2/161

1801E1191

Candidate's Seat No : _____

IMSc CS (NEP) Sem.-1 Examination

Digital Electronics for CS

Time : 2-00 Hours] **January-2025**

Marks:25

Q. 1 (A) EACH QUESTION CARRIES 3MARKS **[06]**

i) Prove De Morgan's law using perfect induction method.

ii) Simplify the given Boolean equation **using basic Boolean laws** and draw the simplified gated circuit daigram. (e.g. A' represents complement of A)

Y = A'B'C'D'+A'B'CD'+AB'C'D'+AB'CD'+A'BCD+A'BCD'+ABC'D+ABCD

(B) EACH QUESTION CARRIES 2MARKS **[04]**

i) Explain universal gates with symbols and truth tables.

ii) Explain basic duality of Boolean algebra.

OR

Q. 1 (A) EACH QUESTION CARRIES 3MARKS **[06]**

i) Simplify the given Boolean equation **using Karnaugh map** and draw the simplified gated circuit diagram using AND-OR network.

$Y = m_2 + m_5 + m_7 + m_9 + m_{11} + m_{13}$

$d = m_0 + m_8 + m_{10} + m_{14}$ (Don't cares)

ii) Simplify the given Boolean equation **using Karnaugh map** and draw the simplified gated circuit diagram using OR-AND network.

$Y = m_3 + m_8 + m_9 + m_{11} + m_{14} + m_{15}$

$d = m_2 + m_7 + m_{12} + m_{13}$ (Don't cares)

(B) EACH QUESTION CARRIES 2MARKS **[04]**

i) Write the truth table of 3-bit X-OR and X-NOR gate.

ii) Write associative and distributive law for Boolean algebra.

Q. 2

(A) Write basic steps for binary multiplication for generalized parallel arithmetic element and explain using appropriate example. **[06]**

(B) EACH QUESTION CARRIES 2MARKS **[04]**

i) Make the JK flip flop using RS flip flop and explain its truth table.

ii) Draw the circuit diagram of BCD counter.

OR

(P.T.O)

Q. 2

(A) Write basic steps for binary division for generalized parallel arithmetic element and explain using appropriate example. **[06]**

(B) EACH QUESTION CARRIES 2MARKS **[04]**

i) Make a full adder using two half adders.
ii) Draw the block diagram and gated diagram of master slave flip flop.

Q.3 EACH QUESTION CARRIES 1 MARK (ATTEMPT ANY FIVE) **[05]**

i) What is cycle stealing in DMA?
ii) Write the difference between PROM and EPROM.
iii) Draw the circuit diagram of NAND gate decoder.
iv) Write an example of zero address instruction.
v) How many select lines require in 16 to 1-line multiplexer.
vi) Write full form of ASCII.
vii) Explain importance of clock in digital circuit.