



AJEENKYA

D Y PATIL UNIVERSITY

End Term Examinations (April 2019)

School: School of Engineering

Program: B.Tech (Biomedical Engineering)

Course: Biomedical Signals and Systems

Course Code: BME204

Semester: IV

Max Marks: 40

Duration (mins):120

PART-A

(Write Very Short / One Line Answer)

Note: Answer all questions. Each question carries 1 mark.

[10]

1. Explain the non linearity property.
2. Explain the time variance property.
3. What is the non causal system
4. Write the expression of Laplace transform
5. Write the application of Laplace transform.
6. Explain initial value theorem in Laplace transform.
7. Define ROC and its significance.
8. What is odd function?
9. What is power signal?
10. Explain Fourier transform.

PART-B

(Short Answer Questions – Not More Than 150 Words)

Note: Answer any four questions. Each question carries 5 marks [20]

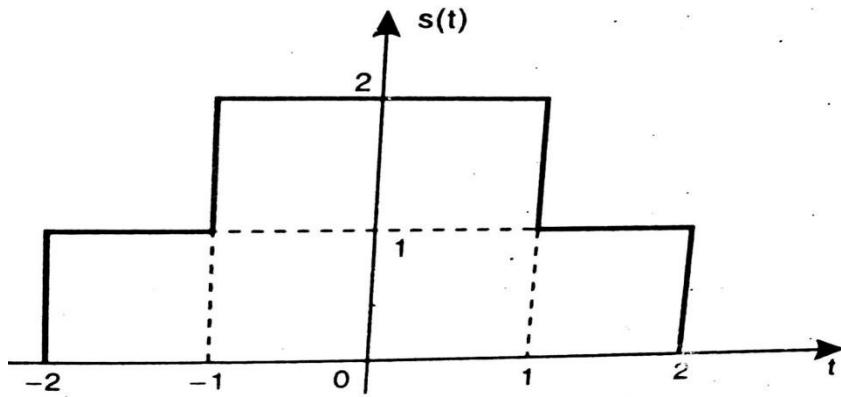
11. Find the transfer function of a causal continuous time LTI system described by the differential equation

$$\frac{d^2y(t)}{dt^2} + 5 \frac{dy(t)}{dt} + 6y(t) = x(t)$$
. together with the condition of initial rest. Also find the response of the system to input $x(t) = 2u(t)$

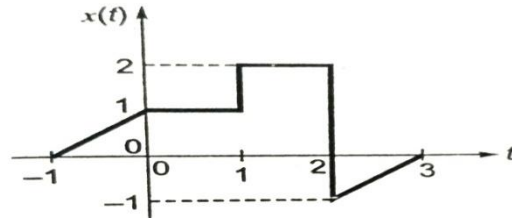
12. Determine the frequency response $H(j\omega)$ and impulse response $h(t)$ for a stable continuous-time LTI system characterized by the linear constant coefficient differential equation given as.

$$\frac{d^2y(t)}{dt^2} + 4 \frac{dy(t)}{dt} + 3y(t) = \frac{dx(t)}{dt} + 2x(t)$$

13. Determine the CTFT of the signal shown in figure.



14. If a plot of a signal $x(t)$ is as shown below in figure, then plot of the signal $x(1-t)$, $x(2/3t-1)$.



15. Using Laplace transformation, solve the following differential equation:

$$\frac{d^2 i}{dt^2} + 4 \frac{di}{dt} + 8i = 8 u(t) \text{ Given that } i(0^+) = 3 \text{ and } \frac{di}{dt}(0^+) = -4$$

16. Determine the inverse z-transform by using partial fraction expansion method. Given

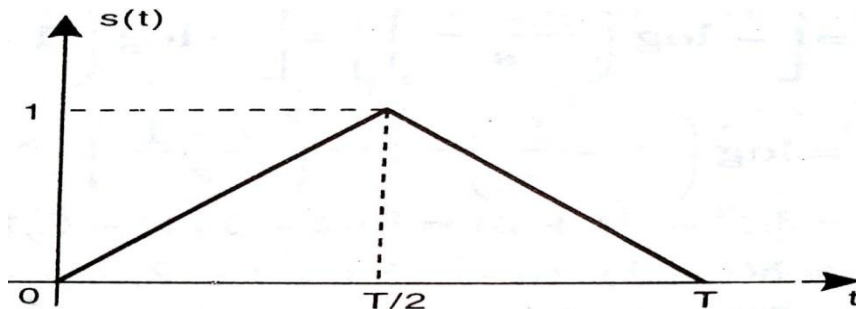
$$X(z) = \frac{z}{\left(z - \frac{1}{2}\right)\left(z - \frac{1}{4}\right)}$$

PART-C

(Long/Case Study/Essay Type Answer Questions)

Note: Answer any one question. Each question carries 10 marks. [10]

17. Find the Laplace transform of triangular waveform shown in fig.



18. Determine the inverse z-transform by using partial fraction expansion method. Given

$$X(z) = \frac{4z^2 - 2z}{z^3 - 5z^2 + 8z - 4}$$