Question Paper Code: 53504

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

Third Semester

Electronics and Instrumentation Engineering

15UEI304 - DIGITAL ELECTRONICS

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. What is the binary equivalent of the decimal number 368?

(a) 101110000	(b) 110110000
(c) 111010000	(d) 111100000

- 2. Which of the following is the most widely used alphanumeric code for computer input and output?
 - (a) Gray (b) ASCII (c) Parity (d) EBCDIC
- 3. How many bits are required to store one BCD digit?
 - (a) 1 (b) 2 (c) 3 (d) 4
- 4. The number of full and half-adders required to add 16-bit numbers is

(a) 8 half-adders, 8 full-adders	(b) 1 half-adder, 15 full-adders
(c) 16 half-adders, 0 full-adders	(d) 4 half-adders, 12 full-adders

- 5. How many flip flops are required to construct a decade counter?
 - (a) 10 (b) 8 (c) 5 (d) 4

6. What is the difference between a ring shift counter and a Johnson shift counter?

(a) there is no difference	(b) a ring is faster
(c) the feedback is reversed	(d) the Johnson is faster

7. Which hazard is overcome by properly designed two level AND-OR or OR-AND circuit

(a) dynamic hazard	(b) static-0 hazard
(c) static-1 hazard	(d) none of the above

8. Table that is not a part of asynchronous analysis procedure.

(a) transition table	(b) state table
(c) flow table	(d) excitation table

- 9. Which of the memory is volatile memory?
 - (a) ROM (b) RAM (c) PROM (d) EEPROM
- 10. In a read-only memory information can be stored
 - (a) at the time of fabrication
 - (b) by the user only once during its life time
 - (c) by the user a number of times
 - (d) in any of the above ways depending upon the type of memory

PART - B (5 x 2 = 10 Marks)

- 11. Convert 0.640625 decimal numbers to its octal equivalent.
- 12. Define combinational logic.
- 13. Write down the characteristic equation for JK flip flop.
- 14. Differentiate fundamental mode and pulse mode asynchronous circuits.
- 15. What is programmable logic array? How it differs from ROM?

PART - C (5 x
$$16 = 80$$
 Marks)

- 16. (a) (i) Convert the binary number $(101111.1101)_2$ in to decimal. (4)
 - (ii) Convert the hexadecimal number in to decimal A3BH and 2F3H. (4)
 - (iii) Design a 4 bit BCD to Excess-3 code converter. (8)

(b) Simplify the following expression using K-map

(i)
$$Y = \sum_{m} (7, 9, 10, 11, 12, 13, 14, 15)$$

(ii) $Y = m_1 + m_5 + m_{10} + m_{11} + m_{12} + m_{13} + m_{15}$ (16)

17. (a) Design a BCD adder and explain its working with necessary logic diagram. (16)

Or

- (b) Give the CMOS logic circuit for NOR gate and explain its operation. (16)
- 18. (a) Design and explain a ring counters with suitable example. (16)

Or

- (b) Design a MOD-6 synchronous counter using J-K Flip-Flops. (16)
- 19. (a) Design an asynchronous sequential circuit that has two internal states and one output. The excitation and output function describing the circuit are as follows:
 X = x₁x₂ + x₁y₂ + x₂y₁; Y = x₂ + x₁y₁y₂ + x₁y₁ + x₁; Z = x₂ + y₁ (16)

Or

- (b) What are hazards? When does the hazard occur in combinational circuits and quote an example? Name the types of hazards and how they are avoided. (16)
- 20. (a) Explain with neat diagrams a RAM architecture. (16)

Or

(b) (i) Draw the block diagram of a PLA and explain its IC 7575-PLA. (16)