

GUJARAT TECHNOLOGICAL UNIVERSITY**MCA - SEMESTER-I • EXAMINATION – SUMMER 2013****Subject Code: 2610004****Date: 13-06-2013****Subject Name: Fundamentals of Computer Organization****Time: 10:30am to 13:00pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1**
- | | | | |
|-----|------|--|-----------|
| (a) | i) | Define the following terms: register, multiplexer, latch | 03 |
| | ii) | Convert $(0.6875)_{10}$ to binary. | 02 |
| | iii) | Convert $(1010.011)_2$ to decimal. | 02 |
| (b) | i) | What is a BCD code? What are its advantages and disadvantages? | 03 |
| | ii) | Where does complements are used? Compare 1's complement with 2's complement. | 04 |
- Q.2**
- | | | | |
|-----|-----|--|-----------|
| (a) | i) | State the De Morgan's theorems. Explain any one. | 03 |
| | ii) | Simplify the following Boolean function: | 04 |
| | i) | $xy+x'z+yz$ | |
| | ii) | $x'y'z+x'yz+xy'$ | |
| (b) | | Draw and explain the block diagram of a digital computer. | 07 |
| | | OR | |
| (b) | | Briefly explain the working of any three peripheral devices. | 07 |
- Q.3**
- | | | | |
|-----|-----|---|-----------|
| (a) | i) | Draw the truth table and graphical symbol, and write the algebraic function for following gates: AND, XOR | 03 |
| | ii) | Simplify the Boolean function: $F = A'B'C' + B'CD' + A'BCD' + AB'C'$ | 04 |
| (b) | | What is Flip-flop? Draw and explain the logic diagram and characteristics table of RS flip flop. | 07 |
| | | OR | |
| (a) | i) | Implement the Boolean function $F = xy + x'y' + y'z$ using logic gates. | 03 |
| | ii) | Simplify the following Boolean function: $F(w,x,y,z) = \sum(0,1,2,4,5,6,8,9,12,13,14)$ | 04 |
| (b) | | What is counter? Design and explain 3-bit binary counter. | 07 |
- Q.4**
- | | | | |
|-----|-----|--|-----------|
| (a) | i) | Implement full adder in sum of products. | 03 |
| | ii) | Define following terms: instruction word, instruction cycle, instruction counter, op-code register | 04 |
| (b) | | What do you mean by Addressing Techniques? Explain the direct, relative and indexed addressing techniques with an example. | 07 |
| | | OR | |
| (a) | i) | Define access time; seek time and latency for disk memories. | 03 |
| | ii) | Differentiate Static and dynamic RAM | 04 |
| (b) | | Explain the organization of control registers of control unit. | 07 |
- Q.5**
- | | | | |
|-----|--|---|-----------|
| (a) | | Explain the interface of different buses with processor, memory and | 07 |
|-----|--|---|-----------|

- I/O devices.
- (b)** Draw and explain the block diagram of 8086 and explain it. **07**
- OR**
- Q.5 (a)** Briefly explain the instruction format of 8086 and explain the working of following instructions: Working of MOV, ADD, MUL, CMP, DEC, XOR **07**
- (b)** Draw the structure of 8086 execution unit and explain it. **07**