Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER-1 (NEW) EXAMINATION – WINTER 2016

Subject Code: 2715401 **Date:04/01/2017**

Subject Name: ARM PROCESSOR ARCHITECTURE AND SYSTEM DESIGN

Time: 2:30 pm to 5:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Explain the availability of different processor modes in ARM CPU along with justifying their requirements. **07**

(b) How Return from Subroutine and Interrupt Service Routine are achieved in ARM processors? Describe the use of stack in these activities. **07**

Q.2 **(a)** Explain the major differences in 5 stage pipeline architecture in comparison with 3 stage pipeline architecture to minimize pipeline stalls. **07**

(b) For the following 'C' Program code, write down its equivalent ARM assembly code. **07**

```
char i = 5;
int b = 3490, c = 2364;
void main()
{
for(i=0;i>0;i--)
{
b=b+1;
c=c<<2;
}
while(1);
}
```

OR

(b) Write an ARM assembly language program to reverse a given array of 16 bit with 10 elements. **07**

Q.3 **(a)** Describe the clock mechanism in LPC2148 for the CPU and peripherals. **07**

(b) Explain the use of PWM Modulator to generate double edge PWM signals. **07**

OR

Q.3 **(a)** It is required to toggle the MAT0.0 port pin with 10 Khz rate. Describe the Timer register usage, PLL settings and write a C program to achieve this. **07**

(b) Answer the following questions. **07**

(i) How slow GPIO and fast GPIO are different and how are they utilized in programming.

(ii) What is the use of Masking register?

(iii) How can you set the alternate function associated with GPIO pin?

Q.4	**(a)**	Describe the importance of Vector Interrupt Controller. Explain the usage of important VIC registers for its use in application development.	**07**
	(b)	Explain the use of peripherals like GPIO, Timer and ADC to acquire an incoming analog signal at a sampling frequency of 2 KHz.	**07**

OR

Q.4	**(a)**	Explain the specific use of ADC Global Data register along with BURST mode of operation.	**07**
	(b)	Justify the requirements of Memory Accelerator Module along with all possible program execution options.	**07**
Q.5	**(a)**	Describe the SPI signals and use of SPI status register for achieving error free data reception.	**07**
	(b)	Explain the I^2C data frame when data is transferred from Slave to Master. Also discuss the importance of NACK pulse.	**07**

OR

Q.5	**(a)**	Describe the CAN bus characteristics along with significance of Wired AND operation for the bus.	**07**
	(b)	Explain the use of Interrupts in LPC2148 for the implementation of UART functionalities.	**07**

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