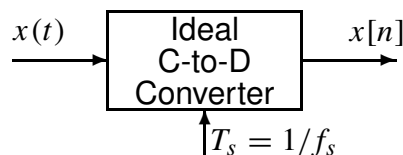


**PROBLEM:**

Circle the correct answer to each of these short answer questions:

1. If the output from an ideal C/D converter is  $x[n] = 3.14 \cos(0.3\pi n)$ , and the sampling rate is 100 samples/sec, then determine the possible value(s) of the the input frequency of  $x(t)$ :

- (a)  $f = 230$  Hz
- (b)  $f = 385$  Hz
- (c)  $f = 100$  Hz
- (d) all of the above
- (e) none of the above



2. Determine the Nyquist rate for sampling the signal  $x(t)$  defined by:  $x(t) = \cos(10\pi t) \sin(100\pi t)$ .

- (a)  $f_s = 10$  samples/sec.
- (b)  $f_s = 55$  samples/sec.
- (c)  $f_s = 100$  samples/sec.
- (d)  $f_s = 110$  samples/sec.
- (e) none of the above

3. If the following MATLAB code is implemented, what is the frequency of the sound that will be produced at the output of the computer's D-to-A converter.

```
soundsc( cos(0.2*pi*(0:9999)), 8000);
```

- (a) 400 Hz
- (b) 800 Hz
- (c) 1600 Hz
- (d) 2000 Hz
- (e) 8000 Hz

4. A rotating disk with one spot is spinning *clockwise* at the rate of 10 revolutions per second. When the disk is illuminated with a strobe light that flashes at a constant rate, the spot appears to rotate *clockwise* at a rate of 2 revolutions per second. Choose a correct value for the flashing rate:

- (a) The flashing rate is 20 flashes per second.
- (b) The flashing rate is 12 flashes per second.
- (c) The flashing rate is 10 flashes per second.
- (d) The flashing rate is 8 flashes per second.
- (e) The flashing rate is 2 flashes per second.