**emirates aviation university**

**School of Engineering**

| **Beng Aerospace / Avionics Technology** |
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| STUDENT NAME: |
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| STUDENT ID. NO.: |
| COURSE NAME : 308EAC Control & Instrumentation |
| BATCH:  BEng AE/AV/ME |
| ISSUE DATE:  27/10/2021 |

| **QUIZ COVER SHEET** |
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| **OUTCOMES (Please tick the relevant outcomes)** | |
|:---:|---|
| **X** | Define and identify the essential components of a range of control systems and apply the concepts of open and closed loop control as well as feed forward and feedback control system design |
| | Assess the operation of a range of actuators, instrumentation sensors and transducers in current use for a range of applications and select appropriate devices for the measurement of a range of physical variables. |
| **X** | Determine measures of performance and the parameters of systems from response data and specify the performance criteria required for control systems |
| | Implement the operation of the industry standard three term PID controller and evaluate its performance |
| | Design and create simulations of continuous systems using appropriate computer packages (e.g. MATLAB or SIMULINK) and appreciate the configuration and application of data acquisition software |

| **RESULT** | | | |
|---|---|---|---|
| | | **GRADING** | **OVERALL** |
| | **Q1** | | |
| | **Q2** | | |
| | **Q3** | | |
| | **Q4** | | |
| | | | |
| | **TOTAL %** | | |

**Assessor feedback:**

| I certify that the work contained within this assignment is all my own work and referenced where required. | Feedback Received: Student Signature: |
|---|---|
| Student Signature:                    Date: | Date: |

| Assessors Name: Dr. Mohammad Alakhras          Signature                    Date |
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## Question 1 (25 Marks)

For the electric circuit in Figure 1, find the transfer function $G(s) = Vc(s)/V(s)$ and its poles and zeros. (L1=1 H, L2=2H, C=3F)

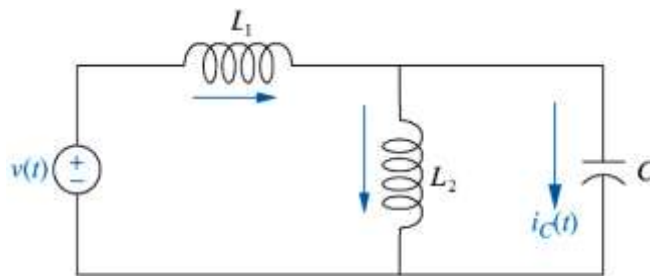

Figure 1

## Question 2 (25 Marks)

Find the transfer function $G(s) = \theta_a(s)/T(s)$, for the rotational mechanical system shown in Figure 2
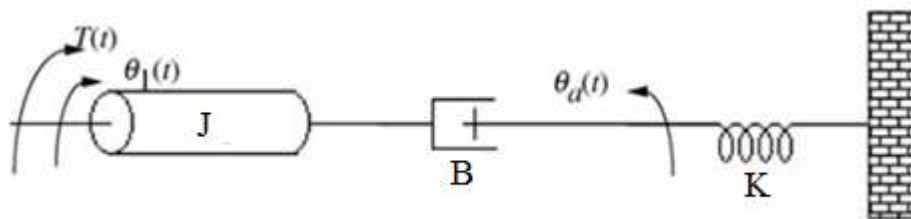J=1 kg.m² /rad, B=1 N.m.s/rad, K=1 N.m/rad



*Figure 2*

## Question 3 (25 Marks)

Simplify the block diagram shown in Figure 3. Obtain the transfer function relating C(s) and R(s ).
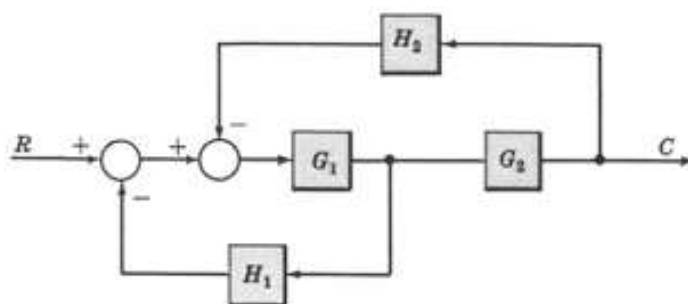


*Figure 3*

## Question 4 (25 Marks)

When the system shown in Figure 4 is subjected to a unit-step input, the system output responds as shown in Figure 5. Determine the values of *a* and *c* from the response curve.
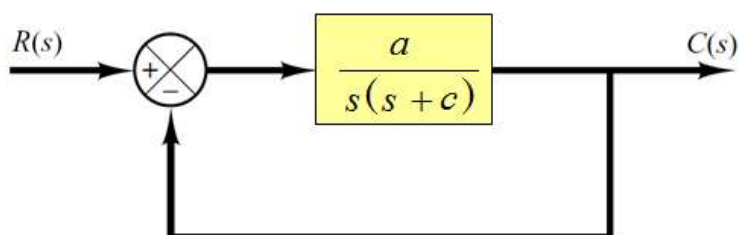


*Figure 4*