

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA - SEMESTER-I • EXAMINATION – SUMMER • 2015

Subject Code: 2610004

Date: 12-05-2015

Subject Name: Fundamentals of Computer Organization

Time: 10:30 pm to 01:00 pm

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) Draw and explain the basic components of digital computer. **07**
(b) Explain the different types of registers used in computer and also explain the different types of flags in CCR. **07**

- Q.2** (a) 1) Give the difference between impact printers and non-impact printers. **03**
2) Write a short note on Video Display Unit (VDU). **04**
(b) 1) Explain different types of number systems. **04**
2) Explain BCD code in details with an example. **03**

OR

- (b) 1) Subtract $(1010)_2$ from $(1101)_2$ using 1st complement. **01**
2) Convert $(101101)_2$ to decimal. **02**
3) Convert $(68)_{10}$ to binary. **02**
4) Convert $(68.68)_{10}$ to binary. **02**

- Q.3** (a) Answer the followings: **07**
1) What are XOR and NAND gate? Give its truth table.
2) Simplify the following logic expression:
$$\bar{x}yz + \bar{x}y\bar{z} + xz$$

3) Simplify the following logic expression:
$$xy + \bar{x}z + yz$$

(b) Answer the followings: **07**
1) State the De Morgan's theorems. Explain any one.
2) What is karnaugh map? Explain with an example.

OR

- Q.3** (a) Answer the followings: **07**
1) What are NOR and AND gate? Give its truth table.
2) What is the Boolean duality principle?
3) Which Boolean operation is referred to as a Boolean sum?

(b) Answer the followings:

07

- 1) Convert the following logic expression into canonical form:

$$A + \bar{A}B$$

- 2) Simplify the following logic expression:

$$A\bar{C} + B\bar{C} + \overline{AC} + \overline{BC}$$

- 3) Implement logic circuits for the following Boolean expression:

$$D = A\bar{B} + \bar{A}C$$

Q.4 (a) What is flip-flop? Explain the R-S flip-flop using NOR and NAND gates. 07

(b) What is ALU? What is the importance of ALU? Draw and explain the block diagram of ALU. 07

OR

Q.4 (a) Write a short note on: Shift registers 07

(b) What is adder? Draw the half adder with the help of XOR gate. 07

Q.5 (a) What is ROM? Draw and explain the logic diagram of ROM and also explain the different types of ROM. 07

(b) What do you mean by Addressing Techniques? Explain Indirect and Indexed Addressing techniques with an example. 07

OR

Q.5 (a) Draw and explain the internal architecture of 8086. 07

(b) Explain the interface of different buses with processor, memory and input output devices. 07
