





12. a) Design a 4 bit BCD adder using full adder and explain its structure and compute the circuit to add 1001 and 0101. Write the sum and carry output of the given binary number. (13)

(OR)

- b) i) Explain the operation and need of priority encoder. (7)  
 ii) Design a  $5 \times 32$  decoder using  $3 \times 8$  decoder and summarize how many decoders required designing? (6)
13. a) Draw RS flipflop circuit and explain its operation with truth table and suggest how to eliminate the undetermined stage? Write some RS Flipflop applications. (13)

(OR)

- b) Design a 4 bit binary counter and explain its counting process. Discuss how to use this circuit to perform both up and down counting. (13)
14. a) Describe the classification of semiconductor memories. (13)

(OR)

- b) Discuss the features and functional blocks of FPGA. (13)
15. a) Illustrate the design procedure of algorithmic state machine with neat flow chart. (13)

(OR)

- b) Discuss the design steps of asynchronous sequential circuits. (13)

**PART – C**

**(1×15=15 Marks)**

16. a) Design a serial 2's complement circuit with a shift register and a flipflop. The binary number is shifted out from one side and its 2's complement shifted into other side of the shift register. (15)

(OR)

- b) Select a  $4096 \times 8$  bit ROM memory to store the driver program of the Robotic design. The memory chip has two chip select inputs and operates from a 5v power supply. How many pins are needed for the integrated circuit package? Draw a block diagram and label all input and output terminals in the ROM. (15)