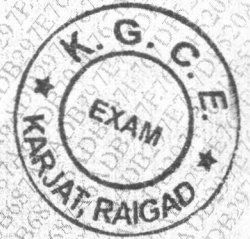


(3 Hours)

80 Marks

- N.B.: (1) Question No. 1 is compulsory.  
 (2) Solve any **three questions** from the **remaining five**  
 (3) Figures to the right indicate full marks  
 (4) Assume suitable data if necessary and mention the same in answer sheet.



- Q.1 a) Perform the following operation using 2's compliment [20]  
 i)  $(14)_{10} - (24)_{10}$   
 ii)  $(24)_{10} - (14)_{10}$   
 Comment on results of (i) and (ii)  
 b) If  $F(A, B, C) = \sum m(0, 3, 5, 7)$  with its truth table and express F in SOP and POS form  
 c) Compare FPGA and CPLD.  
 d) Explain Static RAM
- Q.2 a) Write VHDL code for 3 bit up counter. [10]  
 b) Minimize the following expression using Quine McClusky Technique [10]  
 $F(A, B, C, D) = \sum m(1, 3, 7, 9, 10, 11, 13, 15)$
- Q.3 a) Design 3 bit Binary to Gray code Converter [10]  
 b) Draw and explain a neat circuit diagram of BCD adder [10]
- Q.4 a) Draw and explain two input TTL NAND gate. [5]  
 b) Compare combinational circuits and sequential circuits [5]  
 c) Explain Full Adder circuit using PLA having three inputs, 8 product terms and two outputs. [10]
- Q.5 a) What is excitation table? Explain the excitation table of SR flip flop. [5]  
 b) Convert D flip flop to T flip flop. [5]  
 c) Draw and explain 3 bit asynchronous binary counter using positive edge triggered JK flip flop. Draw the waveforms. [10]
- Q.6 a) Implement following Boolean function using 8:1 multiplexer [6]  
 $F(A, B, C, D) = \overline{A}BD + ACD + \overline{B}CD + \overline{A}CD$   
 b) State and prove Demorgan's theorem [4]  
 c) What are shift registers? How are they classified? Explain working of any one type of shift register. [10]

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