Point Processes – 1 – 8, Ans.

1. (A) $p(t) = \begin{cases} \frac{1}{B}, & t \le B \\ 0, & \text{otherwise.} \end{cases}$

$$\hat{p}(\omega) = \int_0^\infty e^{-i\omega t} p(t)\,dt$$

$$= \frac{1}{B}\int_0^B e^{-i\omega t}\,dt = \frac{1}{-i\omega B}\left(e^{-i\omega B} - 1\right)$$

$$= e^{-i\omega B/2}\,\frac{e^{i\omega B/2} - e^{-i\omega B/2}}{i\omega B}$$

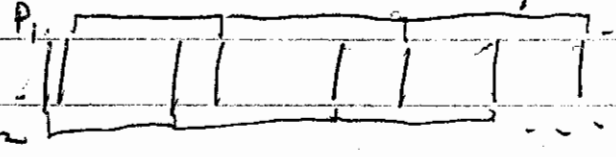
$$= e^{-i\omega B/2}\,\frac{\sin(\omega B/2)}{(\omega B/2)}$$

(B) $s(t) = 1 - \int_0^t p(t')\,dt' = \begin{cases} 1 - \frac{t}{B}, & t \le B \\ 0, & \text{otherwise} \end{cases}$

[see p. 2]

$$s'(t) = -\frac{1}{B}. \quad h(t) = -\frac{s'(t)}{s(t)} = \begin{cases} \frac{1}{B-t}, & t \le B \\ 0, & \text{otherwise.} \end{cases}$$

2. Not a renewal process. Let p_1 + p_2 be clock-like of very similar rates.



A very short interval is never followed by a second short interval.