

Total No. of Questions : 6]

SEAT No. :

P9007

Oct-22/TE/Insem-537

[Total No. of Pages : 1

T.E. (Electrical)

**ADVANCED MICROCONTROLLER AND EMBEDDED SYSTEM
(2019 Pattern) (Semester - I) (303145 A)(Elective - I)**

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Use of Calculator is allowed.
- 5) Assume Suitable data if necessary.

Q1) a) Explain in brief the Program and data memory organization in PIC 18.[5]

b) Compare CISC & RISC architectures. [5]

OR

Q2) a) Explain C data types in brief. [5]

b) Explain status register in detail. [5]

Q3) a) Explain the SFRs related to I/O ports of PIC 18F458 microcontroller.[5]

b) Explain Header and source file in Embedded C Program. Also explain pre-processor directives with examples. [5]

OR

Q4) a) Explain Stack Pointer and Program Counter in detail. [5]

b) Explain various timers and also explain T0CON Register. [5]

Q5) a) Write PIC18 program to blink LEDs connected to Port C of PIC18.[5]

b) Write a C Program to turn bit 5 of Port B on and off 50,000 times. [5]

OR

Q6) a) Write a C18 program to toggle only PORTB.4 continuously every 50msec. Use Timer0, 16 bit mode, 1:4 prescaler to create delay. Assume XTAL = 10 MHz. [5]

b) Write a C18 program to toggle all bits of port B continuously. [5]



Total No. of Questions : 4]

SEAT No. :

P5037

[Total No. of Pages : 1

[6187]-437

T.E. (Electrical Engineering) (Insem)
ADVANCED MICROCONTROLLER AND EMBEDDED
SYSTEMS
(2019 Pattern) (Semester - I) (303145 A) (Elective - I)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) *Solve Q.1 or Q.2, Q.3 or Q.4.*
- 2) *Figures to the right indicate full marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Assume suitable additional data, if necessary.*
- 5) *Use of non-programmable calculator is allowed.*

Q1) a) Explain in brief with neat diagram the data memory organization of PIC 18. [7]

b) Explain status register in detail. State the flags affected after addition of 02H and FE H. [8]

OR

Q2) a) Explain C data types character and integer in detail. Also explain pre-processor directives with examples. [7]

b) Explain Stack pointer (STKPTR) and Bank Select Register (BSR). Also, write instruction to select bank 15. [8]

Q3) a) Explain SFR's related with I/O Ports. Also give dual function of PORTB. [7]

b) Write a C program to generate a delay of 20msec on pin RB0 using Timer0 programming without prescaler, assume XTAL = 10 MHz. [8]

OR

Q4) a) Explain in detail bitwise TOCON register. Also, Explain Prescaler in details. [7]

b) State different types of delay generation. And, write a C program to toggle LEDs connected to Port D with 50msec delay. [8]

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Total No. of Questions : 4]

SEAT No. :

PC37

[6360]-37

[Total No. of Pages : 1

T.E. (Electrical Engineering) (Insem)
ADVANCED MICROCONTROLLER AND
EMBEDDED SYSTEMS
(2019 Pattern) (Semester-I) (Elective - I) (303145 A)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) *Solve Q.1 or Q.2, Q.3 or Q.4.*
- 2) *Figures to the right indicates full marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Assume suitable additional data, if necessary.*
- 5) *Use of non-programmable calculator is allowed.*

- Q1)** a) Compare CISC and RISC architectures. [7]
b) Explain in brief with neat diagram the program memory organization of PIC 18. [8]

OR

- Q2)** a) Explain C control loops and C functions in details. [7]
b) Explain Stack pointer (STKPTR) and Program Counter. [8]

- Q3)** a) Enlist SFR's related with I/O Ports. Write a C program to transfer data from PORTB to PORTC. [7]
b) Write a C program to generate a delay of 10msec on pin RB2 using Timer0 programming 1:4 prescaler, assume XTAL = 10 MHz. [8]

OR

- Q4)** a) Draw LED interfacing diagram with PIC 18. Switch (SW) is connected to RBI and LED connected to RB7. Write a C program get status of SW and send it to LED. [7]
b) Explain T0CON and find value for T0CON register if Timer 0 used in 16-bit mode, 1:4 prescaler, and uses internal clock frequency (Fosc/4) for clock Source. XTAL = 10MHz. [8]



Total No. of Questions : 8]

SEAT No. :

PA-1460

[Total No. of Pages : 2

[5926]-76

T.E. (Electrical)

**ADVANCED MICROCONTROLLER AND EMBEDDED
SYSTEM**

(2019 Pattern) (Semester - I) (Elective - I) (303145 A)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.*
- 2) *Neat diagram must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *use of calculator is allowed.*
- 5) *Assume suitable data, if necessary.*

- Q1) a)** How DC motor speed control is achieved using PWM mode of CCP module of PIC18F458. **[8]**
- b)** Draw CCPICON and list the steps involved in programming PIC18F458 microcontroller in PWM mode. **[9]**

OR

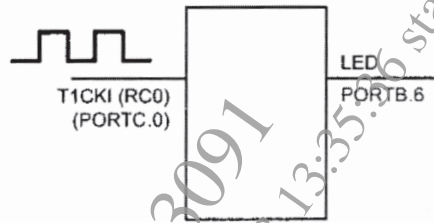
- Q2) a)** List out timers used for CCP module in PIC18F458. Also explain CCP registers used in detail. **[8]**
- b)** Write embedded C program to generate PWM of 5KHz with 40% duty cycle and Prescaler N = 4. **[9]**
- Q3) a)** Write a note on enabling and disabling interrupts and steps to enable interrupts in PIC 18. **[9]**
- b)** Assuming crystal frequency = 10MHz, write a program in C language to generate square wave form with a frequency of 25kHz on PORTB.4. Use timer 0 in 8bit mode without a Prescaler. **[9]**

OR

- Q4) a)** Write a short note on interrupt structure of PIC18F458 microcontroller. **[9]**
- b)** Write a C Program for PIC18 toggle the LED connected to pin 7 of the PORT B every time INT1 is activated by a pulse generator connected at

P.T.O.

INTI (RB1). The program will toggle the LED on falling edge of the pulse. Assume XTAL = 10 MHz. [9]



Q5) a) Explain in detail the function of following flags related to on board ADE of PIC Microcontroller. [8]

- i) ADIF
- ii) Go/Done
- iii) ADFM
- iv) ADON

b) With the help of interfacing diagram and flow chart, explain how PIC microcontroller can be used to measure temperature using LM35 sensor. [9]

OR

Q6) a) Explain features of on-board ADC of PIC18F458. Also explain in detail the functions of ADIF and ADFM bits. [8]

b) Draw a neat diagram and flow chart, explain AC voltage measurement using PIC microcontroller. [9]

Q7) a) Write a C program for the PIC18 to transfer the message “A” serially at 9600 baud, 8-bit data, 1 stop bit. Do this continuously. Assume XTAL=10MHz. [9]

b) Compare synchronous and asynchronous serial communication. Also explain the concept of baud rate with example. [9]

OR

Q8) a) Draw and explain the block diagram of USART transmitter in PIC18. [9]

b) Explain the SPBRG register uses. Also find the value to be loaded in SPBRG register to have baud rate of 4800 and Fosc =10MHz. Assume asynchronous mode an low baud rate. [9]

Total No. of Questions : 8]

SEAT No. :

P286

[Total No. of Pages : 2

[6003]-365

T.E. (Electrical)

**ADVANCED MICROCONTROLLER AND EMBEDDED SYSTEM
(2019 Pattern) (Semester-I) (303145A) (Elective-I)**

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

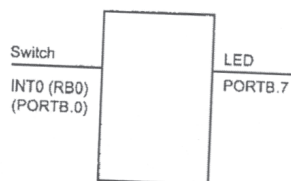
- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.
- 2) Neat diagrams should be drawn whenever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Use of calculator is allowed.
- 5) Assume suitable data if necessary.

- Q1)** a) Explain the steps of PWM programming in CCP module. Find the minimum and maximum PWM frequency allowed for XTAL=10MHz. [9]
- b) Find PR2, CCPR1RL, DC1B1: DC1B0 value for the following PWM frequencies with 75% duty cycle. Assume XTAL=10MHz
- a) 2KHz with prescaler=16
 - b) 5KHz with prescaler=4 [8]

OR

- Q2)** a) Draw CCP1CON and list the steps involved in programming PIC18F458 microcontroller in capture mode. [9]
- b) Use PWM mode of CCP module, write a program in C for PIC18F458 to create a 2.5 MHz PWM waveform with 75% duty cycle on CCP1 pin. Assume XTAL=10MHz. [8]

- Q3)** a) Enlist interrupt registers in PIC18F458. Explain any two. [9]
- b) Write a C program for PIC18 toggle the LED connected to pin 7 of the PORT B every time INT0 is activated by a switch connected at INT0(RB0). Assume XTAL=10MHz. [9]



OR

P.T.O.

Q4) a) State steps the microcontroller does perform upon activation of an interrupt. [9]

b) Write a program in C language using Timer0 to generate square wave form on PORTB.5. Assume PORT C is connected to 8 switches and PORT D to 8 LEDs and same data is being transferred from PORT C to PORT D. [9]

Q5) a) Explain how current is measured using PIC 18 microcontroller. Write a program to measure current and display it on PORT D. [8]

b) Explain the programming of PIC 18 ADC using interrupt with suitable example. [9]

OR

Q6) a) Explain features of on-board ADC of PIC18F458. Also explain in detail the functions of ADIF and ADFR bits. [8]

b) Draw interfacing diagram of 16x2 LCD with PIC18 microcontroller and explain the functions of various pins of LCD. [9]

Q7) a) Explain the interrupt flags bits used in transmission and reception modes of USART. [9]

b) List the steps for programming PIC18 to receive the data serially. [9]

OR

Q8) a) Write a note on SPI protocol. Also state its applications. [9]

b) Explain various modes in serial communication. Also enlist various registers associated with transmission and reception modes of USART. [9]



Total No. of Questions : 8]

SEAT No. :

P-7565

[Total No. of Pages : 2

[6180]-79

T.E. (Electrical)

**ADVANCED MICROCONTROLLER AND EMBEDDED
SYSTEM**

(2019 Pattern) (Semester - I) (303145A) (Elective - I)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.*
- 2) *Figures to the right indicate full marks.*
- 3) *Neat diagrams must be draw,, wherever necessary.*
- 4) *Assume suitable additional data, if necessary.*
- 5) *Use of non-p rogrannzable calculator is allowed.*

Q1) a) Draw CCP1CON and list the steps involved in programming PIC18F458 microcontroller in capture mode. [9]

b) Explain Speed control of DC motor using PWM mode of CCP module. [8]

OR

Q2) a) List out timers used for CCP module in PIC18F458. Also explain CCP registers used in detail. [9]

b) Explain the steps of PWM Programming in CCP Module. Find the minimum and maximum PWM frequency allowed for XTAL=10MHz. [8]

Q3) a) Enlist Interrupt registers in PIC18F458. Explain any two. [9]

b) Explain Enabling and Disabling of Interrupts in PIC18. Also state the steps to enable interrupts in PIC18. [9]

OR

Q4) a) State steps the microcontroller does perform upon activation of an interrupt. [9]

b) Explain external INT0 interrupt programming in PIC18. [9]

P.T.O.

Q5) a) Explain in detail the function of following flags related to on board ADE of PIC microcontroller : [8]

- i) ADIF
- ii) Go/Done
- iii) ADFM
- iv) ADON

b) With the help of interfacing diagram and flow chart, explain how PIC microcontroller can be used to measure temperature using LM35 sensor. [9]

OR

Q6) a) Explain ADCON0 and ADCON1 registers in detail. [8]

b) Draw a neat diagram and flow chart, explain AC voltage measurement using PIC microcontroller. [9]

Q7) a) Write a C program for the PIC18 to transfer the message "A" serially at 9600 baud, 8-bit data, 1 stop bit. Do this continuously. Assume XTAL = 10MHz. [9]

b) Compare synchronous and asynchronous serial communication. [9]

OR

Q8) a) Draw and explain the block diagram of USART transmitter in PIC18. [9]

b) Explain the SPBRG register uses. Also find the value to be loaded in SPBRG register to have baud rate of 4800 and Fosc=10MHz. Assume asynchronous mode and low baud rate. [9]

Total No. of Questions : 8]

SEAT No. :

PB3806

[6262]-66

[Total No. of Pages :2

T.E. (Electrical Engineering)

**ADVANCED MICROCONTROLLER AND EMBEDDED
SYSTEMS**

(2019 Pattern) (Semester- I) (Elective-I) (303145A)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Assume Suitable data if necessary.*
- 5) *Use of non-programmable calculator is allowed.*

- Q1)** a) List the step for compare mode programming of CCP module of PIC18. **[4]**
- b) Explain bit configuration of CCP1CON. **[6]**
- c) Write a C program to create 2 KHz PWM frequency with 75% duty cycle on CCP1 pin. Assume XTAL = 10Mhz. **[8]**

OR

- Q2)** a) Describe programming steps of PWM mode. **[4]**
- b) Explain how time period and duty cycle is set for generation of a waveform using PWM mode of CCP module. **[6]**
- c) Write a program to generate a square wave with frequency 10 kHz and 50% duty cycle on the CCP1 pin, use Timer1. **[8]**

- Q3)** a) Differentiate between Interrupt method and polling method. **[3]**
- b) Explain interrupt structure of PIC 18 with neat diagram **[6]**
- c) Write a C program to toggle an LED connected to pin RB7 on occurrence of an interrupt INTO. **[8]**

OR

- Q4)** a) Explain use of INTOIF in INTCON. **[3]**
- b) What the steps in executing an interrupt. **[6]**
- c) Write a program to generate a square wave that is half the frequency of signal applied at INTO on PORTB.5 **[8]**

P.T.O.

- Q5)** a) Which bits are used to set the conversion time of ADC? [4]
b) Explain bit configuration of ADCON0. [6]
c) Write a C program to get data from Channel 0 (AN0) using ADC interrupt and displays the result on PORTC and PORTD. [8]

OR

- Q6)** a) State the features of ADC of PIC18F458. [4]
b) State the Sensors used for temperature measurement. Draw flow chart for temperature measurement using ADC of PIC 18. [6]
c) With the help of interfacing diagram explain how PC microcontroller can be used to measure temperature using LM35. [8]

- Q7)** a) Explain importance of TSR in serial communication. [3]
b) Write a program for PIC18 to transfer the letter 'T' serially at the baud rate of 9600, continuously. Assume XTAL = 10MHz. [6]
c) Draw and explain Serial communication USART transmit block diagram. [8]

OR

- Q8)** a) Explain how 8 and 9 bit data is transmitted in serial communication? [3]
b) Write down programming steps to transfer data serially. [6]
c) What are the steps for SPI read and write protocol for single byte? [8]

