

## ECE-205 Practice Quiz 3

(No Calculators)

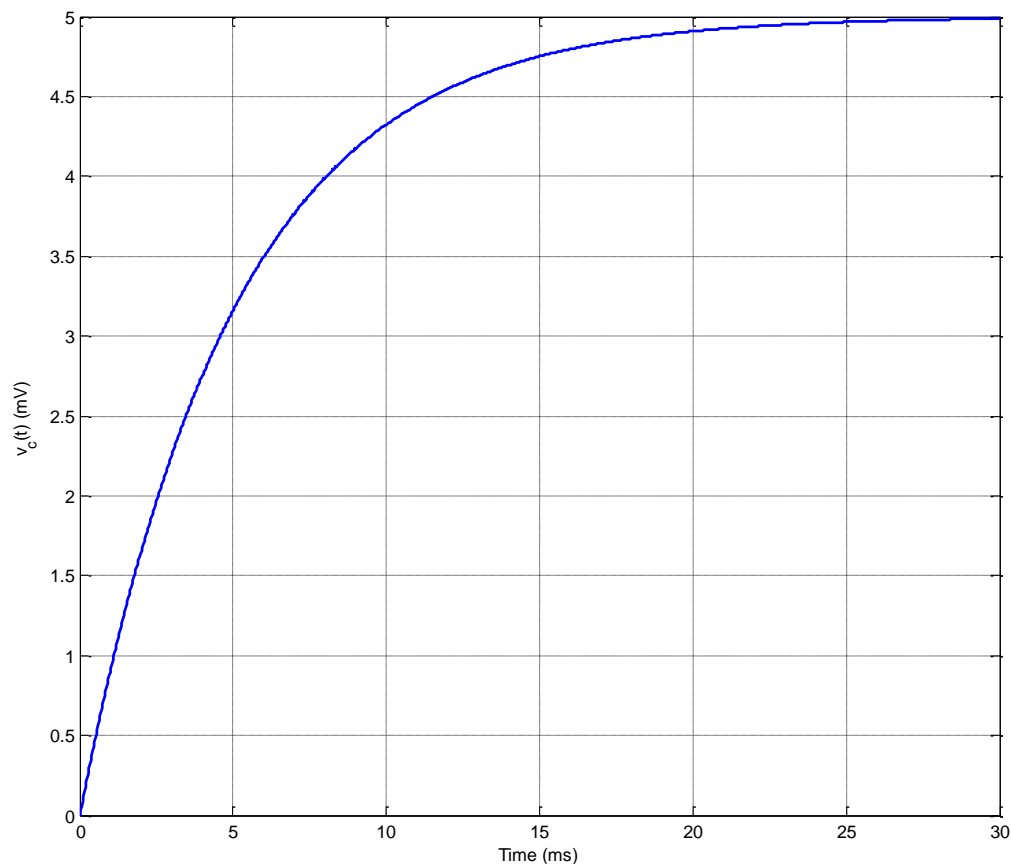
1) A first order system has a time constant  $\tau = 0.1$  seconds. The system will be within 2% of its final value in (choose the smallest possible time)

a) 0.1 seconds   b) 0.2 seconds   c) 0.3 seconds   d) 0.4 seconds   e) 0.5 seconds   f) 1 second

2) A first order system has a time constant  $\tau = 0.05$  seconds. The system will be within 2% of its final value in (choose the smallest possible time)

a) 0.1 seconds   b) 0.2 seconds   c) 0.3 seconds   d) 0.4 seconds   e) 0.5 seconds   f) 1 second

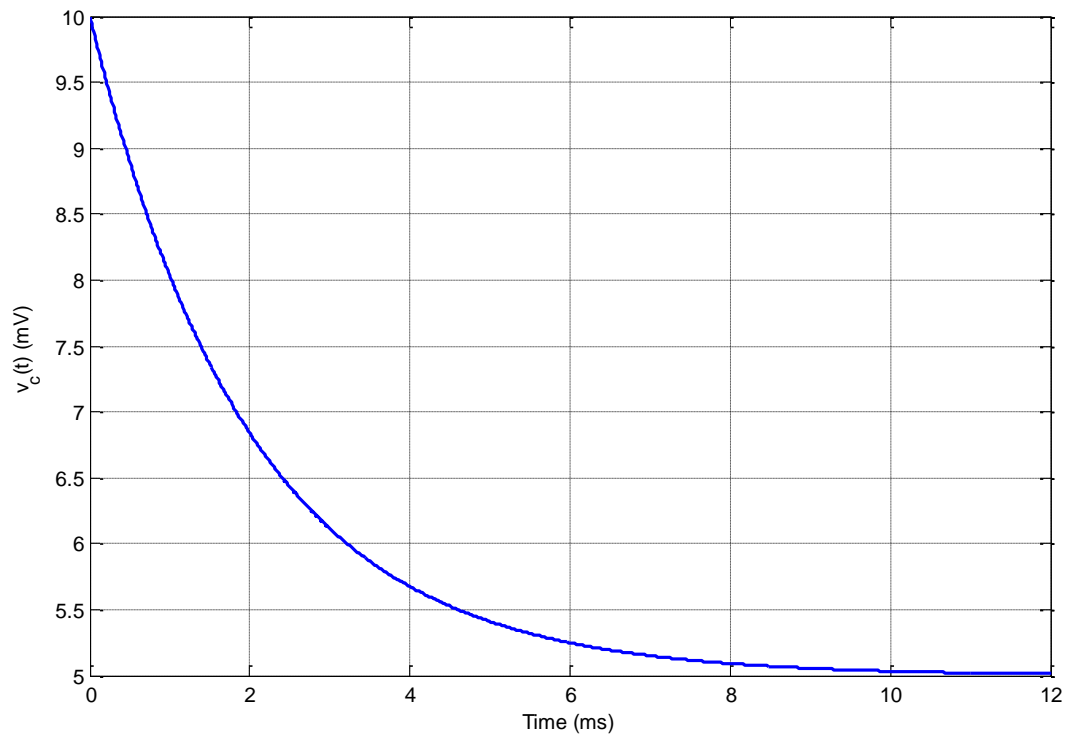
3) The following figure shows a capacitor charging.



Based on this figure, the best estimate of the **time constant** for this system is

a) 1 ms   b) 2.5 ms   c) 5 ms   d) 7.5 ms   e) 10 ms   f) 15 ms   g) 30 ms

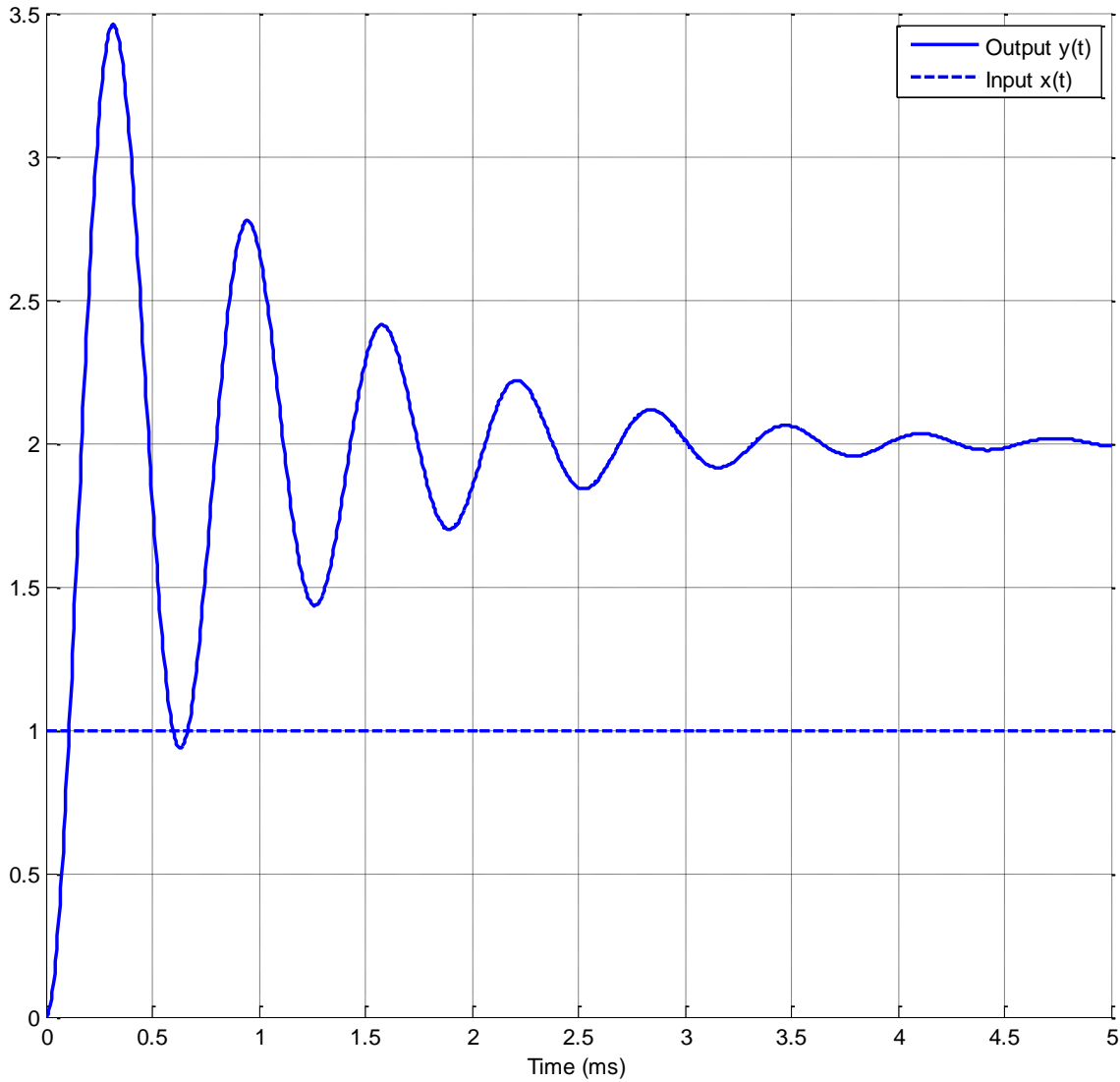
4) The following figure shows a capacitor discharging.



Based on this figure, the best estimate of the **time constant** for this system is

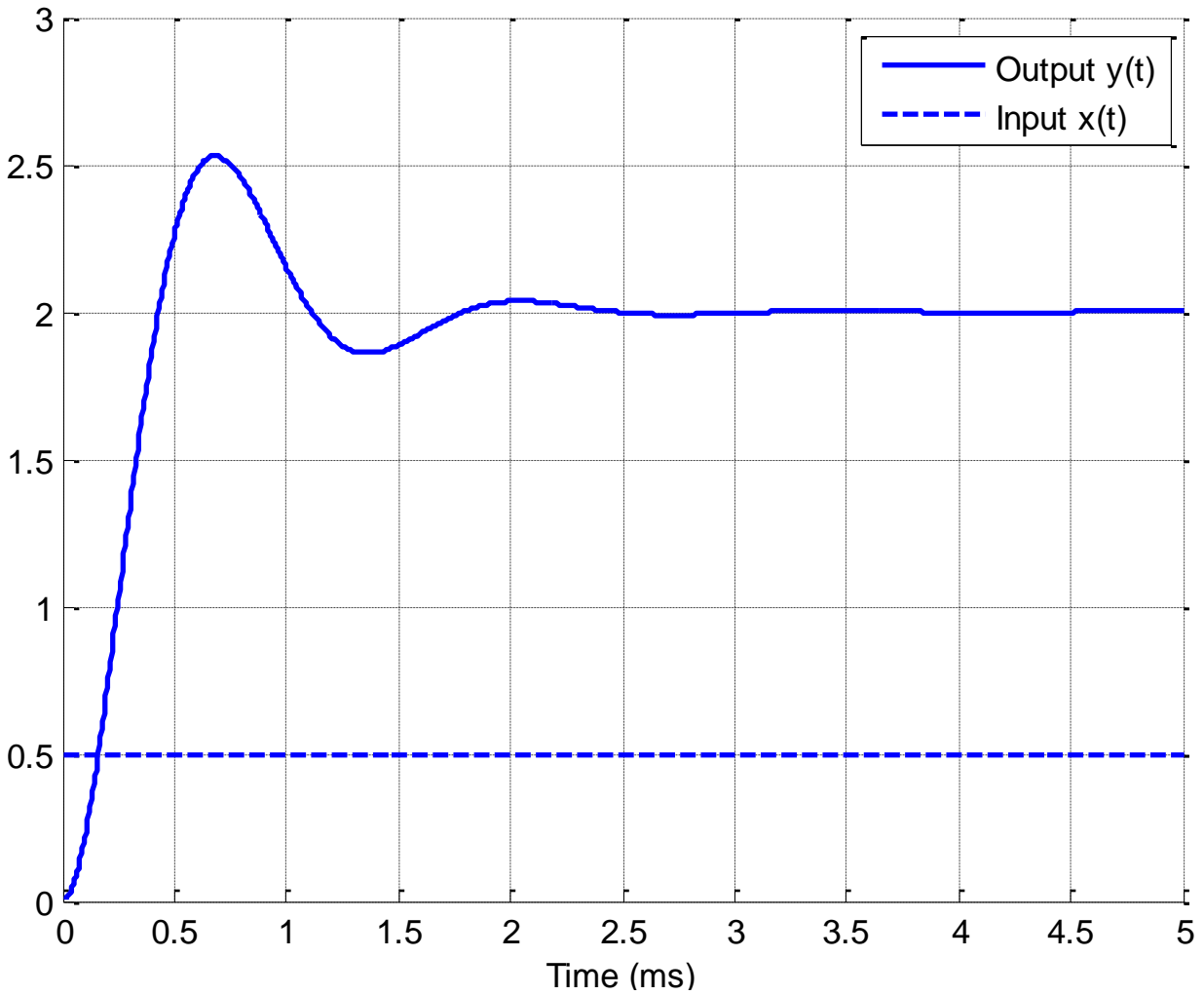
- a) 1 ms   b) 2 ms   c) 3 ms   d) 4 ms   e) 6 me   f) 10 ms   g) 12 ms

Problems 5-8 refer the following graph showing the response of a second order system to a step input.



- 5) The percent overshoot for this system is best estimated as  
a) 350 %   b) 250 %   c) 200%   d) 150 %   e) 100 %   f) 75%
- 6) The (2%) settling time for this system is best estimated as  
a) 1ms   b) 2 ms   c) 3 ms   d) 4 ms
- 7) The time to peak for this system is best estimated as   a) 0.1 ms   b) 0.3 ms   c) 0.9 ms
- 8) The static gain for this system is best estimated as   a) 1   b) 2   c) 3   d) 3.5

Problems 9-11 refer the following graph showing the response of a second order system to a step input.



9) The percent overshoot for this system is best estimated as

- a) 400%   b) 250 %   c) 200%   d) 150 %   e) 100 %   f) 25%

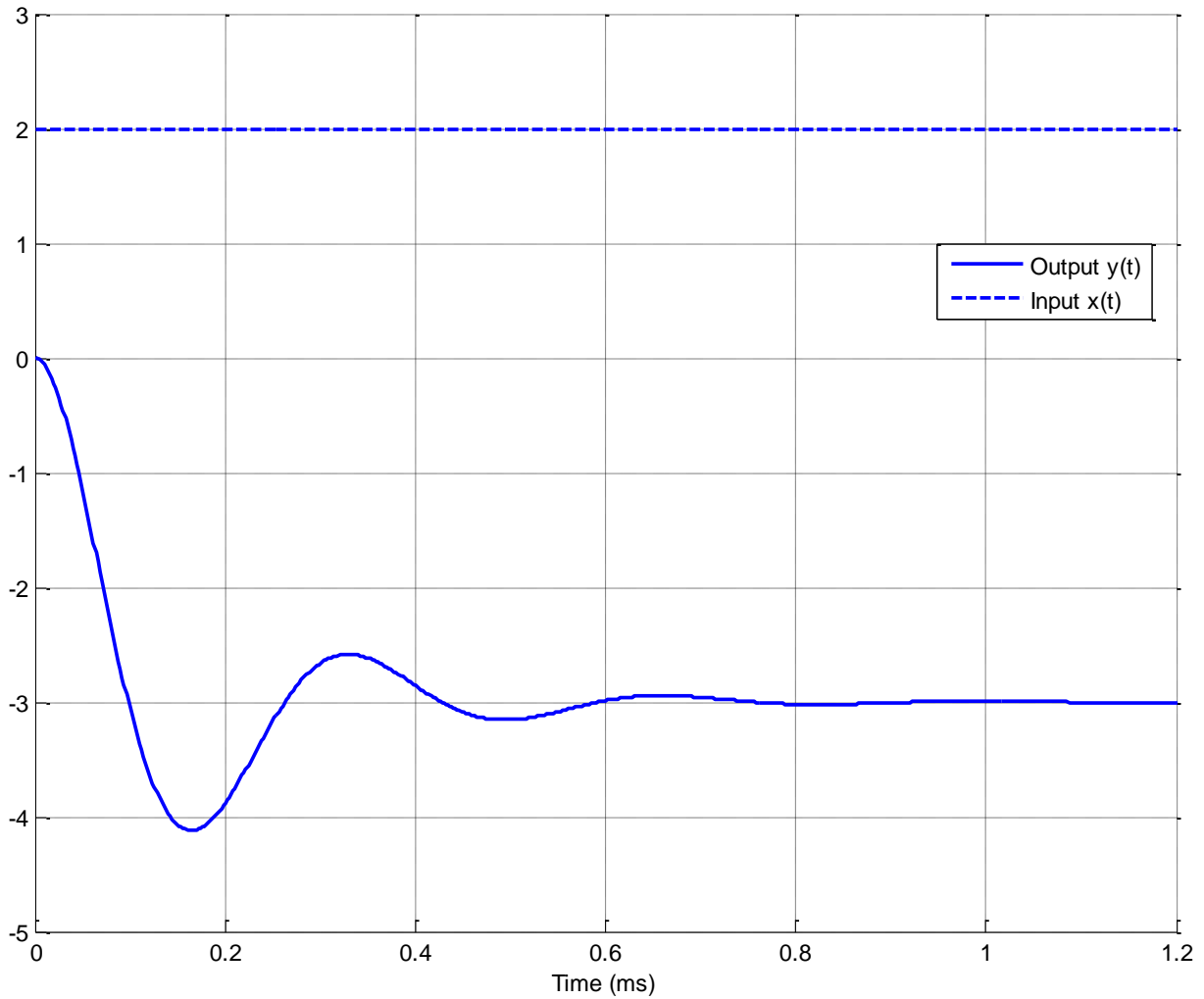
10) The (2%) settling time for this system is best estimated as

- a) 1.5 ms   b) 2.5 ms   c) 4 ms   d) 5 ms

11) The static gain for this system is best estimated as

- a) 1   b) 2   c) 3   d) 4

Problems 12-14 refer the following graph showing the response of a second order system to a step input.



**12)** The percent overshoot for this system is best estimated as

- a) 400%   b) -400 %   c) 300%   d) -300 %   e) -33%   f) 33%

**13)** The (2%) settling time for this system is best estimated as

- a) 0.3 ms   b) 0.6 ms   c) 1.0 ms   d) 1.2 ms

**14)** The static gain for this system is best estimated as

- a) 1.5   b) 3   c) -1.5   d) -3

*Answers: 1-d, 2-b, 3-c, 4-b, 5-f, 6-d, 7-b, 8-b, 9-f, 10-b, 11-d, 12-f, 13-b, 14-c,*