17320

11718

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) **Attempt any SIX of the following:** **12**

(i) Draw symbol of EXOR gate and also write its truth table.

(ii) Identify the function of IC 0800 and IC 0809.

(iii) Convert the following binary number to gray code:

1) 1101001

2) 11111

(iv) What is the role of Preset and clear terminal of flip-flop?

(v) Compare TTL and CMOS Logic families. (2 points)

(vi) What is Tristate buffer? Draw its symbol.

(vii) Define modulus of counter? How many flip flops are required for mod 5 counter?

(viii) State the necessity of multiplexer.

Marks

b) **Attempt any TWO of the following:** **8**

(i) Convert the following into Binary and Add them $(A96)_{16} + (28B)_{16}$

(ii) Differentiate between Synchronous and Asynchronous counter.

(iii) Draw circuit diagram of 1:4 Demux using logic gate. Write its truth table.

2. Attempt any FOUR of the following: **16**

a) Compare EPROM and flash memory.

b) Describe operation of full adder with proper truth table and logical diagram.

c) Convert the following number into Binary:

(i) $(736.6)_8$

(ii) $(2F9.25)_{16}$

d) State and prove De Morgan's Theorems.

e) Draw the diagram of 3-bit twisted ring counter using JK F/F. Also write its truth table. Draw waveforms.

f) Draw the block diagram of successive approximation type ADC and explain its working.

Marks

3. Attempt any FOUR of the following: **16**

a) Convert the following expression into their standard SOP form Y = A + BC + ABC + B

b) What is Race around condition and how it is eliminated?

c) Solve the following using 1^s and 2^s complement method.

(i) $(42)_{10} - (63)_{10}$

(ii) $(11010)_2 - (11100)_2$

d) What is priority encoder? Draw the truth and symbol table of decimal to BCD encoder.

e) Draw 4 bit weighted resistor DAC and give expression for output voltage.

f) Reduce the following Boolean expression using Boolean laws.

$Y = A\overline{B} + \overline{A}B + AB + \overline{A}\,\overline{B}$

$Y = A\overline{B}C + \overline{A}BC + ABC$

4. Attempt any FOUR of the following: **16**

a) Draw the internal diagram of IC 7490. Design mod 8 counter using IC 7490.

b) Explain with circuit diagram, the principle of TTL gate (NAND) with totem pole.

c) Calculate analog output of 4 bit DAC and digital input is 1011. Assume $V_{fs} = 5V$

d) Compare sequential and combinational logic circuit. (Four points)

e) Implement OR gate and AND gate using NAND gate.

f) Compare single slope and dual slope ADC.

Marks

5. Attempt any FOUR of the following: **16**

a) Compare R-2R and binary weighted register.

b) Define memory? Write down types of memory.

c) Draw PIPO shift register. State applications of shift register.

d) Design 16:1 MUX using 8:1 MUX

e) Give any four characteristics of CMOS and ECL logic families.

f) Convert the following decimal numbers into excess-3 code

(i) $(5)_{10}$

(ii) $(25)_{10}$

(iii) $(46)_{10}$

(iv) $(144.4)_{10}$

6. Attempt any FOUR of the following: **16**

a) Draw block diagram and explain working of dual slope ADC.

b) Describe working of SR latch using NAND gates with proper truth table.

c) Draw the block diagram of ALU IC 74181 and also write its operation.

d) Mention any eight Boolean laws.

e) Draw 3 bit synchronous counter with truth table and explain working.

f) Draw and explain static RAM cell (TTL).
