IMPORTANT QUESTIONS

1.   What is DSP & what are its advantages over Analog signal Processing.
2.   Give few examples of discrete time signals. Discuss classification of discrete-time signals.
3.   What is the difference between time domain representation & frequency domain representation of signals. Give representation and application of each.
4.   What are power & energy signals. Give some examples of discrete power & energy signals.
5.   Obtain the convolution sum of two discrete time sequences given below. Also sketch the result

  (a) $x(n) = u(n)$

  (b) $x(n) = \begin{cases} 1 \text{ for } 0 \le n \le 4 \\ \\ 0 \text{ else where} \end{cases}$ $h(n) = \begin{cases} 2^n & 0 \le n \le 6 \\ \\ 0 & \text{else where} \end{cases}$

  (c) $x(n) = \begin{cases} 4 \text{ for } 0 \le n \le 2 \\ \\ 0 \text{ else where} \end{cases}$ $h(n) = \begin{cases} 1 \text{ for } -2 \le n \le 2 \\ \\ 0 \text{ else where} \end{cases}$

6.   Obtain $x(2-n)\, u(n-3)$ of DT sequence & sketch the result:
       $x(n) = \{ 0,1,2,3,4 \}$

7   .Find the Z-T and sketch R.O.C for sequence given below: -
           $x[n] = 2^n\, u[n] + 3^n\, [-n-1]$

8.   a) Find the z transform and ROC of the signal sequence
           $x(n) = [4(2)^n – 5(3)^n]\, u(n)$
9.   What are the applications of Z transforms
11. What do you understand by LTI systems. Discuss their properties.
12. A digital filter has an impulse response of h(n)=[-5, 3, 1, 3, -5]. Find if it is linear phase?
13. What is Gibb's phenomenon?
14. Differentiate between:
     Analog and Digital Filters
     FIR and IIR filters
15. What are the various design techniques of FIR filter? Explain rectangular window technique.
16. State and prove sampling theorem. Define Nyquist rate and Explain Aliasing..
17. Write a short notes on
 (a) Decimators and interpolators
18. What are the Applications of DSP.
19. Derive an IIR filter using Impulse Invariant Method.
20. Check whether each of the following signals are periodic or not .If signal is periodic determine its period.
i. $x(n)= \sin(100\pi n) + \cos 50n$

ii. $x(t)=\sin^2 t$

21. Test the following system for linearity, Causality, Stability and time variance.
   (a) $y(n)=3y(n-1) - nx(n)$
   (b) $y(n)= x(-n)$
   (c) $y(n)=x^2(n)$

22. Find the Z transform of

   $x(n)= \cos(\omega n)u(n)$

23. Determine the direct form I and direct form II for a system given by:

$$H(z) = \frac{0.5z^2 + 2z + 0.2}{3z^3 + 2z^2 + z - 0.2}$$

Which is better?

24. What is aliasing effect? How it can be avoided.

25. Prove Parseval's Energy & Power theorem.