

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

**CLASS: BE
BRANCH: CSE**

**SEMESTER : V
SESSION : MO/18**

SUBJECT: EC4205-MICROPROCESSOR & MICROCONTROLLER

TIME: 03:00

FULL MARKS: 60

INSTRUCTIONS:

1. The question paper contains 7 questions each of 12 marks and total 84 marks.
 2. Candidates may attempt any 5 questions maximum of 60 marks.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) What is meant by variable machines cycle? How is it achieved? [2]
(b) What are the two functions of TMP register connected to ALU section in 8085? [4]
(c) i) With a neat sketch, explain how the address and data buses are demultiplexed out in an 8085 based microprocessor system. [6]
ii) Which are the control signals available in 8085? What are their functions?
- Q.2(a) Explain the various steps involved in executing a DAD D instruction. [2]
(b) Explain the various flags in the PSW register of 8085? Write a delay subroutine using DCX Rp instruction. [4]
(c) Write a program to count the no. of times odd parity numbers appear as memory pairs. (count shall be in BCD) in a block of 24 nos. residing in locations starting from DATAHERE and keep the count in location ODDPARITYCOUNT. [6]
- Q.3(a) What are the two functions for which a 'RIM' instruction is used? [2]
(b) Differentiate between hardware and software interrupts in 8085 and explain their applications. [4]
(c) Interrupt requests are arriving at RST 6.5 pin, at a rate of 200 requests/second. Write a program to utilize these pulses, to design a real time clock, which will count up to 1 hour. Keep the count of seconds, minutes and hour in 3 memory locations SECOND, MINUTE and HOUR respectively. Once 1 hour is over, disable the interrupts. Assume interrupting pulses are sufficiently long enough to be recognized. [6]
- Q.4(a) Explain the difference between port A and port C of 8255. [2]
(b) Interface an 8255 PPI with 8085 with control register address 43H. What will be the status of $A_8 - A_{15}$ pins during the execution of IN and OUT instructions? [4]
(c) An 8-bit D/A converter is connected to port A of 8255 chip. Write an 8085 program to generate a voltage waveform in which the voltage rises linearly from -3V to +3 volts and decreases to -3V at the same rate. The cycle repeats itself. [6]
- Q.5(a) Write down the control word of 8253 timer and explain the function of each bit. [2]
(b) Explain the various modes available in 8279 for display and keyboard. [4]
(c) Write a program to design a clock, which will count up to one hour. Once an hour is reached the count as to be stopped. Use 8253 timer to interrupt the CPU at a rate of 500 times per second. Clock frequency is 2 MHz. Gate of the timer is connected to PC_0 of an 8255. [6]
- Q.6(a) What do you mean by pipelined architecture? How is it implemented in 8086? [2]
(b) Explain the physical address generation in 8086 by giving suitable example. [4]
(c) Explain the functions of various registers of 8086. [6]
- Q.7(a) Write down the features of 8051 microcontroller. [2]
(b) Explain the Internal RAM structure of 8051 microcontroller. Differentiate between byte address and bit address. [4]
(c) Write a program to perform the following. [6]
i. Keep monitoring P1.2 until it becomes high.
ii. When P1.2 becomes high write value 45H on P0.
iii. Send a high to low pulse to P2.3