B. Tech (Third Semester Computer Science & Engineering (C.B.C.S)) Winter – 2022
End Semester Examination
Course Name: Fundamentals of Digital Circuits & Microprocessor

Course Code: BCS2302 ASD/EFV5/63-5F/1471
Time: 3 Hours] [Max. Marks: 60

Instructions to Candidates:

1. *All questions carry marks as indicated.*
2. *All the sub- questions (a, b, c, d, and e) ofQue.1 in Section A are compulsory.*
3. *Solve any two sub-questions in Que. 2 to Que.6 in Section B.*
4. *Assume suitable data wherever necessary.*
5. *Use of non-programmable calculator is permitted.*

Section A

Que. 1. **(a)** Convert hexadecimal number (A0F9.0EB) 16 into decimal form. 2 (CO1)

(b) Convert the Boolean expression Y= AB+A B'C +BC' into standard Boolean SOP expression. 2 (CO2)

(c) Distinguish between combinational and sequential circuits. 2 (CO3)

(d) Illustrate race around condition for J-K flip flop. 2 (CO4)

(e) Write different features of 16-bit Microprocessor 8086. 2 (CO5)

Section B

Que. 2. **(a)** Explain and verify De-Morgan's theorem using suitable example. 5 (CO1)

(b) Write short notes with example: 5 (CO1)
i) XS-3 code
ii) Gray code

(c) Modify following Boolean expression with reduced number of mean terms. 5 (CO1)
i) Y= A[B+C'(AB+AC')']
ii) Y= [A+ (BC)']'. [(AB)' +ABC]

Que. 3. **(a)** Determine reduced SOP expression for the following and implement using logic gates, 5 (CO2)

$$F(A,B,C,D) = \sum m\,(5,6,7,12,13) + d\,(4,9,14,15)$$

(b) Write the following Boolean expression in standard SOP and canonic form 5 (CO2)
Y= A'B'D + A'B + ABC + ACD'
.

(c) Determine reduced POS expression for the following and implement using logic gates, 5 (CO2)

$$F(A,B,C,D,) = \prod M(0,1,4,5,7,10,11,13,14,15)$$

Que.4 **(a)** Design Full adder using XOR and AOI logic gates. 5 (CO3)

(b) Show that Full subtractor can be designed using two half subtractor. 5 (CO3)

(c) Design 8:1 MUX using 4:1 MUX. 5 (CO3)

Que. 5. **(a)** Convert the S-R flip flop into J-K flip flop. 5 (CO4)

(b) Design and implement using JK flip flop negative edge triggered, 3-bit asynchronous up counter. 5 (CO4)

(c) Classify different types of RAM and explain each in brief. 5 (CO4)

Que. 6. **(a)** Discuss on functioning of ALU and various registers of 8085 Microprocessor. 5 (CO5)

(b) Demonstrate different addressing modes of 8085 with one example for each. 5 (CO5)

(c) Sketch memory read timing diagram of 8085 Microprocessor and summarize sequence of operations in it. 5 (CO5)