DF-1518
M. Sc. (Sem. III) Examination
March / April - 2016
Physics : Paper : PH (E) - 534
(Microprocessor & Its Applications)

Time : 3 Hours] [Total Marks : 70

Instructions :
(1)

2. This question paper includes five main questions with three sub-question (a), (b) and (c) in each.

3. Answer any two sub-questions from each main question.

4. Assume data if require.

5. Symbols used have their usual meaning.

1 (a) With example, explain Binary, Octal, Decimal and Hexadecimal number systems.

(b) Using logic gates, design a combinational logic circuit that converts a 4-bit Gray code into a 4-bit Binary code 9s complement of its 4-bit BCD input.

(c) Perform following arithmetic operation,

\[
\begin{align*}
\text{(i) } & 2FH + 16H \\
\text{(ii) } & 1100_2 - 0111_2 \\
\text{(iii) } & 00_8 - 02_8
\end{align*}
\]

2 (a) Draw block diagram of 8085 microprocessor and explain role of stack pointer register.

(b) Draw and explain the timing diagram of instruction fetch cycle of 8085 microprocessor.

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(c) What is address space partitioning? Design 4k \( X \) 8 memory block using 2k \( X \) 4 memory chips.

3 (a) What is flag? Explain different flags of 8085 Microprocessor. Describe flag based Conditional JUMP, instructions with example.

(b) With example, explain the role of 'Stack' and 'Stack pointer' in the microprocessor system during CALL and RET operation.

(c) What is the function of the following instruction of 8085 microprocessor?

   (i) SHLD
   (ii) XCHG
   (iii) POP PSW
   (iv) RRC

4(a) Why ports are required? Sketch internal block diagram of 8255 port and explain function of its each block.

(b) What is control word? Draw the format of the control word of 8255 PPI and explain the function associated with its each bit. Design a control word to set Port A for input, Port B for output and Port C for input in Mod-0.

(c) Design a logic circuit to assign the following address to the ports of the 8255 PPI.
   Port A = 60h Port B = 61h Port C = 62h and Control Register = 63h

5 (a) Sketch block diagram of 8051 microcontroller and briefly explain function of its each block.

(b) Draw control word format of 8253 timer PPI and explain function associated with its each bit.

(c) Sketch the connection diagram and write an assembly program to display 0 to 9 on a common anode type seven segment LED display connected to the port B. (Assume that the delay routine is available. Also assume suitable address of port B and CR).