

[This question paper contains 5 printed pages.]

3098

Your Roll No. ....

MEE

J

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 twenty marks.*

1. (a) Describe the salient features of comparison among  
(i) Cascode Current Mirror (ii) Wilson Current  
Mirror and (iii) Improved Wilson Current Mirror.  
(12)
- (b) Describe the function of an improved  
instrumentation amplifier and discuss how does  
it serve the five important features of an  
instrumentation amplifier. (8)
2. (a) Illustrate the following terms with respect to the  
characteristics of A/D converters :  
(i) Quantization Error

P.T.O.

- (ii) Differential Nonlinearity
  - (iii) Integral Nonlinearity
  - (iv) Aliasing
  - (v) Signal-to-noise ratio (10)
- (b) (i) Describe the function of an OTA as an inverting amplifier with a fixed voltage gain. (4)
- (ii) Also illustrate the basic operation of the OTA schmitt Trigger circuit. (6)
3. (a) Describe the operation of (i) MOS ReadOnly Memory and (ii) MOS Dynamic RAM Cell. (10)
- (b) By drawing a neat diagram of n-Input Binary decoder module write its high-level description. Cite one important application of a decoder in the microprocessor architecture. (10)
4. (a) Describe under what conditions a FSM works in the pulse-mode and in the fundamental mode. (4)
- (b) What are the difference of a Mealy model and Moore model sequential machine. (6)
- (c) Describe function of a four-bit self-starting and self-correcting circulation register/ring counter. (10)

5. (a) Find the input impedance of the circuit given in figure 5(a) and indicate the conditions under which it behaves like Frequency Dependent Negative Resistance (FDNR). (10)

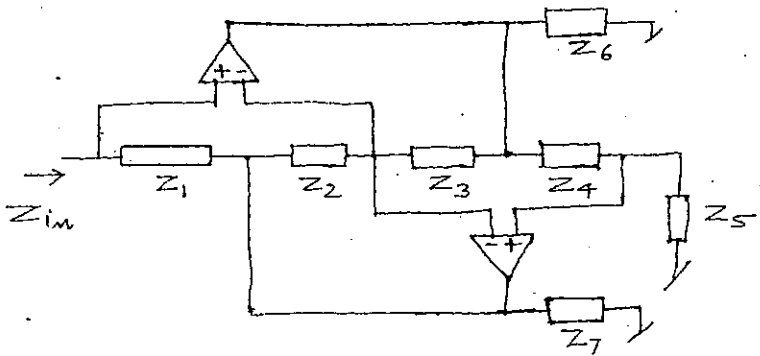


Figure 5(a)

- (b) Find out the transfer function of the given circuit of Figure 5(b) and identify the filter realized. Also find out the parameters of the filter realized. (10)

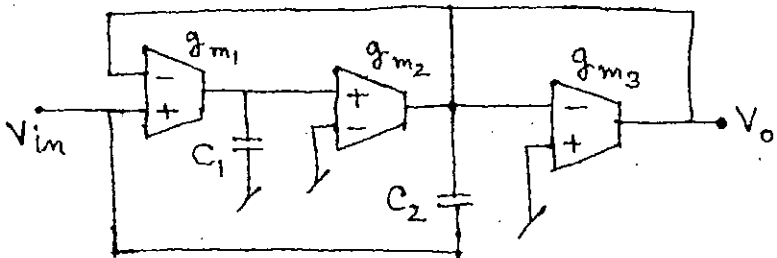


Figure 5(b)

6. (a) Find the flowtable of a synchronous sequential machine having a single input and single output as follows :

The output is to be zero unless an input sequence 0010 is received, i.e.,

if the input sequence is 0100100100

the output sequence is 0000001001 (10)

- (b) Reduce the number of states in the following state table and cite a corresponding isomorphic minimal flow table.

Present States	Next States and Present Outputs	
	x = 0	x = 1
A	F, 0	C, 0
B	H, 1	A, 1
C	H, 0	D, 1
D	B, 0	H, 0
E	G, 0	C, 0
F	C, 1	E, 1
G	H, 1	E, 1
H	C, 0	A, 1

(10)

7. (a) Discuss what is pseudorandom noise? Also describe the function of a 15-bit PRBS recorder/generator and draw a neat diagram for the same. (10)
- (b) Explain the function of a Schmit-Nand gate. Explain the two different uses of 7413 Schmit Nand gate for electronic instrumentation. (10)
8. Write short notes on any two of the following :
- (a) Function of 565 PLL and the application of PLL for coherent AM Detection.
- (b) OP-AMP Based Analog Bar graph Display circuits and its working principle.
- (c) Equivalence between Mealy model and Moore model sequential machines.
- (d) Structured analysis and Design of digital systems. (10,10)