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10639

Reg. No. :

Name :

**Fourth Semester B.Tech. Degree Examination, March 2016
(2013 Scheme)**

13.402 : DIGITAL ELECTRONICS AND LOGIC DESIGN (E)

Time : 3 Hours

Max. Marks : 100

PART - A

Answer **all** questions :

(10×2=20 Marks)

1. State and explain De-Morgan's theorem.
2. Write short notes on excess-3 code.
3. i) Convert $(1101001.101010)_2$ to octal.
ii) Convert $(4BAC)_{16}$ to binary.
4. Design a half adder using NAND gates.
5. Distinguish between CMOS and TTL families.
6. How will you convert R S flip-flop into J K flip-flop ?
7. Draw the circuit diagram of a 4 bit PIPO shift register.
8. Differentiate between combinational and sequential circuit.
9. Write notes on PAL and PLA.
10. Explain state diagrams.



PART – B

Answer **any one** question from **each** Module :

Module – I

11. a) Simplify $Y = \sum (0, 2, 4, 8, 10, 12, 13, 14, 15)$ using Karnaugh map and implement the circuit using minimum number of gates. Also write its equivalent POS form. 10
- b) Prove that $AB + \bar{A}C + BC = AB + AC$. 5
- c) Reduce the expression $(B + BC)(B + \bar{B}C)(B + D)$. 5

OR

12. a) Simplify the expression using Quine MC Clusky method.
 $\sum m = (0, 1, 6, 7, 8, 9, 13, 14, 15)$. 10
- b) Realize all the basic gates using NAND and NOR gates. Write the logic expressions and truth tables. 10

Module – II

13. a) Design and implement a full adder circuit using gates. 10
- b) Explain the operation of a two input TTL NAND gate. 10

OR

14. a) Write notes on multiplexers and demultiplexers. 5
- b) Explain encoder and decoder. 5
- c) With a neat diagram explain the operation of a BCD adder. 10

Module – III

15. a) Draw the circuit diagram of a 4 bit ring counter. Explain its working with timing diagram. 10
- b) Design a mod 5 synchronous up counter using JK flip flop. 10

OR

16. a) Design a serial-in parallel-out shift register. 10
- b) Explain 4 bit Johnson counter with waveforms. 10

Module – IV

17. a) Draw the circuit of an astable multivibrator using discrete gates. Explain its working. 13
- b) What is the difference between static and dynamic RAM. 7

OR

18. a) Draw the circuit of a static bipolar RAM cell and explain its operation. 10
- b) Explain the working of monostable multivibrator using 555 timer. 10