

(b) Determine the periodicity of the following signals.

$$(i) x(t) = 2\cos\frac{2\pi t}{3} + 3\cos\frac{2\pi t}{7}$$

$$(ii) x(t) = 2\cos 3t + 3\sin 7t$$

4. (a) Find  $x(n)$  considering all possible region of convergence.

$$X(z) = \frac{10z}{(z-1)(z-2)}$$

(b) Find the Z-transform of the following sequence –

$$(i) x(n) = u(n-2) - u(n-5)$$

$$(ii) x(n) = \left[ \left(\frac{1}{2}\right)^n - \left(\frac{1}{4}\right)^n \right] u(n)$$

5. (a) Find the DFT of  $x(n) = \{1, 2, 3, 4\}$  using DIT-FFT.

(b) Obtain the magnitude and phase response of the following system by analytical and

$$\text{geometrical method } h(n) = \left\{ 1, \frac{1}{2} \right\}.$$

6. (a) Sketch the signal

$$(i) x(t) = 2u(t) - u(t-2) - u(t-4) - r(t-6) + r(t-8)$$

$$(ii) x(t) = 2r(t) - 2r(t-1) - 2u(t-3)..$$

(b) Determine the inverse Z-transform of

$$X(z) = \frac{1}{1 - 0.8Z^{-1} + 0.12Z^{-2}}$$

(i) if ROC is  $|z| > 0.6$

if ROC is  $|z| < 0.2$

if ROC is  $0.2 < |z| < 0.6$