

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 5 – EXAMINATION – SUMMER 2026

Subject Code: 3151107

Date: 25/05/2026

Subject Name: Advance Microcontroller

Time: 02:30 PM TO 05:00 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.**

- Q.1**
- (a) State the difference between Von Neumann and Harvard architecture. **03**
 - (b) Explain CPSR and SPSR Register of ARM microcontroller. **04**
 - (c) Draw and explain the ARM core dataflow model. **07**
- Q.2**
- (a) Write syntax and usage of following instructions: TST, EOR, RSB **03**
 - (b) Write a program to toggle LEDs connected to port pin P0.2 using in ARM7 microcontroller. **04**
 - (c) Explain 5-stage pipelines used in ARM processor. **07**
- OR
- Q.2**
- (c) Write a short note on exceptions in ARM processor. Discuss the types of exceptions, the exception handling mechanism. **07**
- Q.3**
- (a) Describe Software Interrupt instruction with example. **03**
 - (b) Write an assembly language program to count no of 0's in R2 register. **04**
 - (c) Write a C program to interface a UART device with an ARM microcontroller. **07**
- OR
- Q.3**
- (a) List the properties of the Thumb Instruction Set in ARM processors. **03**
 - (b) What is conditional execution? What are the mnemonic extension codes used for conditional execution? Explain with example. **04**
 - (c) Draw and explain Timer block diagram in LPC2148. **07**
- Q.4**
- (a) Explain the importance of Memory Protection Unit. **03**
 - (b) Describe how bit-wise operations can be performed in C using the ARM compiler. **04**
 - (c) Explain techniques used for memory optimization in embedded systems. **07**
- OR
- Q.4**
- (a) Explain flush and clean operation performed on a cache memory in ARM. **03**
 - (b) Explain the role of the various registers in the ADC of an ARM processor. **04**
 - (c) Write a short note on translation look aside buffer. **07**
- Q.5**
- (a) Compare ARM System Bus (ASB) and ARM Peripheral Bus (APB) by listing their differences. **03**
 - (b) Explain concept of delayed branch. **04**

- (c) Draw interfacing diagram of Common Cathode seven segment display connected to port P0.0 to P0.7. Write C language program to display 0 to F continuously with delay. **07**

OR

- Q.5** (a) Explain advance microprocessor bus architecture (AMBA) and discuss its special features. **03**
- (b) Draw the interfacing diagram of a relay with LPC 2148 and explain its working. **04**
- (c) Write a C program to generate PWM signals with 60% duty cycle in LPC2148. Also, explain the significance of using PWM in embedded systems. **07**
