KATHMANDU UNIVERSITY
End Semester Examination
February, 2025

Marks Scored:

Level : B.E.
Year : II

Course : EEEG 221
Semester : II

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date : 11 FEB 2025

SECTION "A"

[20 Q. × 0.5 = 10 marks]

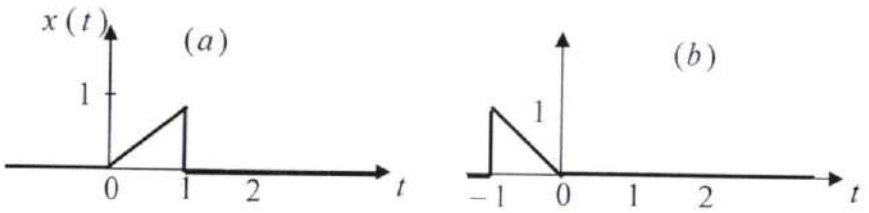
Choose and encircle the most appropriate option from each set of choices

1. The DT unit-impulse $\delta[n]$ may be obtained from unit-step function using the following relation.
   a. $\delta[n] = u[n+1] - u[n]$.
   b. $\delta[n] = u[n] - u[n-1]$.
   c. $\delta[n] = u[n+1] + u[n]$.
   d. $\delta[n] = u[n] + u[n-1]$.

2. The discrete time signal $e^{j(4\pi/3)n}$ has a fundamental period of
   a. 3.
   b. 4.
   c. 6.
   d. 12.

3. The signal $x(t) = u(t+a) - u(t-a)$ will have zero values only for
   a. $t < a$.
   b. $t > -a$
   c. $|t| < a$.
   d. $|t| > a$.

4. In the following figure, if signal in (a) is $x(t)$, the signal in (b) is
   a. $x(-t)$
   b. $x(t+1)$
   c. $x(t-1)$.
   d. $x(-t+1)$.



5. If two signals $x(t)$ and $y(t)$ in the interval a to b are related as $\int_a^b x(t)y^*(t)dt = 0$, then they are
   a. complex conjugates of each other.
   b. orthogonal to each other.
   c. anti-causal of each other.
   d. correlated to each other.

6. A delay system given by $h(t) = \delta(t - t_0)$ where t_0 is a positive value is
   a. casual, stable and memoryless.
   b. non-casual, stable and with memory.
   c. causal, stable and with memory.
   d. causal, unstable, and memoryless.

7. The distributive property of convolution is applcable in
   a. series interconnection of LTI systems.
   b. signal mixing.
   c. parallel interconnection of LTI systems.
   d. signal multiplication.

8. The impulse response of the discrete-time system given by $y[n] - y[n-1] = x[n]$ is
   a. unit step.
   b. shifted unit step by one sample.
   c. unit impulse.
   d. shifted unit impulse by one sample.

9. In the case of a Finite Impulse Response (FIR) system with the length of impulse response 5, any input with a length of 10 will produce an output of the length
a. 5. b. 10. c. 15. d. 14.

10. When finite number of Fourier series coefficients are used to approximate a periodic square wave signal, ripple is observed in the approximation which is called
a. harmonics. b. Gibb's phenomenon.
c. Parseval's identity. d. oscillations.

11. If a periodic signal $x(t)$ is compressed in time domain to $x(2t)$, then its fundamental frequency and Fourier series coefficients will be such that
a. both fundamental frequency and coefficients remain the same.
b. both fundamental frequency and coefficients will be double.
c. fundamental frequency will be double, and the coefficients will remain the same.
d. fundamental frequency remains same, and the coefficients will be half.

12. The Fourier transform of a real and odd signal is
a. real & odd b. imaginary & odd c. real & even d. imaginary & even

13. If a signal is expanded in time without changing its amplitude, then its Fourier transform spectrum will be
a. narrower and taller. b. narrower and flatter.
c. wider and taller. d. wider and flatter.

14. According to Discrete Time Fourier Series properties, the multiplication of any two DT periodic signals $x[n]$ and $y[n]$ will have a resulting signal with its spectral coefficients given by the following operation between the spectral coefficients of $x[n]$ and $y[n]$.
a. cross-correlation b. linear convolution.
c. mixing. d. periodic convolution.

15. The DTFT of any discrete time signal is
a. continuous and non-periodic. b. continuous and periodic.
c. discrete and non-periodic. d. discrete and periodic.

16. In the reconstruction of a sampled signal, a zero-order hold circuit is normally used. The frequency response of the zero-order hold circuit is
a. a rectangular function. b. an impulse function.
c. an exponential function. d. a sinc function.

17. If a signal $x(t)$ has spectrum $X(j\omega)$, the Energy Spectral Density (ESD) of the it is given by
a. $|X(j\omega)|$. b. $\int_{-\infty}^{\infty} |X(j\omega)|d\omega$. c. $|X(j\omega)|^2$. d. $\int_{-\infty}^{\infty} |X(j\omega)|^2 d\omega$.

18. A signal mixer is used in radio transmitters to change frequency from
a. RF to IF. b. IF to RF. c. LO to RF. d. LO to IF.

19. The filter which is used for reducing harmonics in a distorted periodic signal is often called a
a. high pass filter. b. low pass filter. c. band-pass filter. d. band-stop filter.

20. The filter which produces gradual transition from passband to stop-band is called
a. Butterworth. b. Chebyshev. c. Parabolic. d. Elliptic.