ISRA UNIVERSITY

Islamabad Campus

DEPARTMENT OF ELECTRICAL ENGINEERING

MID SEMESTER EXAMINATION - FALL 2016
Program: B.E. (Electrical)
SOLUTION

Course Title: Signal & Systems	**Course Code:** EL-313
Total Marks: 30	**Duration:** 1 Hour 30 Min
Day & Date: Wed, November 30, 2016	**Start Time:** 1000 PST

(Use CAPITAL letters)

Student Name:	Invigilator's Name:
Student Signature:	Invigilator's Signature:
Student Regd. No:	Date:

Section-I
Multiple Choice Questions

**Marks: 6**   **Time Allowed: 20 Minutes**

Each statement is followed by four answers, marked A, B, C & D; only one of them is the best answer. Encircle the best answer. Each correctly circled best answer carries one mark. There is no negative marking for incorrect answer. No mark will be given for over writing, cutting or more than one encircled answers.

PLEASE DO NOT OPEN THE PAPER UNTIL ASKED TO DO SO

***************Good Luck***************

1. For a unit step function the value of the function should be:
    a) 0 for t < 0 and 1 for t ≥ 0 (✓)
    b) 0 for t < 0 and -1 for t ≥ 0
    c) 0 everywhere except for the 0 itself
    d) None of the above

2. A system which is linear is said to obey the rules of:
    a) Scaling
    b) Additivity
    c) Both scaling and additivity (✔)
    d) None of the above

3. A time invariant system is a system whose output:
    a) Increases with a delay in input
    b) Remains same with a delay in input (✔)
    c) Decreases with a delay in input
    d) Vanishes with a delay in input

4. Signal is defined as:
    a) A quantitative description of a physical phenomenon, event or the process.
    b) A function represents a physical quantity or variable containing the information about the behavior and nature of the phenomenon.
    c) A device or a set of rules defining the functional relation between the input and output.
    d) Both (a) and (b) (✔)

5. In a time shift operation, if $t_0 > 0$ then:
    a) The time shift is known as advance.
    b) The time shift is known as delay. (✔)
    c) The signal is decimated.
    d) None of the above.

6. If $0 < a < 1$, the time scale of the resultant signal is:
    a) Decimated.
    b) Speedup.
    c) Slowed down. (✔)
    d) None of the above.

7. For the signal shown below, if we shift it with $t_0 = -1$, then the result will be:

a)

(✔)

b)

c)

d)
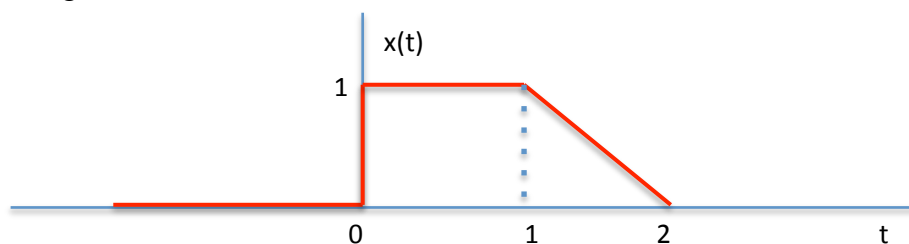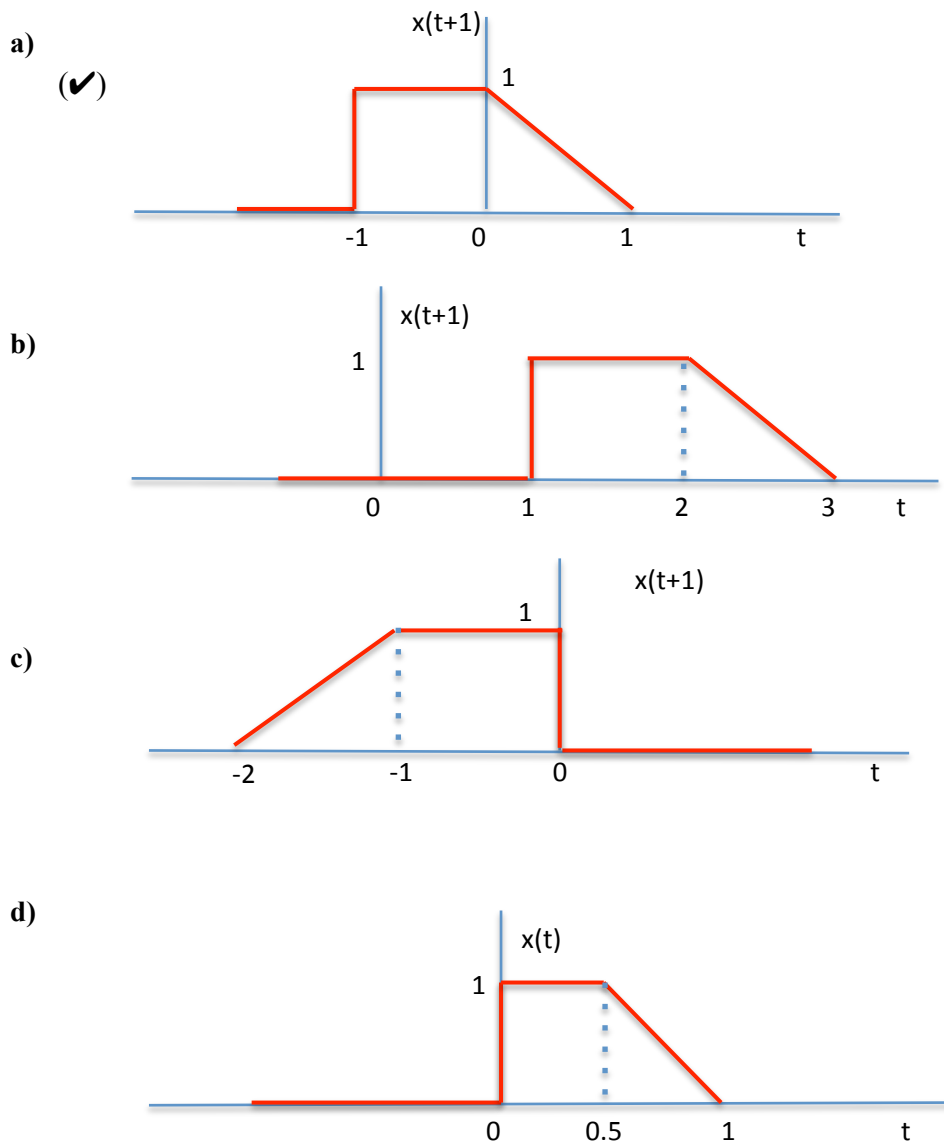
8. A system is said to be defined as non-causal, when:
    a) The output at the present depends on the input at an earlier time.
    b) The output at the present does not depend on the factor of time at all.
    c) The output at the present depends on the input at a time instant in the future. (✔)
    d) The output at the present depends on the input at the current time.

9. Is the function $y[n] = x[n-1] - x[n-4]$ memoryless?
    a) The system is memoryless.
    b) The system needs to have memory, so it is with memory. (✔)
    c) The system is neither memoryless nor with memory.
    d) None of the above.

10. In real exponential function if α >0 then the graph will:
    a) Decrease exponentially.
    b) Grows exponentially.
    c) Increase exponentially.
    d) Both (b) and (c). (✔)

11. A signal x (t) is said to be power signal if:
    a) $0 < P < \infty$ and $E = \infty$ (✔)
    b) $0 < P < E$ and $E = 0$
    c) $0 < P < \infty$ and $E = 0$
    d) None of the above

12. The unit impulse function is also known as:
    a) Dirac Delta function. (✔)
    b) Step function.
    c) Both (a) and (b).
    d) None of the above.

13. A signal cannot be both an energy signal and a power signal.
    a) False.
    b) True. (✔)
    c) May be.
    d) None of the above.

14. The discrete-time unit impulse function δ [n] is defined as:
    a) $\delta[n] = \begin{cases} 0 & for \quad n = 0 \\ 1 & for \quad n \neq 0 \end{cases}$
    b) $\delta[n] = \begin{cases} 1 & for \quad n = 0 \\ 0 & for \quad n \neq 0 \end{cases}$ (✔)
    c) $\delta[n] = \begin{cases} 1 & for \quad n > 0 \\ 0 & for \quad n < 0 \end{cases}$
    d) None of the above.

15. The convolution of x (t) and h (t) is defined by:
    a) $y(t) = \int_{-\infty}^{\infty} x(\tau)h(t - \tau)dt$
    b) $y(t) = \int_{-\infty}^{\infty} [x(\tau) + h(t - \tau)]d\tau$
    c) $y(t) = \int_{-\infty}^{\infty} x(\tau)h(t - \tau)d\tau$ (✔)
    d) None of the above.

16. If the output is a scaled version of its input, then the input function is called as:
    a) Eigenvalue of the system.
    b) Eigenfunction of the system. (✔)
    c) Both (a) and (b).
    d) None of the above.

17. Memory in a discrete time system is analog if:
   a) Energy storage in a continuous time system. (✔)
   b) Memory in a continuous time system.
   c) Sampled memory of a continuous time LTI system.
   d) None of the above.

18. The system $y(t) = x(t) + \frac{1}{3}x(t-3)$ is:
   a) Non-causal system.
   b) Causal system. (✔)
   c) Partly A and partly B.
   d) None of the above.