Symbol Number: _____ Invigilator's Sign: _____ Superintendent's Sign: _____

Symbol No. in Words: _____

Faculty: Engineering	Year/Part: I/I
	F.M. : 50
	P.M. : 20
Program: Electrical and Electronics	Time: 3 hrs
Level: Bachelor	Subject: Analog and Digital Integrated Circuits (EG555Ex)

i. Group A contains Multiple Choice Questions of 10 marks.
ii. Candidates are required to give their answers in their own words as far as practicable.
iii. The figures in the margin indicate Full Marks.
iv. Assume suitable data if necessary.

GROUP A (Multiple Choice Questions) [10x1=10]

1. Which step in the fabrication of integrated circuits involves depositing a layer of semiconductor material with controlled impurity concentrations on top of a substrate?
   a. Masking and Etching
   b. Epitaxial Growth
   c. Diffusion of Impurities
   d. Monolithic Circuit Layout

2. Which configuration of operational amplifier is commonly used to obtain a negative voltage gain?
   a. Inverting amplifier
   b. Non-inverting amplifier
   c. Summer
   d. Integrator

3. Which type of multivibrator circuit has two stable states and can be used as a memory element?
   a. Astable Multivibrator
   b. Bistable Multivibrator
   c. Monostable Multivibrator
   d. Schmitt Trigger

4. What is the function of a Pulse Transition Detector (PTD) in digital signal processing?
   a. To amplify digital signals
   b. To generate clock waveforms
   c. To detect transitions in digital signals
   d. To convert digital signals to analog signals

5. What does the transfer characteristic curve depict in the analysis of logic circuits?
   a. Voltage levels of logic signals
   b. Power dissipation of logic components
   c. Propagation delay of logic signals
   d. Relationship between input and output voltages of logic gates

6. Which logic family is known for its high-speed operation and is commonly used in applications requiring fast switching speeds?
   a. Diode-Diode Logic (DDL)
   b. Resistor-Transistor Logic (RTL)
   c. Transistor-Transistor Logic (TTL)
   d. Emitter-Coupled Logic (ECL)

Marks Secured: _____
In Words: _____
Examiner's Sign: _____ Date: _____
Scrutinizer's Marks: _____
In Words: _____
Scrutinizer's Sign: _____ Date: _____

Code No. _____

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Multiple Choice Questions' Answer Sheet

1.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
5.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10.	Ⓐ	Ⓑ	Ⓒ	Ⓓ

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7. What type of output configuration do open collector gates typically have?
   a. Push-pull b. Tri-state c. High-impedance d. Differential

8. Which type of memory device is typically faster but requires constant power to retain data?
   a. Volatile Memories b. Non-Volatile Memories
   c. Random Access Memory (RAM) d. Programmable Logic Arrays

9. Which logic family is characterized by the use of resistors for pull-up and pull-down functions, providing flexibility but often limited in speed?
   a. Diode-Diode Logic (DDL) b. Resistor-Transistor Logic (RTL)
   c. Diode-Transistor Logic (DTL) d. Transistor-Transistor Logic (TTL)

10. Which operational amplifier configuration is commonly used to perform mathematical operations such as addition and subtraction of multiple input signals?
    a. Inverting amplifier b. Non-inverting amplifier
    c. Summing amplifier d. Integrator

Group "B"

Short Answer Questions (Attempt any Eight Questions only) [8X2=16]

1. Briefly describe the basic principle of operation for Resistor-Transistor Logic with example.
2. What are the primary advantages of CMOS circuits over TTL circuits, and in what types of applications are CMOS circuits typically preferred?
3. How do digital signals differ from analog signals, and what are the key considerations in their implementation within electronic circuits?
4. Why Schmitt trigger is considered as bistable multivibrators?
5. What factors should be considered when selecting a logic IC package for a circuit?
6. Difference between the volatile and non-volatile memories.
7. Write short note on Pulse Transition Detector (PTD).
8. Difference between the Astable multivibrator and Bistable multivibrator.
9. Describe the working principle of non-inverting amplifiers with circuit diagram.

Marks Secured: _____

In Words: _____

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Multiple Choice Questions' Answer Sheet

1.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
5.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10.	Ⓐ	Ⓑ	Ⓒ	Ⓓ

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Group "C"

Long Answer Questions (Attempt any Six Questions only) [6x4=24]

1. Explain the significance of MOS logic Families in modern integrated circuit design.
2. Compare and contrast the key parameters of TTL and CMOS integrated circuits, highlighting their respective advantages and disadvantages in terms of power consumption, speed, and noise immunity.
3. Explain the principle of operation of BJT as a switch with example.
4. Explain the basic principle of operation for Read-Only Memory (ROM).
5. Discuss the role of diffusion of impurities in integrated circuit fabrication, and explain how this process is utilized to create specific electrical properties within semiconductor materials.
6. Write the Characteristics of Ideal and Practical Parameters of Op-Amps.
7. Discuss the significance of the transfer characteristic curve in understanding the behavior of logic circuits. How does this curve depict the relationship between input and output voltages, and what information does it provide about the circuit's operation? With example.

Marks Secured: _____

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Examiner's Sign: _____ Date: _____

Scrutinizer's Marks: _____

In Words: _____

Scrutinizer's Sign: _____ Date: _____

Code No. _____

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Multiple Choice Questions' Answer Sheet

1.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	6.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	7.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	8.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	9.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
5.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	10.	Ⓐ	Ⓑ	Ⓒ	Ⓓ