UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2017

Program: B. Tech/ADE   Semester – V[th]
Subject (Course): Microprocessor based control system   Max. Marks : 100
Course Code: ADEG342   Duration   : 3 Hrs
No. of page/s: 02

Note: Attempt all the questions

<div align="center">

SECTION A   (5X4= 20 MARKS)

</div>

Q1. Answer the following questions

(a) In POP instruction, after each execution of the instruction, the stack pointer is_____
     (i) incremented by 1 (ii) decremented by 1 (iii) incremented by 2 (iv) decremented by 2

(b) _____ and _____instructions provide a means of moving two bytes of data
     between HL register and a RAM address in 8085.
     (i) LDAX & STAX   (ii) LHLD & SHLD   (iii) LDA& STA (iv) PUSH & POP

(c) Consider the following fragment of an 8085 program

     2000 MVI A,82H
     2002 ORA A
     2003 JC 2007
     2006 XRA A
     2007 OUT PORT1
     2009 HLT
     The output at PORT1 is_____

(d) In Intel 8085 microprocessor EI instruction is of _____ byte and DI instruction is
     of_____byte.

Q2. What do you understand by interrupt? Differentiate various types of interrupt in 8085
    microprocessor.

Q3. In figure 1, if we use all the output lines (O_7 to O_0) of the decoder to select eight memory
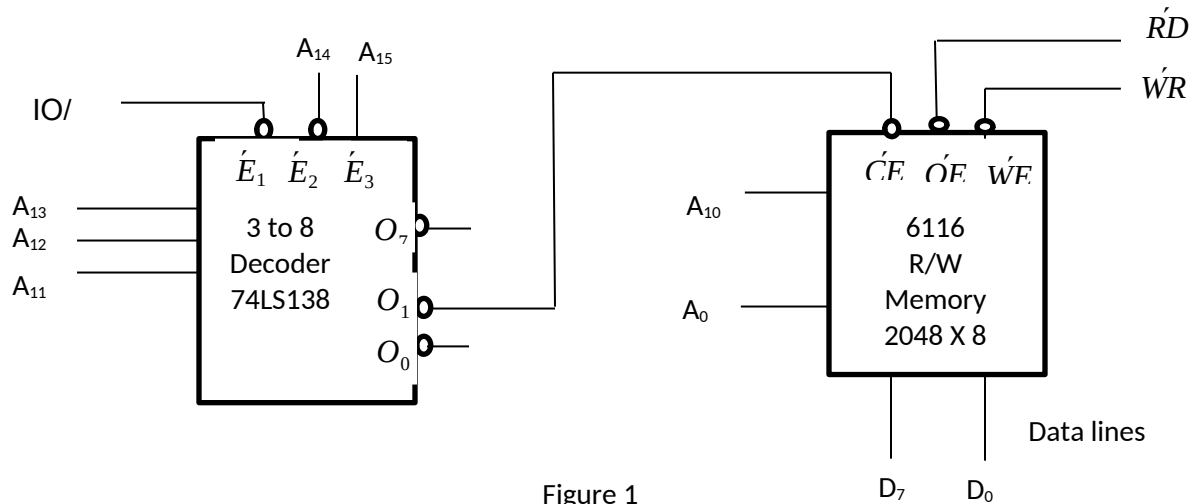chips of the same size as the 6116, what is the total range of the memory map?

Figure 1

Q4. Draw and explain the architecture of 8254 programmable interval timer.

Q5. Explain the principle of operation of Hall Effect sensor. Discuss any one application where this sensor finds application in automated vehicle.

SECTION B   (5X8= 40 MARKS)

Q6. Explain automotive electronics. With the help of suitable diagram discuss the principle of operation of optical sensor and exaust gas oxygen sensor.

Q7. Explain the operation of following converters with suitable diagram

    (a) R/2R Ladder network DAC   (b) Successive Approximation ADC

Q8. Draw and analyze the timing diagram of the following instruction of Intel 8085

  (a) MVI A, 05H   (b) OUT 08H

Q9. Explain the following data transfer schemes with suitable examples:

  (a) Unconditional (b) Polling (c) Interrupt (d) With habdshake signals

  (e) With HOLD signal

Q10. Write an assembly language program to arrange 34, 56, AB, E4, 28, 54 in ascending order. These numbers are stored in the memory locations 3501 to 3505H. The result has to be stored in the memory location 3601 to 3605H.

Q11. (a) The 8255 IC is interfaced with the microprocessor as shown in figure 2. Perform the following operations.

i. Find the port addresses by analyzing the decode logic.
ii. Find the Mode 0 control word to configure port A and port C_U as output port and port B and port C_L as input ports.
iii. Write a program to read the input from port B and finds it's 2's complement and display it at port A and read from port C_L and display the output at port C_U.
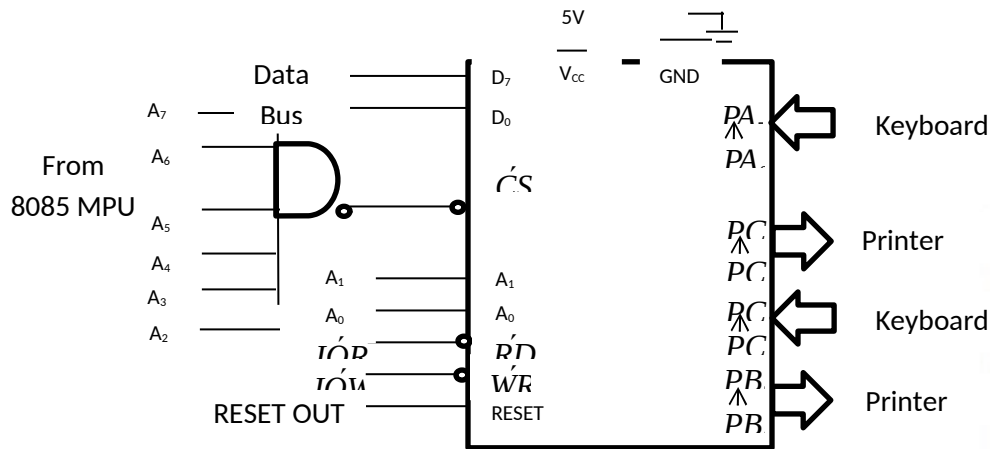

Figure 2

(b) Write an assembly language program to flash 00 and FF six times with four second delay between each flash.

Q12. (a) Design a traffic light controller by writing a program which provide the given on/off time to three traffic lights (Green, Yellow and Red) and two pedestrian signs (WALK and DON'T WALK). The signal lights and signs are turned on/off by the data bits of an output port as shown below:

Lights	Data Bits	On Time
Green	D0	15 seconds
Yellow	D2	5 seconds
Red	D3	20 seconds
WALK	D5	15 seconds
DON'T WALK	D7	25 seconds

The traffic and pedestrian flow are in the same direction; the pedestrian should cross the road when the Green light is on.

(b) Write an assembly language program and algorithm to exchange 10 bytes of data stored in memory starting from 5500 H with the data in memory location starting from 6500 H.

UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2017

Program: B. Tech/ADE   Semester – V[th]
Subject (Course): Microprocessor based control system   Max. Marks   : 100
Course Code: ADEG342   Duration   : 3 Hrs
No. of page/s: 02

Note: Attempt all the questions

<div align="center">

SECTION A   (5X4= 20 MARKS)

</div>

Q1. Answer the following questions

(a) In PUSH instruction, after each execution of the instruction, the stack pointer is_____

   (i) incremented by 1 (ii) decremented by 1 (iii) incremented by 2 (iv) decremented by 2

(b) In Intel 8085 microprocessor RST 6 transfers the program execution to which of the following location
   (i)   0020H   (ii) 0028H   (iii) 0030H   (iv) 0038H

(c) _____ and _____ lines provide the 8085 with a DMA capability by allowing another processor on the same system bus to request control of the buses.

(d) In Intel 8085 microprocessor SIM instruction stands for _____and RIM instruction stands for_____

Q2. Elucidate the operation of following instructions:

   (a)   STAX rp
   (b)   JP addr
   (c)   EI
   (d)   RET

Q3. Draw and explain the architecture of 8237 DMA controller.

Q4. Explain the principle of operation of optical sensor. Discuss any one application where this sensor finds application in automated vehicle.

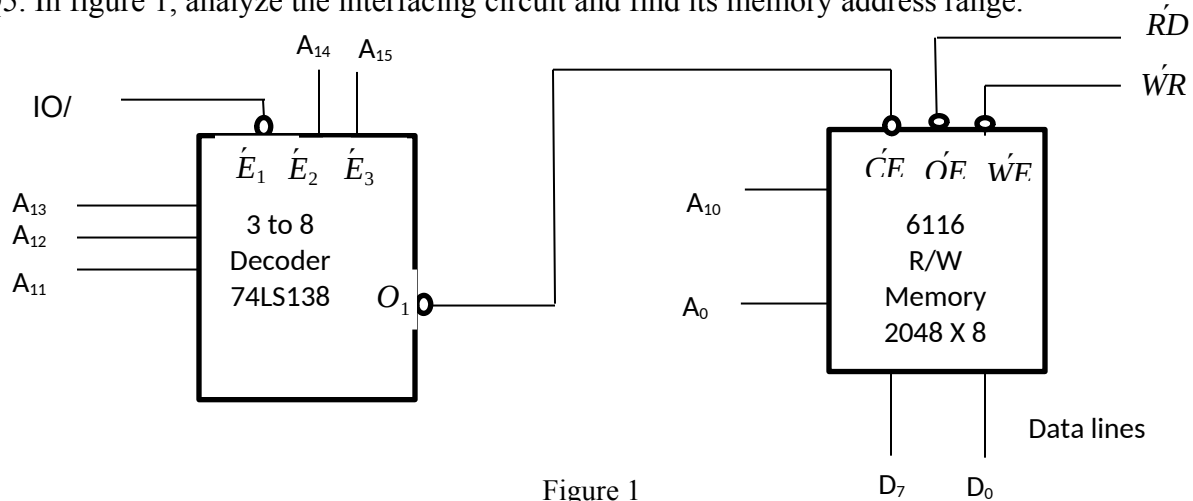Q5. In figure 1, analyze the interfacing circuit and find its memory address range.

Figure 1

SECTION B (5X8= 40 MARKS)

Q6. Explain automotive electronics. With the help of suitable diagram discuss the principle of operation of variable reluctance type sensor and exaust gas oxygen sensor.

Q7. Explain the operation of following converters with suitable diagram

(a) Weighted resistor DAC   (b) Counter type ADC

Q8. Discuss different vectored and non vectored interrupt of Intel 8085. Briefly explain multiple interrupt using a priority encoder.

Q9. Discuss microprocessor controlled and peripheral controlled data transfer schemes with suitable examples.

Q10. Draw and analyze the timing diagram of LDA 3005H of Intel 8085.

SECTION C (20X2= 40 MARKS)

Q11. (a) Design a interfacing for 4x4 keyboard with intel 8085 microprocessor by utilizing 8279 IC. Also draw the complete flow chart.

(b) Write an assembly language program to arrange 34, 56, AB, E4, 28, 54 in descending order. These numbers are stored in the memory locations 3501 to 3505H. The result has to be stored in the memory location 3601 to 3605H.

Q12. (a) Write a program to control a railway crossing signal that has two alternately flashing red lights, with a 1-min delay on time for each light.

(b) Write an assembly language program to divide two 8 bit numbers. Dividend and divisor are 28H and 13H and are placed in memory locations 3501H and 3504H respectively.