Quiz Number:	Course Title:	Course Code:	Date:	Duration of Quiz:	Number of Questions:	Instructor:	University:	Department:
2	Systems and Control	ELEC 341	June 20, 2019	20 minutes	5	Siamak Najarian, Ph.D., P.Eng.	UBC	Electrical and Computer Engineering

Student First Name:

Student Last Name:

Student ID Number:

Please carefully read the following instructions and guidelines:

1. *Write your name and student ID number on Page 1 and Page 4.*
2. *This quiz is closed books/notes.*
3. *Cell phones and laptops are not allowed.*
4. *Regular non-graphing calculators are allowed but you cannot share your calculators.*
5. *Please do not detach the binding staple.*
6. *No need to show your detailed calculations. They will not be marked.*
7. *The answer sheet is on the last page (Page 4). Please **blacken** your answer choice.*
8. *Only the answer sheet will be marked.*
9. *If needed, you may use the formulas listed at the end of questions part (Page 4).*

Please do not write in this table.

Question Number	Marks (out of 1)
1	
2	
3	
4	
5	
Total Grade (out of 5)	

Best of Luck!

Question 1: Consider the following open-loop transfer function:

$$L(s) = \frac{(s+4)(s+0.5)}{s(s+1)(s+3)(s+5)}$$

The number of asymptotes, the centroid, and the angles of asymptotes are, _____ , _____ , and _____ , respectively.

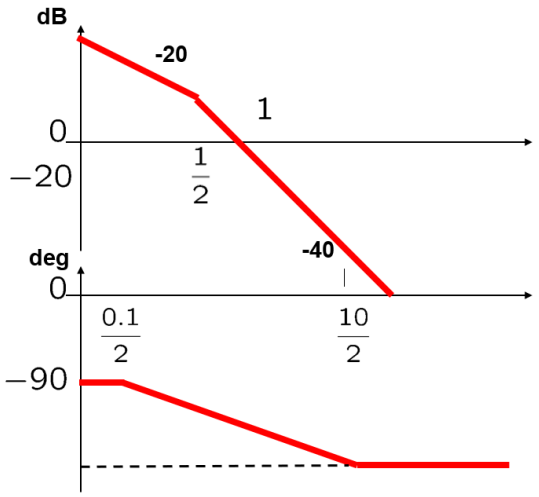
A) 2; -2.25; $\pm 90°$
B) 2; -2.50; $\pm 90°$
C) 3; -1.25; $\pm 60°$ and 180°
D) 3; -1.75; $\pm 60°$ and 180°

Question 2: The root locus of the system with the open-loop transfer given below has a break-away point located at _____ with the corresponding gain (*K*) of _____ .

$$H(s) = \frac{1}{s(s+2)(s+3)}$$

A) -0.683; 3.116
B) -0.784; 3.116
C) -0.784; 2.114
D) -0.683; 2.114

Question 3: The following Bode plot (in the form of straight line approximation) most probably belongs to the open-loop frequency function of $L(s)$ = _____ .



A) $\frac{(s+1)}{s(2s+1)}$

B) $\frac{1}{s(s+1)}$

C) $\frac{1}{s(2s+1)}$

D) $\frac{(s+1)}{(2s+1)}$

Question 4: Consider the following open-loop transfer function of a closed-loop control system:

$$G(s) = \frac{s}{(s+2)^3(s+4)^2}$$

For the above OLTF, the approximate values of magnitude $M(\omega)$ (in dB) and phase angle $\Phi(\omega)$ (in degrees) at an angular frequency of 8 rad/s are _____ , and _____ , respectively.

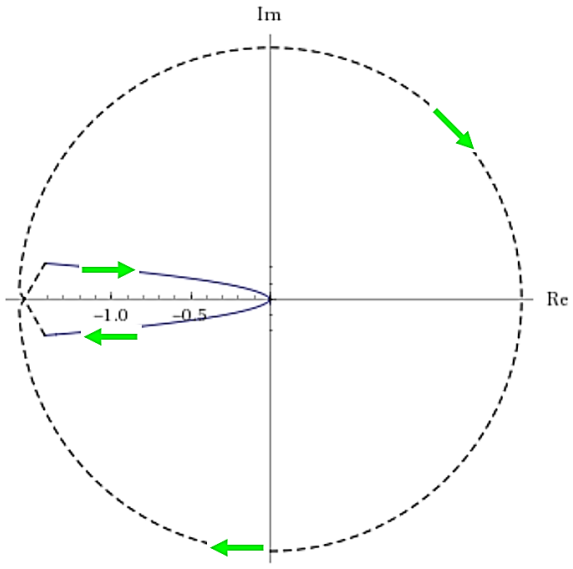
A) -85 and -265

B) -75 and -280

C) -85 and -280

D) -75 and -265

Question 5: The Nyquist plot of an open-loop transfer function is given as below. Knowing that the open-loop transfer function has no poles in the open RHP, we can claim that the closed-loop system is _____ .



A) stable.
B) unstable.
C) marginally stable.
D) stable under certain conditions.

Formula Sheet:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \qquad Z = P + N \qquad \frac{\pi}{r} \times (2k+1),\ k = 0, 1, \ldots, (r-1) \qquad r = \underbrace{n}_{\deg(\text{den})} - \underbrace{m}_{\deg(\text{num})}$$

Answer Sheet:

Question Number	A	B	C	D
1				
2				
3				
4				
5				

Student First Name:

Student Last Name:

Student ID Number:

Answer Sheet:

Question Number	A	B	C	D
1	■			
2			■	
3			■	
4				■
5		■		