

B.Tech Sem – IV (2007 Course) (Electronics) : WINTER - 2018

SUBJECT: DIGITAL ELECTRONICS AND LOGIC DESIGN

Day: Thursday
Date: 15/11/2018

W-2018-2760

Time: 02.30 PM TO 05.30 PM
Max. Marks: 80

N.B.:

- 1) **Q.No.1** and **Q.No.5** are **COMPULSORY**. Out of the remaining attempt **ANY TWO** questions form section – I and Section – II.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the section should be written in **SEPARATE** answer books.
- 4) Draw neat and labeled diagrams **WHEREVER** necessary.
- 5) Assume suitable data, if necessary.

SECTION-I

- Q.1** a) Convert the following numbers to their equivalent gray code. (05)
i) $(42)_{10}$ ii) $(16)_{10}$ iii) $(100100)_2$
- b) Reduce the following function using K-map technique. (05)
 $F(A,B,C,D)=\sum m(0,1,4,8,9,10)$
- c) Write a short note on tristate logic and its application. (04)
- Q.2** a) Classify the different digital codes. (07)
- b) Using 2's complement perform the following (06)
i) $(-14)_{10} + (+9)_{10}$ ii) $(7)_{10} - (9)_{10}$ iii) $(39)_{10} - (8)_{10}$
- Q.3** a) Simplify the following expression using method indicated and implement using basic gates: (13)
- i) $F(A,B,C,D)=\sum m(1,3,7,11,15) + d(0,2,5)$ [Using K-map]
- ii) $F(A,B,C,D)=\sum m(0,1,3,7,8,9,11,15)$ [Quine Mc-cluskey method]
- Q.4** a) Compare the TTL, CMOS and ECL logic family. (06)
- b) With neat circuit diagram explain the operation of bipolar static RAM cell. (07)

SECTION-II

- Q.5** a) Draw and explain half subtractor circuit along with truth table. (05)
- b) Write a short note on ALU. (04)
- c) Draw and explain Ring counter. (05)
- Q.6** a) Design a 4-bit BCD to Excess-3 code converter and implement it using required gates. (07)
- b) Design a 5-bit comparator using a single IC7485 and gate. (06)
- Q.7** a) Implement the following expression using 8:1 multiplexer. (07)
 $Y(A,B,C,D)=\sum m(0,1,2,5,7,8,9,14,15)$
- b) What is Encoder? Explain a 'Priority encoder' with logic diagram. (06)
- Q.8** Carry out the following flip-flop conversions: (06)
- i) S-R to D
- ii) J-K to S-R
- b) What is the shift register? State and explain different modes of shift register. (07)

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