Name:

Enrolment No:

UPES

End Semester Examination, May 2025

Course:	**Digital Electronics**	**Semester:**	**2**
Program:	**B.Tech_CS_CSE**	**Time:**	**03 hrs.**
Course Code:	**ECEG1012**	**Max. Marks:**	**100**

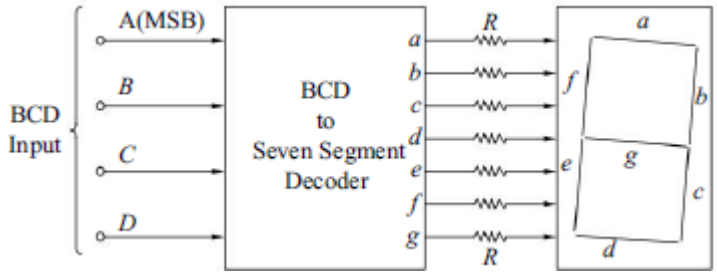
Instructions:

- **Electronic gadgets are not allowed during the examination except a scientific calculator.**
- **Carrying any material related to the subject of examination and bags are prohibited during the examination.**
- **Exchange of material is prohibited.**

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	a. Express XNOR operation using 2-input NOR gates b. Express OR operation using CMOS logic	**2+2**	**CO1**
Q2	Differentiate multiplexers and encoders with labeled diagrams.	**4**	**CO1**
Q3	Distinguish between synchronous sequential circuits and asynchronous sequential circuits.	**4**	**CO2**
Q4	Draw the truth table for BCD to Excess-3 converter and express the outputs (Excess-3) in terms of min-terms and don't cares.	**4**	**CO3**
Q5	Define opcode and operand with an example.	**4**	**CO4**

SECTION B
(4Qx10M= 40 Marks)

Q6	Consider the following diagram of BCD-to-7-Segment decoder.  a. Write the truth table for the BCD-to-7 Segment Decoder b. Derive an expression for the segment 'g' of the 7-segment display.	**10**	**CO2**

Q7	Simplify the following Boolean expression using the Quine-McCluskey (QM) minimization technique $f\ (A,B,C,D) = \sum m(0, 1, 3, 7, 8, 9, 11, 15)$	**10**	**CO1**
Q8	Design a sequential circuit to generate the sequence $0 \rightarrow 3 \rightarrow 1 \rightarrow 7 \rightarrow 5 \rightarrow 0$ using T flip-flops	**10**	**CO2**
Q9	a. Explain briefly about the applications of flipflops. b. Design a 4-bit Johnson (Twisted Ring) Counter with appropriate timing diagram. OR a. Explain briefly the operation of Parallel Input Serial Output Shift Register (PISO). b. Design a 4-bit Ring Counter with appropriate timing diagram.	**10**	**CO2**
SECTION-C (2Qx20M=40 Marks)			
Q10	a) Explain the various addressing modes of 8085 microprocessors with example. b) Describe briefly the bus structure of 8085 with a block diagram	**10+10**	**CO4**
Q11	a. Write the encoded digital signal by quantizing an analog signal of 10V (peak-to-peak) into 8-levels. b. Explain a 3-bit parallel-comparator (FLASH) A/D converter with a neat and clear diagram. OR	**5+15**	**CO3**
	a. Convert the 8-bit digital value 10110101 to its equivalent analog value (Consider $K = \frac{R_f}{2^7 R} V_R = 1$). b. Explain a 3-bit weighted resistor D/A converter with a neat and clear diagram.	**5+15**	**CO3**