UNIT 5
INTERFACING MICROCONTROLLER

1. What is the clock source for the timers?
   a) some external crystal applied to the micro-controller for executing the timer
   b) from the crystal applied to the micro-controller
   c) through the software
   d) through programming

   Answer: b

2. What is the frequency of the clock that is being used as the clock source for the timer?
   a) some externally applied frequency f'
   b) controller's crystal frequency f
   c) controller's crystal frequency /12
   d) externally applied frequency/12

   Answer: c
   Explanation: The frequency of the clock source for the timer is equal to f/12(where f is the frequency of the crystal).

3. What is the function of the TMOD register?
   a) TMOD register is used to set various operation modes of timer/counter
   b) TMOD register is used to load the count of the timer
   c) Is the destination or the final register where the result is obtained after the operation of the timer
   d) Is used to interrupt the timer

   Answer: a

4. What is the maximum delay that can be generated with the crystal frequency of 22MHz?
   a) 2978.9 sec
   b) 0.011 msec
   c) 11.63 sec
   d) 2.97 msec

   Answer: d
   Explanation: For generating the maximum delay we have to multiply the maximum number of counts with the time period required to execute one machine cycle(65536*1/22MHz).

5. Auto reload mode is allowed in which mode of the timer?
   a) Mode 0
   b) Mode 1
   c) Mode 2
   d) Mode 3

   Answer: c

6. Find out the roll over value for the timer in Mode 0, Mode 1 and Mode 2?
   a) 00FFH,0FFFH,FFFFH
   b) 1FFFH,0FFFH,FFFFH
   c) 1FFFH,FFFFH,00FFH
   d) 1FFFH,00FFH,FFFFH

   Answer: c
   Explanation: For Mode 0 13 bit value is used so 1FFFH is chosen to be the roll over value. Similarly for Mode 1 FFFFH and for Mode 2 FFH is the roll over value for the timers and counter.

7. What steps are followed when we need to turn on any timer?
   a) load the count, start the timer, keep monitoring it, stop the timer
   b) load the TMOD register, load the count, start the timer, keep monitoring it, stop the timer
   c) load the TMOD register, start the timer, load the count, keep monitoring it, stop the timer
   d) none of the mentioned

   Answer: b

8. If Timer 0 is to be used as a counter, then at what particular pin clock pulse need to be applied?
   a) P3.3
   b) P3.4
   c) P3.5
   d) P3.6

   Answer: b
   Explanation: If Timer 0 is to be used as a counter, then a pulse has to be applied at P3.4 and if it is for Timer 1 then the clock pulse has to be applied at the pin P3.5.

9. In the instruction "MOV TH1,#-3", what is the value that is being loaded in the TH1 register?
   a) 0xFCH
   b) 0xFBH
   c) 0xFDH
   d) 0xFEH

   Answer: c
   Explanation: Negative value is loaded in 2's complement form. -3 represented in 2's complement form as FDH.
   Steps to convert into 2's complement:
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3 → 0000 0011          Binary Equivalent of '3'
  → 1111 1100          1's Complement of decimal '-3'
  → 1111 1101          2's Complement of decimal '-3'
    F    D             Hex Equivalent of '-3'
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10. TF1, TR1, TF0, TR0 bits are of which register?
    a) TMOD
    b) SCON
    c) TCON

d) SMOD

Answer: c

11. Which of the following best states the reason that why baud rate is mentioned in serial communication?
a) to know about the no of bits being transmitted per second
b) to make the two devices compatible with each other, so that the transmission becomes easy and error free
c) to use Timer 1
d) for wasting memory

Answer: b

12. With what frequency UART operates(where f denoted the crystal frequency)?
a) f/12
b) f/32
c) f/144
d) f/384

Answer: d
Explanation: UART frequency is the crystal frequency f/12 divided by 32, that comes out to be f/384.

13. What is the function of the SCON register?
a) to control SBUF and SMOD registers
b) to program the start bit, stop bit, and data bits of framing
c) to control SMOD registers
d) none of the mentioned

Answer: b

14. What should be done if we want to double the baud rate?
a) change a bit of the TMOD register
b) change a bit of the PCON register
c) change a bit of the SCON register
d) change a bit of the SBUF register

Answer: b
Explanation: PCON register consists of SMOD bit as its D7 bit, so if we set this bit then the baud rate gets doubled.

15. When an interrupt is enabled, then where does the pointer moves immediately after this interrupt has occurred?
a) to the next instruction which is to be executed
b) to the first instruction of ISR
c) to a fixed location in memory called interrupt vector table
d) to the end of the program

Answer: c

16. What are the contents of the IE register, when the interrupt of the memory location 0x00 is caused?
    a) 0xFFH
    b) 0x00H
    c) 0x10H
    d) 0xF0H

    Answer: b
    Explanation: When interrupt of 0x00 is caused (the reset interrupt) then all the other interrupts will be disabled or the contents of the IE register becomes null.

17. After RETI instruction is executed then the pointer will move to which location in the program?
    a) next interrupt of the interrupt vector table
    b) immediate next instruction where interrupt is occurred
    c) next instruction after the RETI in the memory
    d) none of the mentioned

    Answer: b

18. Which pin of the external hardware is said to exhibit INT0 interrupt?
    a) pin no 10
    b) pin no 11
    c) pin no 12
    d) pin no 13

    Answer: c

19. Which bit of the IE register is used to enable TxD/RxD interrupt?
    a) IE.D5
    b) IE.D2
    c) IE.D3
    d) IE.D4

    Answer: d
    Explanation: IE.D4 is used to enable RS interrupt or the serial communication interrupt.

20. Which of the following combination is the best to enable the external hardware interrupt 0 of the IE register (assuming initially all bits of the IE register are zero)?
    a) EX0=1
    b) EA=1
    c) any of the mentioned
    d) EX0=1 & EA=1

    Answer: d

21. Which register is used to make the interrupt level or an edge triggered pulse?
    a) TCON
    b) IE
    c) IPR

   d) SCON

   Answer: a

22. What is the disadvantage of a level triggered pulse?
   a) a constant pulse is to be maintained for a greater span of time
   b) another interrupt may be generated if the low-level signal is not removed before the ISR is finished
   c) it is difficult to produce
   d) another interrupt may be caused if the signal is still low before the completion of the last instruction

   Answer: d

23. What is the correct order of priority that is set after a controller gets reset?
   a) RI/TI > TF1 > TF0 > INT1 > INT0
   b) RI/TI < TF1 < TF0 < INT1 < INT0
   c) INT0 > TF0 > INT1 > TF1 > RI/TI
   d) INT0 < TF0 < INT1 < TF1 < RI/TI

   Answer: c

24. Why two pins for ground are available in ADC0804?
   a) for controlling the ADCON0 and ADCON1 register of the controller
   b) for controlling the analog and the digital pins of the controller
   c) for both parts of the chip respectively
   d) for isolate analog and digital signal

   Answer: d
   Explanation: Two grounds are available in ADC0804 to isolate analog signal from digital signal. This isolation provides accuracy in digital output.

25. What is the function of the WR pin?
   a) its active high input used to inform ADC0804 to the end of conversion
   b) its active low input used to inform ADC0804 to the end of conversion
   c) its active low input used to inform ADC0804 to the start of conversion
   d) its active high input used to inform ADC0804 to the start of conversion

   Answer: c

26. State which of the following statements are false?
   a) CLK IN pin used for External Clock Input or Internal Clock with external RC element
   b) INTR pin tells about the end of the conversion
   c) ADC0804 IC is an 8 bit parallel ADC in the family of the ADC0800 series
   d) None of the mentioned

   Answer: d

27. While programming the ADC0808/0809 IC what steps are followed?
   a) select the analog channel, start the conversion, monitor the conversion, display the digital results

b) select the analog channel, activate the ALE signal (L to H pulse), start the conversion, monitor the conversion, read the digital results
c) select the analog channel, activate the ALE signal (H to L pulse), start the conversion, monitor the conversion, read the digital results
d) select the channel, start the conversion, end the conversion

Answer: b

28. In ADC0808/0809 IC which pin is used to select Step Size?
a) Vref
b) Vin
c) Vref/2 & Vin
d) None of the mentioned

Answer: a
Explanation: Step Size is calculated by formula $Vref/(2^n)$. As ADC0808/0809 8-bit ADC value of n=8. Therefore formula becomes $Vref/(2^8)$ = Vref/256. If Vref = 5V then Step Size will be 5/256 i.e. 19.53mV.

29. What is the difference between ADC0804 and MAX1112?
a) ADC0804 has 8 bits and MAX1112 has 1 bit for data output
b) ADC0804 is used for adc and dac conversions whereas MAX1112 is used for serial data transmissions
c) ADC0804 has 32 bits and MAX1112 has 3 bit for data output
d) None of the mentioned

Answer: a
Explanation: ADC0804 is used for parallel ADC and MAX1112 is used for serial ADC.

30. Which of the following statements are true about DAC0808?
a) parallel digital data to analog data conversion
b) it has current as an output
c) all of the mentioned
d) none of the mentioned

Answer: a

31. 8 input DAC has _____
a) 8 discrete voltage levels
b) 64 discrete voltage levels
c) 124 discrete voltage levels
d) 256 discrete voltage levels

Answer: d
Explanation: For n input DAC has 2^n discrete voltage levels.

32. INTR, WR signal is an input/output signal pin?
a) both are output
b) both are input
c) one is input and the other is output

d) none of the mentioned

Answer: c
Explanation: INTR pin tells about the end of the conversion (output) and WR pin tells us to start the conversion (input).

33. What is the difference between LM 34 and LM 35 sensors?
    a) one is a sensor and the other is a transducer
    b) one's output voltage corresponds to the Fahrenheit temperature and the other corresponds to the Celsius temperature
    c) one is of low precision and the other is of higher precision
    d) one requires external calibration and the other doesn't require it

    Answer: b
    Explanation: LM 34's output voltage corresponds to the Fahrenheit temperature and LM 35 corresponds to the Celsius temperature.

34. What is signal conditioning?
    a) to analyse any signal
    b) conversion or modification is referred to as conditioning
    c) conversion from analog to digital is signal conditioning
    d) conversion from digital to analog is signal conditioning

    Answer: b.

35. What steps have to be followed for interfacing a sensor to a microcontroller 8051?
    a) make the appropriate connections with the controller, ADC conversion, analyse the results
    b) interface sensor with ADC and ADC with 8051
    c) interface sensor with the MAX232, send now to microcontroller, analyse the results
    d) none of the mentioned

    Answer: b.

36. LM35 has how many pins?
    a) 2
    b) 1
    c) 3
    d) 4

    Answer: c
    Explanation: LM35 has 3 pins.
    1.Power(+5 Volts)
    2.Output analog voltage
    3.Ground(0 Volts)

37. Why Vref is set of ADC0848 to 2.56 V if analog input is connected to the LM35?
    a) to set the step size of the sampled input
    b) to set the ground for the chip
    c) to provide supply to the chip

d) all of the mentioned

Answer: a
Explanation: Vref is used to set the step size of the ADC conversion, if it is selected to 2.56 then the step size will be selected to 10mV, so for every step increase of the analog voltage an increase of 10 mV will be there.

38. Which of the following steps detects the key in a 4*4 keyboard matrix about the key that is being pressed?
    a) masking of bits
    b) ensuring that initially, all keys are open
    c) checking that whether the key is actually pressed or not
    d) all of the mentioned

    Answer: d
    Explanation: For detecting that whether the key is actually pressed or not, firstly this must be ensured that initially all the keys are closed. Then we need to mask the bits individually to detect that which key is pressed. Then we need to check that is the key actually pressed or not, by checking that whether the key pressed for a time more than 20 micro seconds.

39. What is described by this command: CJNE A,#00001111b, ROW1
    a) it masks the bit and then jumps to the label where ROW1 is written
    b) it makes the value of the accumulator 0FH and then jumps at the address where ROW1 label is written
    c) it compares the value of the accumulator with 0FH and jumps to the location where ROW1 label is there if the value becomes equal
    d) it compares the value of the accumulator with 0FH and jumps to the location where ROW1 label is there if the value is not equal

    Answer: d
    Explanation: This particular command CJNE A,#00001111b, ROW1 compares the value of the accumulator with 0FH and jumps to ROW1 address if the value is not equal.

40. To detect that in which column, the key is placed?
    a) we can mask the bits and then check it
    b) we can rotate the bits and then check that particular bit which is set or reset(according to the particular condition)
    c) none of the mentioned
    d) all of the mentioned

    Answer: d

41. In reading the columns of a matrix, if no key is pressed we should get all in binary notation
    a) 0
    b) 1
    c) F
    d) 7

Answer: b
Explanation: If no key is pressed, then all the keys show 1 as they are all connected to power supply.

42. If we need to operate a key of a keyboard in an interrupt mode, then it will generate what kind of interrupt?
a) ES
b) EX0/EX1
c) T0/T1
d) RESET

Answer: b
Explanation: If a key is to operate in an interrupt mode then it will generate an external hardware interrupt.

43. To identify that which key is being pressed, we need to:
a) ground all the pins of the port at a time
b) ground pins of the port one at a time
c) connect all the pins of the port to the main supply at a time
d) none of the mentioned

Answer: b
Explanation: To detect that which key is being pressed, we need to ground the pins one by one.

44. Key press detection and Key identification are:
a) the same processes
b) two different works are done in Keyboard Interfacing
c) none of the mentioned
d) any of the mentioned

Answer: b
Explanation: They are two different works that are involved in Keyboard Interfacing. One is used for checking that which key is being actually pressed and the other is used to check that is the key actually pressed or not.

45. Why do we need a ULN2803 in driving a relay?
a) for switching a motor
b) for increasing the current
c) for increasing the power
d) for switching the voltage

Answer: b
Explanation: We need a ULN2803 for driving a relay because the relay coil requires 10mA or more current to be energized. If microcontroller pins are not able to provide sufficient current to drive relays then we need ULN2803 for driving relays.

46. How can we control the speed of a stepper motor?
a) by controlling its switching rate
b) by controlling its torque
c) by controlling its wave drive 4 step sequence

d) cant be controlled

Answer: a
Explanation: Speed of a stepper motor can be controlled by changing its switching speed or by changing the length of the time delay loop.

47. How many rows and columns are present in a 16*2 alphanumeric LCD?
    a) rows=2, columns=32
    b) rows=16, columns=2
    c) rows=16, columns=16
    d) rows=2, columns=16

    Answer: d

48. How many data lines are there in a 16*2 alphanumeric LCD?
    a) 16
    b) 8
    c) 1
    d) 0

    Answer: b

49. Which pin of the LCD is used for adjusting its contrast?
    a) pin no 1
    b) pin no 2
    c) pin no 3
    d) pin no 4

    Answer: c
    Explanation: Pin no 3 is used for controlling the contrast of the LCD.

50. For writing commands on an LCD, RS bit is
    a) set
    b) reset
    c) set & reset
    d) none of the mentioned

    Answer: b

51. Which command of an LCD is used to shift the entire display to the right?
    a) 0x1C
    b) 0x18
    c) 0x05
    d) 0x07

    Answer: a

52. Which command is used to select the 2 lines and 5*7 matrix of an LCD?
    a) 0x01
    b) 0x06
    c) 0x0e

d) 0x38

Answer: d

53. Which of the following step/s is/are correct for sending data to an LCD?
    a) set the R/W bit
    b) set the E bit
    c) set the RS bit
    d) all of the mentioned

    Answer: d
    Explanation: To send data to an LCD, RS pin should be set so that LCD will come to know that it will receive data which has to display on the screen. R/W pin should be reset as data has to be displayed (i.e. write to the LCD). High to low pulse must be applied to the E pin when data is supplied to data pins of the LCD.

54. Which of the following step/s is/are correct to perform reading operation from an LCD?
    a) low to high pulse at E pin
    b) R/W pin is set high
    c) low to high pulse at E pin & R/W pin is set high
    d) none of the mentioned

    Answer: c

55. Which instruction is used to select the first row first column of an LCD?
    a) 0x08
    b) 0x0c
    c) 0x80
    d) 0xc0

    Answer: c