H.T No: | | | | | | | | | | | R22

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **M.Tech II Semester Supplementary Examinations March-2025**
Course Name : **ARM Microcontrollers**
Course Code : **B455303**
Branch : **Embedded Systems**
Date & Session : **18-03-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions
Each question carries ONE mark. **10x1=10M**

1. List the ARM Processor families. 1 M
2. Write the Exception table of ARM with its addresses. 1 M
3. Differentiate between ARM mode and Thumb mode. 1 M
4. Define conditional exception of ARM. 1 M
5. Write the functions of memory protection unit of ARM Cortex-M3. 1 M
6. List the system level features of cortex-M4 Processor. 1 M
7. Define the advantage of unified assembly language (UAL). 1 M
8. How the Accessing of special instructions is done in ARM? 1 M
9. Write the format of CPACR register of ARM Cortex-M Processor. 1 M
10. List the application of ARM Cortex-M Processor in the field of Communications. 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Explain the ARM Design Philosophy. 10M

OR

11. B). Write the CPSR register format of ARM and explain each bit in it. 10M

12. A). Explain the Data Processing instructions of ARM with suitable example. 10M

OR

12. B). Explain the Register load instructions of ARM with suitable example. 10M

13. A). Write a note on interrupt and exception support of Cortex-M3 processor. 10M

OR

13. B). Explain the Cortex-M4 architecture with a neat diagram and write the architectural features. 10M

14. A). Explain the structure of barrel shifter of Cortex-M Processor with a neat diagram. 10M

OR

14. B). Explain the process of Accessing special instructions of ARM Cortex-M Processors. 10M

15. A). Explain the design aspects of FFT using ARM Cortex-M4 Processor with an example. 10M

OR

15. B). Explain the Structure of Floating-point register of ARM Cortex-M Processor. 10M

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

Examination : **M.Tech II Semester Supplementary Examinations March-2025**
Course Name : **Digital Control Systems**
Course Code : **B455304**
Branch : **Embedded Systems**
Date & Session : **20-03-2025 AN** **Duration: 3 hours** **Max. Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions
Each question carries ONE mark. **10x1=10M**

1. Why is a Sample and Hold circuit required in digital systems? 1 M
2. Give the Definition of Z-Transform. 1 M
3. What are the advantages of State Space technique? 1 M
4. List the properties of the state transition matrix. 1 M
5. Differentiate between the concept of reachability and controllability. 1 M
6. Define the concept of Asymptotic stability in discrete time systems. 1 M
7. Show the relation between the s-domain pole location to that of the z domain poles location. 1 M
8. What are the criteria to be considered for the design of proportional controller? 1 M
9. List the features of Full order observer. 1 M
10. What do you mean by State feedback? 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Discuss the effect of a Sampler on a transfer function of a cascade connected block. 10M

OR

11. B). Compare between Transfer function and a pulse transfer function. 10M

12. A). For the given system below obtain the state transition matrix. 10M

$$X(k+1) = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} X(k)n + \begin{bmatrix} 0 \\ 1 \end{bmatrix} U(k);$$

$$Y(k) = [1 \quad 0] X(k); \qquad X(0) = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

OR

12. B). Obtain the solution of the Discrete Time State Equation. 10M

13. A). Derive the relation between s plane and z plane using bilinear transformation. 10M

OR

13. B). State and explain Jury stability test applied to discrete time controls with a suitable example. 10M

(P.T.O..)

14. A). Consider the following system X(k+1) = AX(k) + BU(k) were $A = \begin{bmatrix} 1 & 0.2 \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 0.02 \\ 0.2 \end{bmatrix}$. Determine a state feedback controller K to place the closed loop poles at z=0.4±j0.6 10M

OR

14. B). Write a short note on Digital PID Controller. 10M

15. A). Explain in detail the procedure for state regulator design using pole placement method for a digital control system. 10M

OR

15. B). Explain the procedure for the design of a full order observer. What are its advantages? 10M

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