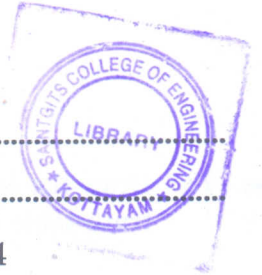


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Reg. No.....

Name.....



**B.TECH. DEGREE EXAMINATION, NOVEMBER 2014**

**Fifth Semester**

Branch : Electrical and Electronics Engineering

**DIGITAL CIRCUITS (E)**

(Old Scheme—Supplementary/Mercy Chance)

[Prior to 2010 Admissions]

Time : Three Hours

Maximum : 100 Marks

**Part A**

*Answer all questions briefly.*

*Each question carries 4 marks.*

1. Distinguish between Weighted and Non-weighted codes. Give examples.
2. Draw the truth-table of half adder and half subtractor.
3. Define fan-in and fan-out. Give values for TTL family.
4. What is a totempole configuration ? What are its advantages ?
5. What is a tristate buffer ? What are its uses ?
6. Write the merits and demerits of a synchronous counter compared to asynchronous counter.
7. What is a presettable counter ? What are its advantages ?
8. What are the differences between Shift registers and Counters ?
9. Draw the circuit of a 3 bit ring counter and state its applications.
10. Show how binary division can be performed with the help of shift registers.

(10 × 4 = 40 marks)

**Part B**

*Answer all questions.*

*Each full question carries 12 marks.*

11. Reduce  $f = \Sigma (1, 2, 4, 5, 6, 8, 9, 12) + d (3, 10, 13, 15)$  using K-map and realise using fundamental logic gates.

*Or*

12. Explain full adder and full subtractor with their truth tables. Realise them using NAND gates only.

**Turn over**

13. Draw the complete circuit of a two-input TTL NAND gate. Explain its working with the help of truth-table and voltage transfer characteristics.

Or

14. (a) Explain 16 : 1 multiplexer with the help of function table and logic diagram. (5 marks)  
(b) Draw the logic diagram and function table of a BCD-to-7 segment decoder. (7 marks)
15. Design and draw the circuit of a Mod-16 up-counter using positive edge triggered JK flip-flops and with minimal combinational logic circuits. Explain using timing diagram.

Or

16. (a) What is race-around ? Explain. Describe any two distinct methods to avoid it. (6 marks)  
(b) Draw the excitation tables for JK, D and T flip-flops and explain them. (6 marks)
17. Design and draw a synchronous mod-6 counter using JK flip-flops. Show the design with the excitation table and K-map. Explain with the logic diagram and waveforms.

Or

18. Design and draw a mod-controlled 4 bit up-down synchronous counter using T flip-flops. Draw the timing diagrams and explain.
19. With a neat circuit diagram, explain the working of a universal shift register.

Or

20. Draw the circuit of a 4 bit shift left and shift right register with mod-control and explain its working with the help of waveforms. Explain its practical applications.

[5 × 12 = 60 marks]

