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Question Paper Code:94B02

B.E./B.Tech. DEGREE EXAMINATION, NOV 2022

Fourth Semester

Biomedical Engineering

19UBM402 - ANALOG AND DIGITAL INTEGRATED CIRCUITS

(Regulations 2019)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Define slew rate. What causes the slew rate? CO1-U
2. Design an amplifier with a gain of -10 and input resistance of 10 k Ω . CO2-Ap
3. Enumerate the advantages of active filters over the passive filters? CO3-An
4. Which is the fastest ADC? State the reason. CO1-U
5. Define lock range and capture range of PLL. CO1-U
6. Mention the need for voltage regulator. CO1-U
7. What are called don't care conditions? CO1-U
8. Distinguish between demultiplexer and decoder. CO3-An
9. How can a D flip-flop be converted into T flip-flop? CO1-U
10. What are the advantages of Programmable Logic Devices? CO1-U

PART B - (5 x 16 = 80 Marks)

11. (a) (i) Why R_{comp} is used in all opamp circuits? Explain the effect of R_{comp} in the circuit? CO1-U (8)
- (ii) Enlighten in detail about an Instrument which has high CMRR, Gain and low output impedance. CO3-Ana (8)

Or

- (b) (i) Briefly explain the function of a Sample and Hold circuit using op-amp. CO1-U (8)
- (ii) Differentiate the performance of inverting and non-inverting operational amplifier configurations. CO3-Ana (8)
12. (a) (i) Explain how a comparator can be used as a phase detector. CO1-U (8)
- (ii) Design an op-amp circuit which converts irregularly shaped waveform to regular shaped waveform. CO3-Ana (8)

Or

- (b) (i) Derive the transfer function of First order High Pass Filter and plot its frequency response. CO1-U (8)
- (ii) What are the limitations in weighted resistor type D/A converters and explain how this problem can be solved in R-2R ladder type D/A converters. CO3-An (8)
13. (a) Design an IC 555 in Monostable mode and obtain the timing(T) information. Also, suggest a method to avoid triggering during positive pulses. CO1-U (16)

Or

- (b) What is IC 723 regulator? Design a Low Voltage regulator and High Voltage regulator using IC 723. CO1-U (16)
14. (a) (i) Obtain the minimal SOP and POS expression of the function
 $F = \sum_m(0,3,4,5,7,8,13,15)$ using K-map. CO2-Ap (12)
- (ii) Implement the following function using suitable multiplexer. $F(a,b,c) = \sum m(3,7,4,5)$. CO2-Ap (4)
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- Implement the following function using suitable multiplexer. $F(a,b,c) = \sum m(3,7,4,5)$.
- Implement the given function using multiplexer.
 $F(x, y, z) = \sum(0, 2, 6, 7)$
- Implement the following Boolean function using 8:1

(7)

BTL 1

Remember

9.

Mux: $F(A,B,C,D)=\sum m(0,1,3,4,8,9,15)$

Or

- (b) Minimize the given the boolean function using Quine - CO2-App (16)
McCluskey method $F(A,B,C,D,E) = \sum$
(0,2,4,6,9,13,21,23,25,29,31).

15. (a) Design a 4 bit synchronous counter using JK flip-flop. CO2-App (16)

Or

- (b) (i) Realize 'T' Flip Flop using SR Flip Flop & JK Flip Flop. CO2-App (8)
(ii) Design the following expression $F=AB+BC+CA$ using CO2-App (8)
PLA.

