

- Q.4** a) State and prove the following FT properties. **(07)**
 i) Time Scaling.
 ii) Differentiation in time.
- b) Find the inverse Laplace Transform of **(06)**

$$X(s) = \frac{2}{(s+4)(s-1)}$$
 if the region of convergence is
 i) $-4 < \text{Re}(s) < 1$ ii) $\text{Re}(s) > 1$ iii) $\text{Re}(s) < -4$

SECTION - II

- Q.5** a) Explain an application of correlation in Radar. **(05)**
 b) Describe probability density function (PDF) **(05)**
 c) Define mean, mean square, and standard deviation variance of the random variable. **(04)**
- Q.6** a) Compute the cross correlation of the following:- **(07)**

$$x(n) = \{ \underset{\uparrow}{2} \ \underset{\uparrow}{3} \ \underset{\uparrow}{4} \} \quad x(n) = \{ \underset{\uparrow}{1} \ \underset{\uparrow}{2} \ \underset{\uparrow}{3} \}$$
- b) Describe in detail the properties of auto correlation of energy signal. **(06)**
- Q.7** a) Consider the experiment that consists of tossing three honest coins. The random variable chosen is defined as assigning '0' to a tail and '1' to a head and then adding the numbers. Determine and plot the cumulative distribution function. **(07)**
 b) Explain the properties of probability density function. **(06)**
- Q.8** a) What is the need of standard probability models? Explain uniform distribution in detail. **(07)**
 b) Suppose 10,000 digits are transmitted over a noisy channel having error probability per digit equal to 5×10^{-5} . Estimate the probability of getting two digits in errors. Use Poisson's distribution. **(06)**
