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**Question Paper Code: 54402**

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2024

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. Which of the following oscillators is suitable for measuring frequencies in the range of Mega Hertz? CO1- R  
(a) RC phase shift      (b) Wien bridge      (c) Hartley      (d) Both (a) and (c)
2. Clock for binary logic signals are generated using \_\_\_\_\_ Multivibrator. CO2- R  
(a) Monostable      (b) Univibrator      (c) Bistable      (d) Astable
3. Most of the linear Ic's are based on the two-transistor differential amplifier because of its CO3- R  
(a) Input voltage-dependent linear transfer characteristics  
(b) High voltage gain  
(c) High input resistance  
(d) High CMRR
4. \_\_\_\_\_ Instrument is used to amplify output signal of transducer. CO4- R  
(a) Integrator      (b) Differential amplifier      (c) PLL      (d) Instrumentation amplifier
5. The most commonly used amplifier in sample and hold circuit is CO5- R  
(a) A unity gain non-inverting amplifier  
(b) A unity gain inverting amplifier  
(c) An inverting amplifier with a gain of 10  
(d) An inverting amplifier with a gain of 100

PART – B (5 x 3= 15 Marks)

6. What is the condition for Barkhausen criterion in oscillator.( 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. Examine why integrators are preferred over differentiators in analog computer CO4- R
10. List the important specifications parameters of D/A and A/D converters CO5- R

PART – C (5 x 16= 80 Marks)

11. (a) Explain the operation of Hartley oscillator and derive an equation for frequency of oscillation with neat and necessary diagrams CO1- U (16)  
Or  
(b) (i) Derive an expression for frequency of tuned oscillator and explain its operation with neat sketch CO1- App (10)  
(ii) Explain the principles of LC oscillator with neat diagrams CO1- U (6)
12. (a) What is clipper and clamper circuit and list their types also explain the working principle of any one type from each with neat circuit diagram and waveforms. CO2- U (16)  
Or  
(b) With the neat circuit diagram and waveforms, Explain the operation of a Monostable multi-vibrator and derive the expression for the pulse width CO2- App (16)
13. (a) Explain the general construction and manufacturing process of monolithic ICs with necessary diagrams. CO3- U (16)  
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) (i) Explain the construction and operation of an Instrumentation amplifier CO4- App (10)  
(ii) Write the use of peak detector and explain the working of Peak detector with neat circuit and waveforms. CO4- U (6)

Or

- (b) (i) Design a fourth order Butterworth low-pass filter having upper cut-off frequency 1 kHz CO4- App (8)
- (ii) With neat circuit and block diagram explain the operation of basic Phase Locked Loop. CO4- U (8)
15. (a) Explain the working principle of following basic D/A converter techniques, CO5- U (16)
- (i) Weighted Resistor type
- (ii) R-2R Ladder type
- Or
- (b) Explain the working principle and operation of any two applications of Astable multi-vibrator using IC 555 timer CO5- U (16)

