

[This question paper contains 3 printed pages.]

Your Roll No.

3208

J

MEE

Paper – EE.504

**INTEGRATED ELECTRONICS AND APPLIED
INSTRUMENTATION**

Time : 3 Hours

Maximum Marks : 100

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

Attempt any five questions.

All questions carry equal marks.

1. Describe with neat diagram the operation of the Instrumentation amplifiers with the basic differential amplifiers and also the improved instrumentation amplifiers model. How would these realise the five important features of the Instrumentation amplifier.
20
2. (a) What is OTA ? Explain the basic OTA voltage amplifier circuit. 6
(b) Can you obtain an electronically tunable resistor using two OTAs ? 8
(c) Discuss the working principle of a sample and hold circuit using OTA. 6

[P. T. O.]

3. (a) Explain the meaning of the following DAC/ADC specifications : 2 × 5
- (i) Resolution
 - (ii) Linearity
 - (iii) Accuracy
 - (iv) Monotonicity
 - (v) Settling time
- (b) Discuss the principles of :
- (i) Pipeline A/D Converter 5
 - (ii) Algorithmic ADC 5
4. (a) Design a cyclic code to BCD converter and realize the circuits with MUX modules. 14
- (b) Explain the operation of a basic DRAM unit cell, drawing a neat diagram of the same. 6
5. (a) Explain the salient differences between a Mealy model and a Moore model sequential machine. 6
- (b) Prove that for a Moore model machine M of q states, $P_E = P_K$, such that $K \leq q - 2$; and for a Mealy model machine, $K \leq q - 1$. 6
- (c) The flow table of a Moore machine M is given below. Find the reduced flow table of an equivalent Mealy machine of the same : 8

Machine M

<i>Present States</i>	<i>Next States</i>		<i>Present Outputs</i>
	$x = 0$	$x = 1$	
A	A	B	0
B	C	D	1
C	E	F	1
D	G	H	0
E	A	B	1
F	C	D	0
G	E	F	0
H	G	H	1

6. (a) What are Light emitting diodes ? Cite a schematic structure of an IRED chip and explain the operation.

12

- (b) Discuss the operation of an analog bar graph display with operational amplifiers and LEDs.

8

7. Write short notes on *any four* of the following :

5 × 4 = 20

- (a) Transition matrix for FSM
 (b) EPROM and its working
 (c) PAL/GAL
 (d) Universal shift register
 (e) Nullators
 (f) Norators

100