Q1 Define the following terms
(a) Transfer function.
(b) Z-transform
(c) L-transform
(d) Signum Function

SECTION-A

Q2(a) Find whether the following signals are periodic or not? if periodic then find their fundamental period.
(i) $x(t) = \cos(0.2\pi t)$
(ii) $x(n) = e^{j6\pi n}$
(iii) $x(t) = \sin\left(\frac{6\pi}{7} t + 1\right)$
(iv) $(n) = e^{j\frac{2\pi}{3} n} + e^{j\frac{3\pi}{2} n}$
(v) $x(n) = 12\cos(20n)$
(vi) $x(t) = \cos2\pi t + \sin5\pi t$

(b) Derive the necessary condition for a discrete time signal to be periodic.

SECTION-B

Q5(a) Find the transfer function of the first order continuous time system.
(b) Define the term transfer function and Find the transfer function of the given difference equation

Q.6 Find the Laplace transform and ROC of the following signals
(a) $x(t) = e^{2t}.u(t)$
(b) $x(t) = -e^{-at}.u(-t)$
(c) $x(t) = e^{-2t}.u(t) + e^{-3t}.u(t)$
(d) $x(t) = e^{-at}.u(t) + e^{-bt}.u(t)$
(e) $x(t) = e^{-blt}.u(t)$

Q.7 (a) Define ROC for Z transform? Discuss its properties in detail.
(b) What do you mean by one sided Z-transform?