

- N.B :** (1) Question No. 1 is **compulsory**.
 (2) Attempt any **three** questions from remaining.
 (3) Assume suitable **data** wherever **necessary**.

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| 1. | (a) Prove $A + (A+B) = A$, stating all the rules used. | 4 |
| | (b) Explain two opamp parameters. | 4 |
| | (c) Convert following :— | 4 |
| | (i) $(101101)_2$ to gray code | |
| | (ii) $(247.6875)_{10}$ to octal. | 4 |
| | (d) Design full adder using NAND gate. | 4 |
| | (e) Explain hazards in combinational logic circuits. | |
| 2. | (a) Explain 555 timer working as monostable multivibrator. | 10 |
| | (b) Explain an instrumentation amplifier and mention to applications. | 10 |
| 3. | (a) Design mod-12 asynchronous counter using JK flip flop. | 10 |
| | (b) Minimize the expression using K map and implement using gates. | 10 |
| | $F = \sum m(0, 5, 9, 12, 13, 14, 15) + d(1, 2, 3, 4)$ | |
| 4. | (a) Explain successive approximation type ADC. | 10 |
| | (b) Explain noise margin and fan out. | 10 |
| 5. | (a) Implement following expression $F(A, B, C) = \sum m(0, 2, 5, 6, 7)$ using | 10 |
| | (i) 8 : 1 Mux (one) | |
| | (ii) 4 : 1 Mux (two) | 10 |
| | (b) Explain high pass filter along with its frequency response. | |
| 6. | (a) Explain carry look ahead adder. | 10 |
| | (b) Convert JK to SR flip flop. | 5 |
| | (c) Write short note on interfacing of logic families. | 5 |