ENGR 203    Spring 2018

Test 2 (05/22/2018)

Total # Pages 4
Total # Problems 4

Name_____________________________________

1. (25 points) ___________
2. (15 points) ___________
3. (15 points) ___________
4. (25 points) ___________

Total (80 points) ___________

GOOD LUCK
1. a). For \( H(s) = \frac{2s + 1}{(s + 1)^2} \) **find** the time domain impulse response waveform \( h(t) \) in the lecture notation). (10 points)

b). For \( H(s) = \frac{s - 1}{s + 2} \) **find** the time domain step response waveform \( g(t) \) in the lecture notation). (10 points).

c). For \( H(s) = \frac{4}{s^2 + 3s + 2} \) **find** the steady-state output \( t \rightarrow \infty \) when the input is \( 6u(t) \). (5 points).
2. **Find** the transfer function \( H(s) = \frac{V_2(s)}{V_1(s)} \) and **determine** if the circuit is stable. (15 points)

![Circuit Diagram]

3. a). The transfer function \( H(s) \) or the impulse response \( h(t) \) for various circuits is shown below. **Indicate** whether they represent a stable or unstable circuit. (5 points)

<table>
<thead>
<tr>
<th>H(s)/h(t)</th>
<th>H(s)</th>
<th>h(t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer Function</td>
<td>( H(s) = \frac{(s-1)}{(s+1)(s+100)^2} )</td>
<td>( H(s) = \frac{1}{s^2+1} )</td>
</tr>
<tr>
<td>Impulse Response</td>
<td>( h(t) = e^t u(t) )</td>
<td></td>
</tr>
</tbody>
</table>

Stable/ Unstable

b). For \( H(s) = \frac{-4(s+3)}{s^2+8s+33} \) **find** the steady-state output when the input is \( 8 \cos(3t)u(t) \). (10 points)
4. **Draw** the Bode magnitude and phase plots for \( H(s) = \frac{s(s+10)^2}{(s+1)} \) and label the magnitude and phase values. Use straight line approximations. **(25 points)**