(3 Hours) **[Total Marks: 80]**

N.B.: (1) Question No. 1 is **Compulsory**.
(2) Attempt any **three** questions out of the remaining **five**.
(3) Each question carries 20 marks and sub-question carry equal marks.
(4) Assume suitable data if required.

1. (a) Analyze the important issues faced during Hardware-Software Co-design. (5)
   (b) Compare White-Box and Black-Box testing. (5)
   (c) Draw program model CDFG control data flow graph to calculate the roots of quadratic equation. (5)
   (d) What is the Need of RTOS in Embedded system? (5)

2. (a) Draw and explain Waterfall Model used in Embedded Product Design Life-Cycle (EDLC) (10)
   (b) Demonstrate with examples Classification of embedded systems. Discuss various characteristics of the same. (10)

3. (a) Draw an architecture of the ARM Cortex-M3 and discuss its any three important features (10)
   (b) List and explain Design metrics of Embedded system with suitable graphs wherever necessary. (10)

4. (a) Discuss the differences between RISC and CISC cores. Which of them is used in the embedded systems? Why? (10)
   (b) Write in detail about types of memories required in the embedded system. (10)

5 (a) Compare i) RS-232, RS-485 ii) Bluetooth, Zig-Bee. (10)
   (b) Analyze the significance of Low Power modes in Cortex-M3 (10)

6. (a) Design Automatic Railway Ticket Vending Machine highlighting
      i. Specification requirements (choice of components),
      ii. Hardware architecture
      iii. Software architecture (10)
   (b) Discuss with one example each following:
      i. Hardware testing tools
      ii. Software testing tools (10)

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