



**B.E DEGREE EXAMINATIONS: MAY 2018**

(Regulation 2015)

Fourth Semester

**ELECTRONICS AND INSTRUMENTATION ENGINEERING**

U15EIT401 : Linear Integrated Circuits

**COURSE OUTCOMES**

- CO1:** Comprehend the fundamental concepts of op-amps  
**CO2:** Attain knowledge of characteristics of op-amp  
**CO3:** Outline the applications of Op-amps in integrated circuits  
**CO4:** Design electrical circuits, devices, and systems to meet application requirements  
**CO5:** Design of analog circuits using simulation tools.  
**CO6:** Design a project as a team

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-  
PART A (10 x 1 = 10 Marks)**

1. 

	List I		List II	
A. Timer			i. MPY634	
B. VCO			ii. IC555	
C. PLL			iii. IC566	
D. Analog Multiplier			iv. IC565	

CO4 [K<sub>2</sub>]
- |    | A   | B  | C   | D  |
|----|-----|----|-----|----|
| a) | ii  | i  | iii | iv |
| b) | iii | iv | ii  | i  |
| c) | ii  | iv | iii | i  |
| d) | iii | i  | ii  | iv |
2. The operational amplifier is used in the nonlinear mode in CO2 [K<sub>2</sub>]
- |                    |                              |
|--------------------|------------------------------|
| a) Integrator      | b) Active filters            |
| c) Schmitt trigger | d) Instrumentation amplifier |
3. Negative feedback in amplifier results in COL [K<sub>L</sub>]
- |                           |
|---------------------------|
| (i) Reduced voltage gain  |
| (ii) Reduced sensitivity  |
| (iii) Decreased bandwidth |
| (iv) Reduced Distortion   |

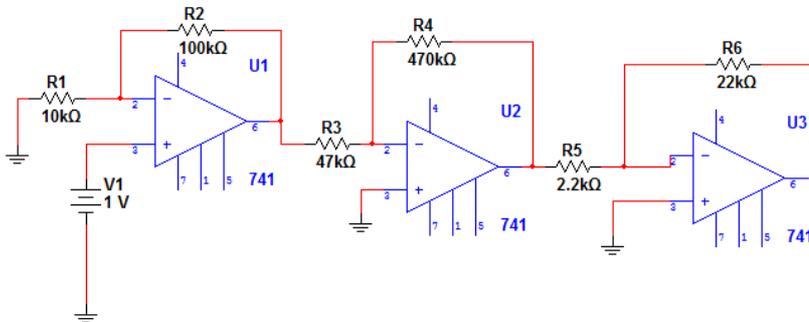


- a) Both A and R are Individually true and R is the correct explanation of A      b) Both A and R are Individually true but R is not the correct explanation of A
- c) A is true but R is false      d) A is false but R is true

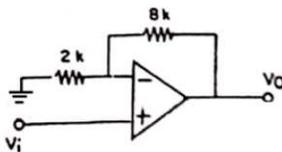
10. What is used to higher the speed of operation in MOSFET fabrication CO1 [K<sub>2</sub>]
- a) Ceramic gate      b) Silicon dioxide
- c) Silicon nitride      d) Poly silicon gate

**PART B (10 x 2 = 20 Marks)**  
**(Answer not more than 40 words)**

11. Justify that how the precision diode differs from conventional one. CO3 [K<sub>2</sub>]
12. List the basic building blocks of PLL. CO4 [K<sub>2</sub>]
13. Calculate the values of LSB and MSB for an 8-bit DAC for 0V to 10V range. CO4 [K<sub>3</sub>]
14. The Op-amp used in the non-inverting mode has an input offset voltage  $V_{ios}$  of 5mV. The op-amp has the  $R_i = 10k\Omega$ ,  $R_f = 560k\Omega$ ,  $R_{comp} = 10K\Omega$ . What is the output offset voltage? CO2 [K<sub>3</sub>]
15. List out the characteristics of an ideal Op-Amp. CO2 [K<sub>2</sub>]
16. Mention the applications of analog multiplier. CO4 [K<sub>2</sub>]
17. The circuit given below was drawn by Multisim .what will be the output voltage get from multisim? Consider the open loop gain is  $\infty$ . CO5 [K<sub>3</sub>]



18. The operational amplifier has a very poor open loop gain of 45. Find the closed loop gain of the amplifier. CO1 [K<sub>3</sub>]



19. Suggest any one method to reduce the  $V_T$  in MOSFET fabrications. CO1 [K<sub>3</sub>]
20. Mention the operation of peak detector with suitable circuit. CO3 [K<sub>2</sub>]

**Answer any FIVE Questions:-**  
**PART C (5 x 14 = 70 Marks)**  
**(Answer not more than 300 words)**

**Q.No. 21 is Compulsory**

- 21.a Describe the DC characteristics of operational amplifier and also explain the compensation techniques used. (12) CO2 [K<sub>3</sub>]
- b List the compensation techniques used in AC characteristics. (2) CO2 [K<sub>3</sub>]
22. Illustrate the operation of LM723 and LM317 positive voltage regulator with suitable schematic diagram and also mention the applications. CO4 [K<sub>3</sub>]
23. Design a differentiator that will differentiate an input signal with the  $f_{\max} = 200\text{Hz}$  and also derive an expression for the output of a practical differentiator. CO3 [K<sub>3</sub>]
24. Draw the functional Diagram of voltage controlled oscillator using NE566 VCO and explain its operation and applications. CO4 [K<sub>2</sub>]
- 25.a Derive the transfer function for first order low pass filter using Op-amp. (7) CO3 [K<sub>2</sub>]
- b Derive the gain of instrumentation amplifier and also compare it with differential amplifier. (7) CO3 [K<sub>2</sub>]
26. Elaborate the various processes used to fabricate ICs using silicon planar technology with suitable sketch. CO1 [K<sub>2</sub>]
27. Design a signal conditioning part for temperature sensor LM35 which produce  $-550\text{mV}$  at  $-55^\circ\text{C}$  and  $1500\text{mV}$  at  $150^\circ\text{C}$  and also convert the signal to digital by using successive approximation ADC. CO6 [K<sub>5</sub>]

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