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Question Paper Code: 54402

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2021

Fourth Semester

Electronics and Communication Engineering

15UEC402–ANALOG CIRCUITS

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Identify the frequency range of Very high frequency oscillator. CO1- R
(a) 30MHz-300MHz (b) 20MHz-30MHz (c) 300MHz-3GHz (d) 30MHz-3GHz
2. Clock for binary logic signals are generated using _____ Multivibrator. CO2- R
(a) Monostable (b) Univibrator (c) Bistable (d) Astable
3. Most difficult to fabricate in an IC is CO3- R
(a) Diode (b) FET (c) Capacitor (d) Transistor
4. _____ Instrument is used to amplify output signal of transducer. CO4- R
(a) Integrator (b) Differential amplifier (c) PLL (d) Instrumentation amplifier
5. Sample and Hold circuit is used in CO5- R
(a) Amplifier (b) ADC (c) Multiplexer (d) DAC

PART – B (5 x 3= 15 Marks)

6. State Barkhausen criterion and discuss the mechanism for start of oscillation. CO1- R
7. Define Rise time and storage time of Speed Up capacitor with expression. CO2- R
8. List the advantages of integrated circuit (IC) over discrete component circuit. CO3- R
9. Summarize the frequency expressions for LPF, HPF and BPF. CO4- R
10. Define capture range and lock range of PLL. CO5- R

PART – C (5 x 16= 80 Marks)

11. (a) Explain the construction and principle of RC Phase shift oscillator. Also derive its frequency of oscillation. CO1- U (16)
- Or
- (b) (i) Explain the principle of Colpitt's Oscillator with suitable circuit. Also derive the condition for oscillation and expression for frequency of oscillation. CO1- U (10)
- (ii) Draw the miller oscillator and briefly explain the operation CO1- U (6)
12. (a) (i) Draw and explain RL Integrator and Differentiator circuits, also derive the output expression. Discuss on the output of both the circuits for sinusoidal input. CO2- App (12)
- (ii) Draw the biased positive clippers circuit and explain with an example. CO2- App (4)
- Or
- (b) Calculate the component values of monostable multivibrator developing an output pulse of $140\mu\text{s}$ duration. Assume $h_{FEmin}=20, I_c=6\text{mA}, V_{cc}=6\text{V}, V_{BB}= -1.5\text{V}$. CO2- App (16)
13. (a) (i) Why aluminium is used for metallization? Explain metallization in detail. CO3- U (8)
- (ii) How ion implantations differ from diffusion techniques? Explain about ion implantation in detail. CO3- U (8)
- Or
- (b) How external frequency compensation and internal frequency compensation reduce the bandwidth of the op-amp purposely? Justify with suitable explanation and sketch. CO3- U (16)
14. (a) Define time taken for the PLL to establish lock? Derive lock in range and capture range of PLL. CO4- App (16)
- Or
- (b) Design 2nd order active low pass filter for frequency 5KHz. CO4- App (16)
15. (a) With neat diagram explain the working of linear voltage regulator using operational amplifier. CO5- U (16)
- Or
- (b) Summarize and explain the various important specifications of both D/A and A/D converters generally specified by the manufacturers. CO5- U (16)