

Time: 3 hours

Total Marks: 80

- N.B.: (1) Question No. 1 is compulsory.  
 (2) Solve any three questions from remaining five questions.  
 (3) Draw neat diagrams and assume suitable data wherever necessary. Justify your assumptions.

1. Attempt any **four**: **20**
- (a) Define the following **08**  
 i) Slew Rate ii) CMRR iii) SVRR iv) Input offset Voltage v) Input bias Current
- (b) Explain why most of the applications of op amp is in inverting mode. **2**
- (c) Design a low pass filter at a cutoff frequency of 1KHz with a passband gain of 2. **5**
- (d) Advantages of precision rectifiers over normal rectifiers. **5**
2. (a) Implement  $V_0 = 3V_a - 5V_b - 6V_c$  **10**  
 (b) Derive an expression for basic integrator circuit. In  $RC = 1\text{sec}$  & input is 2V dc then draw the output waveform. **10**
3. (a) Draw and explain in detail (any one) **10**  
 i) Square wave generator ii) RC phase shift oscillator .
- (b) Design a second order KRC low pass filter with a cut off frequency  $f_0 = 1\text{kHz}$  and pass band gain of 1.586. **5**
4. (a) Explain a non inverting comparator with suitable example and waveforms. **10**  
 (b) Write short note on (any one) **10**  
 a) PLL b) R-2R Ladder D to A converter
5. (a) What is the function of a Voltage Regulator. Explain in detail about Fixed voltage series regulator. **10**  
 (b) Design a regulator using IC723 to meet the following specifications **10**  
 $V_0 = 5\text{V}$   $I_0 = 100\text{mA}$   $V_{in} = 15\text{V}$   $I_{SC} = 150\text{mA}$  .
6. (a) Write short note on (any two) **20**  
 a) Precision rectifier  
 b) RC phase shift oscillator  
 c) Successive Approximation DAC  
 d) instrumentation amplifier