

(3 Hours)

[Total Marks: 80]

NOTE:-1) Question 1 is compulsory

- 2) Solve **any three** from the remaining five questions
- 3) Assume suitable data if necessary.
- 4) Figures to the right indicate full marks

- Q.1. a.** What is the need of multirate processing? Give some examples of multirate digital systems. **20**
- b.** What is Digital Signal Processor and explain it's basic characteristics.
- c.** What is the relation between digital and analog frequency in impulse invariant transformation .What is aliasing ?
- d.** What do you mean by overflow limit cycles ? How it can be avoided?
- Q.2. a.** Design a high pass filter using Hamming window with cut off frequency of 1.2 rad/sec and number of coefficients =9. **10**
- b.** Explain Gibb's phenomenon in FIR filter design. **10**
- Q.3. a.** Explain frequency warping effect in BLT in detail. **10**
- b.** The digital filter with system function $H(z) = \frac{0.5Z}{z-0.5}$ Find the output noise power from digital filter when input is quantized to have 8- bits. **10**
- Q.4. a.** Explain the application of DSP in speech. **10**
- b.** Explain how higher throughput is obtained in DSP using the VLIW architecture. **10**
- Q.5. a.** Find DFT of $x(n)=2^n$ using the 8-point DIT-FFT algorithm. **10**
- b.** Develop a radix -2 DIF -FFT algorithm for computing 8 point DFT. **10**
- Q.6. a.** Explain in detail polyphase decomposition. **10**
- b.** What is the need for multistage filter implementation. Explain it's drawbacks. **10**