



K17P 0233

Reg. No. :

Name :

First Semester M.C.A. Degree (Reg./Supple./Imp.) Examination, January 2017
(2014 Admn. Onwards)
MCA 1C02 : DIGITAL SYSTEMS AND INTRODUCTION TO
MICROPROCESSORS

Time : 3 Hours

Max. Marks : 80

- Instructions :** 1) **Section – A** : Answer **any ten** questions. **Each** question carries **three** marks.
2) **Section – B** : Answer **all** questions. **Each** question carries **ten** marks.

SECTION – A

Answer **any ten** questions, **each** question carries **three** marks.

1. Convert $(0.6875)_{10}$ to binary.
2. Explain distributive law of Boolean algebra.
3. Give the truth table of half subtractor.
4. Write a note on decoders.
5. With a block diagram explain combinational circuit.
6. Write a note on shift registers.
7. State various applications of shift registers.
8. Compare synchronous and asynchronous counters.
9. How transistor can be used as a switch ?
10. Define propagation delay.
11. Write a note on function of the address bus and the direction of the information flow on the address bus.
12. Explain the complete functioning of the following instructions in 8085 processor :
i) SUB B ii) RST 1.

P.T.O.



SECTION – B

Answer all questions, each question carries 10 marks.

13. a) i) Convert the following expression into SOP form $f(A, B, C) = A + ABC$. 5
 ii) Simplify the expression $AB + \overline{AC} + \overline{ABC} (AB + C)$. 5
 OR
- b) i) Convert the given expression into standard POS form $Y = A \cdot (A + B + C)$. 5
 ii) Prove that $(a + b) (\overline{a} + c) (b + c) = (a + b) (\overline{a} + c)$. 5
14. a) i) Reduce the following using K-map technique : 5
 $f(A, B, C, D) = \overline{A} \overline{B} D + ABC\overline{D} + \overline{A}BD + ABC\overline{D}$.
 ii) With the help of a neat diagram explain design of a BCD adder circuit. 5
 OR
- b) i) Simplify the following using K-map technique : 5
 $Y = (\overline{P} + Q + \overline{R}) (P + Q + R) (P + Q + \overline{R})$.
 ii) Implement the following Boolean function using 8 : 1 MUX : 5
 $F(P, Q, R, S) = \sum m (0, 11, 3, 4, 8, 9, 15)$.
15. a) i) What is a sequential circuit ? Discuss the different types of sequential circuits. 5
 ii) Explain the working of Johnson counter. 5
 OR
- b) i) Explain the operation of the master-slave J-K flip-flop along with its circuit diagram. 5
 ii) Draw and explain 4-bit serial in parallel out shift register. 5
16. a) i) Draw and explain the basic CMOS inverter circuit. 5
 ii) Describe the characteristics of TTL family. 5
 OR
- b) i) Give the comparison between TTL and CMOS families. 5
 ii) Explain the following : 5
 A) Fan-out B) Fan-in C) Noise margin.
17. a) i) With the help of a block diagram explain the architecture of intel 8085. 10
 OR
- b) i) Explain various addressing modes in 8085. 5
 ii) Explain subroutines in 8085. 5