

(3 Hours)

[Total Marks :100

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- N.B. : (1) Q.No 1 is compulsory
 (2) Solve any three questions out of remaining questions.
 (3) Assume suitable data if necessary.

1. Solve any five 20
 - (a) Convert
 - (i) $(174.03125)_{10}$ in octal number and $(DB.94)_{16}$ in binary
 - (ii) Make subtraction using 2's complement method $(52)_{10} - (65)_{10}$
 - (b) Compare schottky barrier diode and PN junction diode
 - (c) Derive the relation between α and β .
 - (d) List the ideal characteristics of OPAMP
 - (e) Prove that NAND gate is universal gate. **a2zSubjects.com**
 - (f) Convert T-FF to D-FF
2. (a) Draw block diagram of a shunt voltage regulator and explain the working 4
 (b) Derive the expression for the stability factor 'S' of a voltage divider bias circuit 8
 (c) Draw circuit diagram of differentiator using OPAMP and explain 8
3. (a) Explain inverting summing amplifier using OPAMP. Derive the expression for output voltage. 8
 (b) $Y = ABC + \bar{B}\bar{C}D + \bar{A}BC$ simplify this equation and realize using basic gates. 4
 (c) Minimize the following expression using K-map 8

$$Y = \sum m (1, 2, 9, 10, 11, 14, 15)$$
 Implement the circuit using minimum number of gates
4. (a) Design on 8 bit comparator using IC 7485 8
 (b) Implement the following function using 8:1 Mux 4

$$F(A, B, C, D) = \sum m (0, 1, 2, 4, 6, 9, 12, 14)$$

 (c) What is shift register? Mention different modes of operation of shift register. 8

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| 5. | (a) | What are advantages of VHDL
Write VHDL program for full adder | 8 |
| | (b) | Design 4 bit synchronous up counter using T-FF | 8 |
| | (c) | Draw the circuit of JK FF using NAND gates and write the truth table | 4 |
| 6. | (a) | Design on astable multivibrator using IC 555 timer to generate an output of 1KHz with 60% duty cycle | 5 |
| | (b) | Draw the circuit diagram of regulated power supply to produce out put voltage of +5V | 5 |
| | (c) | Draw drain characteristics of n-channel JFET and explain various regions | 5 |
| | (d) | What is excess 3 code? Why it is called self complementary code? | 5 |