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BE (MPNA2)
Roll no - 19

DSIP /AT-1

Q2]

A] $x(n) = \left(\frac{1}{5}\right)^n u(n)$

$$E = \sum_{-\infty}^{\infty} (x(n))^2$$

$$= \sum_{-\infty}^{\infty} \left[\left(\frac{1}{5}\right)^n u(n) \right]^2$$

zeta 114

$$= \sum_{-1}^{-\infty} \left[\left(\frac{1}{5}\right)^n u(n) \right]^2 + \sum_0^{\infty} \left[\left(\frac{1}{5}\right)^n u(n) \right]^2$$

$$= 0 + \sum_0^{\infty} \left(\frac{1}{5}\right)^{2n}$$

$$= \frac{1}{1 - \left(\frac{1}{5}\right)^2} = \frac{1}{1 - \frac{1}{25}} = \frac{25}{24}$$

$$= 1.041 \text{ Joules}$$

\therefore Energy is a finite value,
Power = 0 watt.

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BEA

~~Q3]~~
~~A]~~ ~~4 point DFT~~

Power of the signal

$$P = \lim_{N \rightarrow \infty} \frac{1}{2N+1} \sum_{n=-N}^N |x(n)|^2$$

$$= \lim_{N \rightarrow \infty} \frac{1}{2N+1} \sum_{n=-N}^N \left[\left(\frac{1}{5}\right)^n u(n) \right]^2$$

= 0

Energy is finite & power is zero
 \therefore It is energy signal.