**Answers:**

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| **1** | Using the Laplace transform pairs and the Laplace transform theorems, derive the Laplace transforms for the following time functions. Specify the theorems.  Using the Laplace transform pair  Using the frequency shift theorem  Using the Laplace transform pair | |
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| **2** |  | |
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| **3** | **The poles of a transfer function** **are**  (1) the values of the Laplace transform variable, s, that cause the transfer function to become infinite or  (2) any roots of the denominator of the transfer function that are common to roots of the numerator.  **The zeros of a transfer function are**  (1) the values of the Laplace transform variable, s, that cause the transfer function to become zero, or  (2) any roots of the numerator of the transfer function that are common to roots of the denominator. | |
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| **4** | Given  the values of when means initial value. | |
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| **5** | Put | |
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| **6** | The design of a control system follows these steps:  **Step** **1** Determine a physical system and specifications from requirements.  **Step 2** Draw a functional block diagram.  **Step 3** Represent the physical system as a schematic.  **Step 4** Use the schematic to obtain a mathematical model, such as a block diagram.  **Step 5** Reduce the block diagram.  **Step 6** Analyze and design the system to meet specified requirements and specifications that include stability, transient response, and steady-state performance | |
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| **7** |  | |
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| **8** |  | |
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| **9** | The time constant Rise time and settling time | |
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| **10** | Type of system: Type 2, Justification 2 poles at origin  Order of the system: 4th order system, Justification system having 4 poles. | |