

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2021****Subject Code:3170914****Date:27/12/2021****Subject Name:Advanced Microcontrollers****Time:10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

**MARKS**

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|------------|--|-----------|
| <b>Q.1</b> | (a) Describe the flow of ARM development tools .   | <b>03</b> |
|            | (b) List the difference between RISC and CISC architectures.   | <b>04</b> |
|            | (c) Explain the ARM programmer's model with appropriate diagram.   | <b>07</b> |
| <b>Q.2</b> | (a) What do you mean by load & store architecture?   | <b>03</b> |
|            | (b) Explain ARM architecture inheritance.  | <b>04</b> |
|            | (c) With the help of diagram, explain 3 stage pipeline of ARM.   | <b>07</b> |
|            | <b>OR</b>  |           |
|            | (c) Explain in detail ARM 5-stage pipelining with neat Sketch.   | <b>07</b> |
| <b>Q.3</b> | (a) Explain following instructions with examples.<br>(1) SMULL (2) ASR (3) BL  | <b>03</b> |
|            | (b) Explain ARM Data Format & Directives.  | <b>04</b> |
|            | (c) Explain Data Transfer instructions of ARM processor with example.  | <b>07</b> |
|            | <b>OR</b>  |           |
| <b>Q.3</b> | (a) Explain following instructions with examples.<br>(1) SWP (2) ADDEQ (3) BNE                                       | <b>03</b> |
|            | (b) Explain CPSR in details.   | <b>04</b> |
|            | (c) Explain concept of delayed branch. Why FIQ response is fast in ARM processor compared to IRQ?                    | <b>07</b> |
| <b>Q.4</b> | (a) Explain following instructions with examples.<br>(1) EOR (2) RSB (3) CMP   | <b>03</b> |
|            | (b) Explain conditional execution with example.  | <b>04</b> |
|            | (c) What is Stack? Explain types of stack operation supported by ARM processor along with Instruction use for Stack. | <b>07</b> |
|            | <b>OR</b>  |           |
| <b>Q.4</b> | (a) Explain following branch instructions with examples.<br>(1) BEQ (2) BX R12 (3) BLX                               | <b>03</b> |
|            | (b) List out C data types use in programming.  | <b>04</b> |
|            | (c) Explain basic Interrupt Stack Design and Implementation in ARM.  | <b>07</b> |
| <b>Q.5</b> | (a) List advantage and disadvantages of Harvard Architecture over Von Neumann architecture.                          | <b>03</b> |
|            | (b) Explain STM32F401 Nucelo board.  | <b>04</b> |
|            | (c) Explain ARM Processor Exception and Modes.   | <b>07</b> |

**OR**

- Q.5** (a) Explain following assembly language instructions for ARM processor **03**  
(1) MOV R1,R2,LSL #3 (2) TST R2,R3
- (b) Explain Speed control of DC motor using STM32 . **04**
- (c) Explain Interfacing LED and LCD using STM32F401 board. **07**

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