

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER-IV (NEW) EXAMINATION – SUMMER 2022**

Subject Code:3141008

Date:02-07-2022

Subject Name:Microprocessor &amp; Microcontroller

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
<b>Q.1</b>	(a) List differences between 8085 Microprocessor or AVR Microcontroller.	<b>03</b>
	(b) What is the role of DDR Register in GPIO Programming in AVR Microcontroller? Write assembly language instructions to initialize PORT A as an input and PORTD as an output port.	<b>04</b>
	(c) What is the meaning of address space partitioning? Draw interfacing diagram to interface 16KB RAM and 16KB PROM with starting address 0000H and 8000H respectively	<b>07</b>
<b>Q.2</b>	(a) Show how address bus and data bus are de-multiplexed to design 8085 microprocessor based application with help of diagram.	<b>03</b>
	(b) List differences between RISC and CISC architecture. Write advantages of RISC architecture over CISC architecture.	<b>04</b>
	(c) Explain Architecture of 8085 Microprocessor with diagram and explain important signals.	<b>07</b>
<b>OR</b>		
	(c) Explain Architecture of AVR Microcontroller with diagram. Which registers are used as memory pointers?	<b>07</b>
<b>Q.3</b>	(a) What will be content of register R16 after execution of following instructions? SEC LDI R16,0x01 LSL R16	<b>03</b>
	(b) Explain SBI, SBR, CBI and CBR instructions with help of examples	<b>04</b>
	(c) Explain assembly language instruction used for comparison purpose. Write assembly language program using comparison instruction to Read 8 bit value from Port A, Compare it with reference value 080, If reading is greater than 0x80, set port pin PD0 and if reading is less than or equal to 0x80, reset port pin PD0.	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	(a) 8 LEDs are connected with PORTB of AVR Microcontroller such that Anode of LEDs tied together and connected to +5 V, Cathode of LEDs are connected to eight pins of Port B. Write instructions to (1) glow all LEDs (2) Turn off all LEDs (3) Glow alternate LEDs	<b>03</b>
	(b) What will status of flags C,Z,V and S after execution of following instructions? LDI R16,0x88 LDI R17,0xFF	<b>04</b>

ADD R16, R17

- (c) In AVR microcontroller application, NPN Type Proximity sensor is connected to PB0. Write assembly language program to Turn ON Solenoid connected to port pin PD7, if object is near to Proximity sensor. Assume that NPN Proximity switch gives logic 0 when object is near to it and solenoid is turned ON if controlling pin is at logic 1. **07**
- Q.4** (a) Write AVR C Program to get status of port pin PA0 and send it to port pin PD0 continuously in infinite loop. **03**
- (b) What is interrupt? Explain steps for executing interrupts. List any eight interrupts available in AVR Microcontroller. **04**
- (c) Explain steps for enabling external interrupts for AVR microcontroller. Write program to toggle port pin PD7 when external interrupt 1 occurs. **07**
- OR**
- Q.4** (a) What is need of timers in microcontroller? **03**
- (b) How timer interrupts are enabled and disabled. Explain TIMSK register of AVR Microcontroller. **04**
- (c) Write AVR C program to generate square wave of 16 KHz with 50% duty cycle on PB5 pin using Timer 0 generated delay. Assuming Crystal of 8 MHz **07**
- Q.5** (a) What is difference between SPI and I2C ? **03**
- (b) How SPI interfacing is better than UART interfacing for serial communication? Explain SPI signals showing interfacing of SPI device with AVR Microcontroller **04**
- (c) Explain interfacing of 16x2 LCD with AVR Microcontroller. Write assembly or C language program to display message "Atmanirbhar Bharat" on the LCD. **07**
- OR**
- Q.5** (a) Common anode seven segment display is connected to port D. Write assembly language or C language instructions to display number 6 on seven segment display. **03**
- (b) Write C language program to rotate DC Motor in full speed. Assuming that DC motor is controlled by IC LM293D using port pins PC6 and PC7. **04**
- (c) Draw stepper motor interfacing diagram in unipolar mode using port pins PD0 to PD3. Write C or assembly language program to rotate stepper motor in full step mode continuously in clockwise direction. When External interrupt 0 occurs, it should change to anticlockwise direction. **07**

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