

Code No: RT31026

**R13**

**SET - 1**

**III B. Tech I Semester Supplementary Examinations, May -2018**  
**LINEAR & DIGITAL IC APPLICATIONS**  
(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
2. Answering the question in **Part-A** is compulsory  
3. Answer any **THREE** Questions from **Part-B**

**PART -A**

- |   |    |  |      |
|---|----|--|------|
| 1 | a) | List the advantages of ICs over discrete components?         | [3M] |
|   | b) | Define input offset current and input offset voltage         | [4M] |
|   | c) | Give the important features of an instrumentation amplifier. | [4M] |
|   | d) | Define capture range and lock range?                         | [4M] |
|   | e) | Draw the circuit of first order active filter.               | [3M] |
|   | f) | Compare successive approximation ADC with dual slope ADC.    | [4M] |

**PART -B**

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|---|----|---|------|
| 2 | a) | What is a differential amplifier? Mention the classification of differential amplifier with neat diagrams.  | [8M] |
|   | b) | Explain ac analysis of dual input balanced output differential amplifier configuration.   | [8M] |
| 3 | a) | What is an operational amplifier? Give its symbol and also draw its electrical equivalent circuit.  | [8M] |
|   | b) | An op-amp has a slew rate of $2V/\mu s$ . What is the maximum frequency of an output sinusoid of peak value 5V at which the distortion sets in due to the slew rate limitation?   | [8M] |
| 4 | a) | With a neat sketch explain the instrumentation amplifier  | [8M] |
|   | b) | Draw the circuit of a voltage to current converter if the load is i) floating and ii) Grounded. Are there any limitations as the size of the load when grounded?                  | [8M] |
| 5 | a) | Draw the block diagram of NE/SE565 PLL and explain the operation with the help of waveforms.  | [8M] |
|   | b) | What is meant by VCO? Explain in detail and state the applications of VCO?  | [8M] |
| 6 | a) | Plot and explain frequency response of<br>i) Low pass Butter worth filter    ii) High pass filter    iii) Band pass filter<br>iv) Band Reject filter                              | [8M] |
|   | b) | Design a second order Low Pass Filter at a high cut off frequency of 2 KHz. Draw the frequency response and the circuit with all components.                                      | [8M] |
| 7 | a) | Compare different types of A-D converters   | [8M] |
|   | b) | Find the voltage at all nodes 0, 1, 2 ... and at the output of a 5-bit R-2R ladder DAC. The LSB is 1 and all other bits are equal to '0'. Assume $V_R = -10V$ and $R = 10k\Omega$ | [8M] |

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