Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Course: Microprocessor based control system — **Semester: V**
Program: B. Tech. /ADE — **Time 03 hrs.**
Course Code: ADEG342 — **Max. Marks: 100**
Instructions: Attempt all the questions

SECTION A

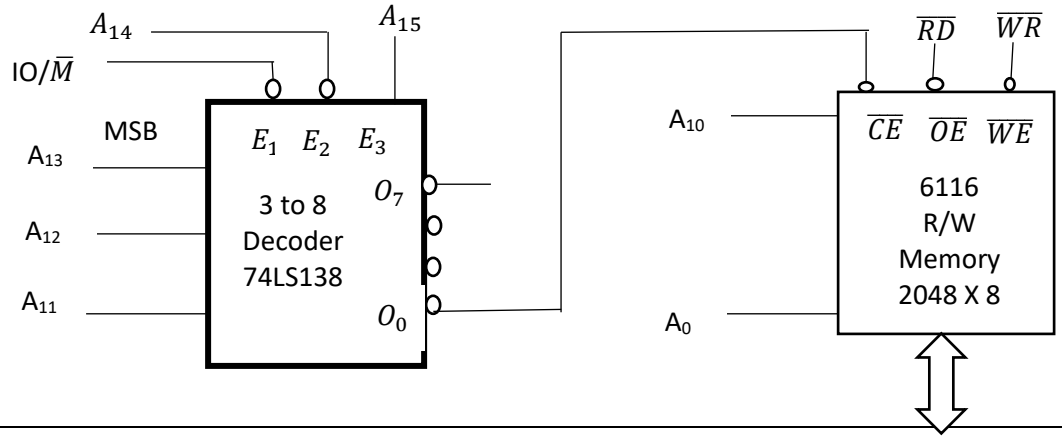
S. No.		Marks	CO
Q 1	**Answer the following objective questions** (a) In 8085 microprocessor, data-bus and address bus are multiplexed in order to (i) Increase the speed of microprocessor (ii) Reduce the number of pins (iii) Connect more peripheral chips (iv) None of these (b) How many T-states are required for execution of OUT 80H instruction? (i) 10 (ii) 13 (iii) 7 (iv) 12 (c) What is SIM in context of 8085 microprocessor? (i) Select Interrupt Mask (ii) Sorting Interrupt Mask (iii) Set Interrupt Mask (iv) Set Integer Mask (d) In Intel 8085 microprocessor, which of the following are the software interrupt? (i) RST 0-7 (ii) RST 5.5 - 7.5 (iii) INTR, TRAP (iv) RST 4.4 - 6.4	**4**	**CO1, CO4**
Q 2	In figure 1, if we use all the output lines (O_7-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? 	**4**	**CO3**

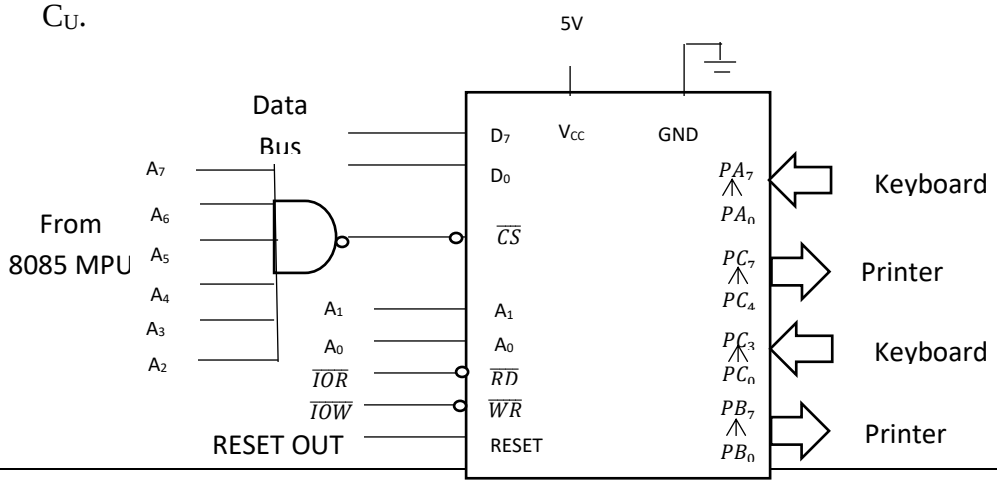
	Figure 1 $D_0 - D_7$		
Q 3	Explain the principle of operation of optical sensor and discuss how it measure the speed of automated vehicle.	**4**	**CO5**
Q 4	Write an assembly language program to enable all the interrupts of Intel 8085 and find 2's complement of an 8 bit number which is present at FC50H and store the result in FC52H. Microprocessor is moving in a endless loop while executing the program which is being interrupted by applying a rising pulse at RST 7.5 terminal manually.	**4**	**CO4**
Q 5	Write an assembly language program to perform Exclusive OR between two 8 bit numbers 7EH and 8DH. Rotate the result right for 3 times and display the result at the LED output port with address 40H.	**4**	**CO2**
	SECTION B		
Q 6	What do you understand by electronic control unit. Explain the principle of operation of sensor and actuator for controlling the fuel injection in automated vehicle with suitable diagram.	**8**	**CO5**
Q 7	Differentiate the following data transfer schemes with suitable example: (a) Synchronous and Asynchronous (b) Hardware and Software (c) Serial mode and Parallel mode (d) Peripheral and memory mapped	**8**	**CO3**
Q 8	Draw and analyze the timing diagram of the following set of instructions. MVI A, 05H RAL Identify the addressing modes of both the instruction and explain them.	**8**	**CO1**
Q 9	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 B and port C_U as output port and port A and port C_L as input ports. iii. Write a program to read the input from port A and finds it's 2's complement and display it at port B and read from port C_L and display the output at port C_U. 	**8**	**CO4**

	Figure 2		
Q 10	Write an assembly language program to generate a square wave with period of 400μs. Use bit D_0 to output the square wave.	**8**	**CO2**
SECTION-C			
Q 11	(a) Design an up-down counter to count from 0 to 9 and 9 to 0 continuously with a 1.5 second delay between each count and display the count at one of the output ports. Draw a flow chart and show the delay calculations. (b) Design a interfacing for 4x4 keyboard with intel 8085 microprocessor by utilizing 8279 IC. Also draw the complete flow chart.	**20**	**CO2, CO4**
Q 12	(a) Write an assembly language program with algorithm to control a railway crossing signal that has two alternately flashing red lights, with a 5-second delay on time for each light. (b) Write an assembly language program with algorithm to divide two 8 bit numbers which are stored at 4501H and 4502H. Store the quotient and remainder in 4504H and 4505H.	**20**	**CO2**