10

(b) Obtain the inverse Laplace transform of

$$F(s) = \frac{5}{(s-3)(s+2)}$$

If ROC is :

(i) $-2 < \text{Re}(s) < 3$

(ii) $\text{Re}(s) > 3$. 10

Section–D

8. Find Z-transform of the following :

(i) $(k + 1)\, a^k$

(ii) $k^2 a^k$

(iii) $u(k)$

(iv) $f(k)$ 20

9. (a) State and prove initial value theorem and final value theorem. 10

(b) Find inverse Z-transform of :

(i) $\dfrac{3z-5}{(z-1)(z-3)}$

(ii) $\dfrac{z^2-5}{(z-1)(z-2)^2}$ 20

B. Tech 4th Semester (AEIE) Examination,

May–2016

SIGNALS AND SYSTEMS

Paper–EE–228–F

Time allowed : 3 hours] *[Maximum marks : 100*

Note : *Attempt **five** questions. **Q. No. 1 is compulsory** and attempt **one** question from each of the four sections.*

1. (a) Discuss periodic signals. 5

(b) Write down the proof of frequency differentiation and integration property of Fourier transform. 5

(c) Given :

$$\{h(K)\} = \left(\frac{1}{2}\right)^K \cdot (\mu(K))$$

$$\{r(K)\} = \{\mu(K)\}$$

Find y (K) for K = 2, and 3 by convolution sum method. 5

(d) Describe ROC, strengthen your answer with an example. 5

Section–A

2. Explain the following signals with help of illustrations :

(i) Deterministic and Random

(ii) One-Dimension and Multi-dimension.

(iii) Even and Odd.

(iv) Energy and Power. 20

3. Discuss the following signals :

(i) Rectangular pulse

(ii) Sinusoidal

(iii) Unit step

(iv) Unit Ramp. 20

Section–B

4. State all the properties of Fourier transform with their proofs. 20

5. Find DFT of the following signals.

(i) $x(n) = a^n \mu(n) \quad |a| < 1$

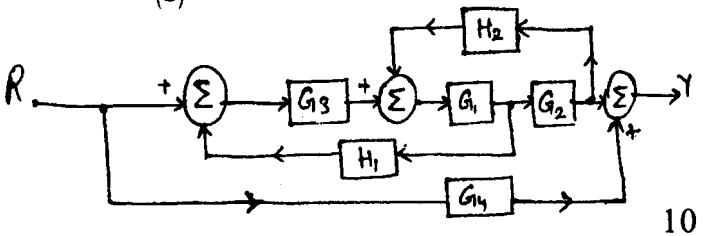
(ii) $x(n) = \cos w_o n$

(iii) $x(n) = \left\{\frac{\sin\left(\frac{\pi}{4} n\right)}{\pi n}\right\} \cdot \left\{\frac{\sin\left(\frac{\pi}{2} n\right)}{\pi n}\right\}$ 6,7,7

Section–C

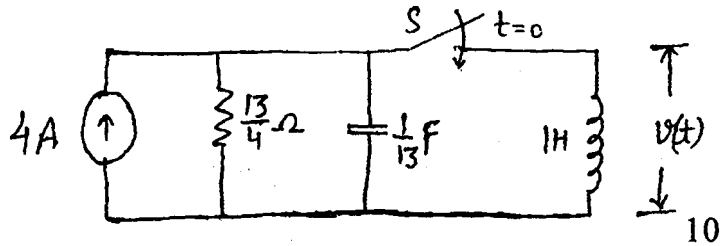
6. (a) For the block diagram given below find

$$T_{(S)} = \frac{Y_{(S)}}{R_{(S)}}$$



10

(b) For the given circuit find v (t) after the switch is closed at t = 0



10

7. (a) If the Fourier transform of a signal h (t) is H (w), Prove that :

$$\Delta T_1 . \Delta W_1 = 1.$$

where

$$\Delta T_1 = \frac{\int_{-\infty}^{\infty} h(t)\, dt}{h_{(0)}} \quad \text{and} \quad \Delta W_1 = \frac{\frac{1}{2\pi} \int_{-\infty}^{\infty} H(w)\, dw}{H_0}$$