SECBiomed)/Sem-IV/Choice Based

Paper / Subject Code: 40104 / Digital Electronics

23/05/19

Q.P. Code : 21326

[Time: 3 Hours] **[Marks: 80]**

Please check whether you have got the right question paper.

N.B:
1. Question **No. 1** is **compulsory.**
2. Attempt any **Three** questions from remaining Five questions.
3. Answers should be supported by diagrams, waveforms and theorems if any.

Q.1 a) Convert the no (27.125)10 into octal and hexadecimal number system. **04**

b) Prove the following using Boolean algebraic theorems. **04**

i) $AB+\overline{A}B+\overline{A}\,\overline{B} = \overline{A}+B$

ii) $A+\overline{A}B+A\overline{B} = A+B$

c) Realize the logical function using basic gates and then NAND gates only **04**

$$F=\left[A+\left(\overline{A+\overline{C}}\right)\right]\left(B+\overline{C}\right)\overline{A}$$

d) What is parity? How can it be used for error detection? **04**

e) State the rules for BCD subtraction. **04**

Q.2 a) Design an 8 bit adder using two 4 bit adders. **05**

b) Design a 32:1 MUX using 16:1 MUX. **05**

c) Design a BCD to Excess –3 code converter using minimum no of NAND gates. **10**

Q.3 a) Implement the following expressions using 8:1 multiplexer. **10**

$F(A, B, C, D) = \sum m\,(0,2,5,6,9,10,11,14)$

b) Design a 3 bit binary up-down counter with a direction control M. Use JK FF and synchronous mode. **10**

Q.4 a) Find a logical expressions for full subtract or and represent using NAND gates. **05**

b) Represent $(4096)_{10}$ into **05**

i) BCD ii) Excess -3 iii) Gray code iv) Sign magnitude format.

c) Carry out following subtraction using 2's complement method. **05**

i) (72 – 112)

d) Implement **05**

$F_1 = \sum m\,(1,2,5,6,10,12,13,15)$

Using a decoder specify the number of IC used.

TURN OVER

Q.5 a) Design a logic circuit to convert JK FF to D flip flop. 10
b) Design a 3 bit binary asynchronous counter. Draw counter circuit with timing diagram. 10

Q.6 Write short notes on any two. 20
(a) Characteristics of digital IC.
(b) Ring counter and twisted ring counter
(c) Master slave J-K flip flop.
(d) Five and stoic variable K maps.