

Reg. No. :

--	--	--	--	--	--	--	--	--	--

**Question Paper Code: 44304**

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Fourth Semester

Electrical and Electronics Engineering

14UEE404 - ANALOG INTEGRATED CIRCUITS

(Common to Instrumentation and Control Engineering)

(Regulation 2014)

Duration: 1.15 hrs

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

**(Answer any six of the following questions)**

- In Monolithic IC
  - Performance depends on the substrate
  - Performance does not depend on the substrate
  - Performance depends on interconnects
  - Performance depends on packaging
- How many leads does the TO-5 metal can package of an operational amplifier have
  - 8, 10, or 12
  - 6, 8, or 10
  - 8 or 14
  - 8 or 16
- Specified value of CMRR for 741 opamp is
  - 30 dB
  - 40 dB
  - 90 dB
  - 120 dB
- What is the scale multiplier (factor) of a basic integrator?
  - R/C
  - C/R
  - RC
  - 1/RC

5. In applications where measurement of a physical quantity is involved, the Op-amp circuit recommended is
- (a) Basic non-inverting amplifier (b) A comparator  
(c) An active filter (d) An instrumentation amplifier
6. In a sample and hold circuit the following statement is false
- (a) Sample time is much smaller than hold time  
(b) Aperture time is the delay between the time that the pulse is applied to the switch and the actual time the switch closes  
(c) Acquisition time is the time it takes for the capacitor to charge from one voltage to another voltage  
(d) The voltage across the hold capacitor changes by 50% during hold time
7. Which of the following techniques are used for the analog multipliers?
- (a) Logarithmic multipliers (b) Variable trans-conductance multipliers  
(c) Both (a) and (b) (d) None of these
8. How many  $V_{cc}$  connections does the 565 PLL use?
- (a) 0 (b) 1 (c) 2 (d) 3
9. Regulators in which the transistor act in the active region are called
- (a) linear regulator (b) switching regulator  
(c) non linear regulator (d) adjustable regulator
10. Voltage regulator LM7805 has an output voltage of
- (a) 5 volts (b) -5 volts (c) 0.5 volts (d) -0.5 volts

PART – B (3 x 8= 24 Marks)

**(Answer any three of the following questions)**

11. Mention the dimensions of a typical Integrated Circuits and different types of packaging of IC's. List the steps involved in the manufacturing process of an Integrated Circuits. Discuss the following processes in the monolithic IC technology with necessary diagram wherever necessary.
- (i) Epitaxial Growth, (ii) Isolation by diffusion. (8)

12. An IC 741 op-amp whose slew rate is  $0.5 \text{ V}/\mu\text{s}$  is used as an Inverting Amplifier with a gain of 50. The voltage gain against frequency curve of IC 741 is flat upto 20 kHz. Evaluate what maximum peak to peak signal can be applied without distorting the output. (8)
13. What is an Instrumentation Amplifier? Draw a system whose gain is controlled by an adjustable resistance. Name the circuit that is used to detect the peak value of the non-sinusoidal waveforms. (8)
14. Enumerate the desirable properties for a Voltage Controlled Oscillator (VCO). Draw the circuit diagram of a Voltage Controlled Oscillator (VCO) and discuss its operation in a detailed manner with proper mathematical equation. State assumptions and approximations, if any. (8)
15. With neat circuit diagram explain the operation of SMPS. (8)