explain with suitable example.
- 12. Explain AND and OR Operation with suitable examples of logic statements and electrical switches. Does AND Operation perform multiplication? Explain.
- 13. What are the different types of memory? Discuss their merits, demerits and area of applications.
- 14. What is a half-adder? Write truth table for a half adder and develop its logic circuit.
- 15. Explain the term hardware interrupts. What do you understand by exception?

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