NEW SCHEME

EC45

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Fourth Semester B.E. Degree Examination, July/August 2004

Common to EC/EE/TE/ML/BM/IT/EE

Microprocessors

Time: 3 hrs.] [Max.Marks : 100

Note: ***1. Answer any FIVE full questions.***
2. 8085 instruction set will be provided on request.

1. (a) Explain the functions and timing associated with i) STA and ii) RST instructions. **(3 Marks)**

(b) The instruction set of microprocessor is divided into several headings. Explain the importance and significance. How are the codes designed for ADD B and JNZ addr ? **(9 Marks)**

(c) What is cycle stealing ? Explain with an example and the corresponding ALP. **(8 Marks)**

2. (a) Explain the various addressing modes used in 8085 with an example for each. **(5 Marks)**

(b) Write a recursive subroutine named FACT to find factorial of the number in 8085 μP. **(7 Marks)**

(c) Discuss the advantages if any, of having more number of general purpose registers in a microprocessor. Substantiate with a suitable example. **(8 Marks)**

3. (a) Using a suitable delay routine, write an ALP for a real time clock with i) A TIC at each second, ii) Alaram Facility and iii) 12 hour and 24 hour facility provision. **(10 Marks)**

(b) Using JMP, can you call a subroutine ? Explain with an example and a corresponding ALP. **(6 Marks)**

(c) Why you think that W and Z registers are provided in 8085 ? Explain their use with an example. **(4 Marks)**

4. (a) Write an ALP, so that HEX byte is displayed on the DATAFIELD and the corresponding decimal Value (00_{10} to 255_{10}) is displayed on the address field. How would you modify the above program to convert the range displayed (0000-0255) to (0000-1020)? **(10 Marks)**

(b) Write a subroutine DAC, which does the same function that of DAA ? Can you write the DAC, with/without testing for the AC flag ? Explain. **(5 Marks)**

(c) One of the easy ways of interfacing a slow device to processor is to reduce the clock frequency, if so, what are the limits and why ? **(5 Marks)**

5. (a) Design a microcomputer to obtain the following :

4K EPROM, 512 bytes static RAM, four, 8 bit and two, 6-bit ports, using

i) Standard I/O and linear decoding

ii) Full decoding using 3X8 decoder

iii) Memory mapped I/O and full decoding. **(16 Marks)**

(b) What is vector interrupt ? Explain its working with an example and an ALP. **(4 Marks)**

6. (a) How is the device priority determined in hardware polling ? Explain. **(4 Marks)**

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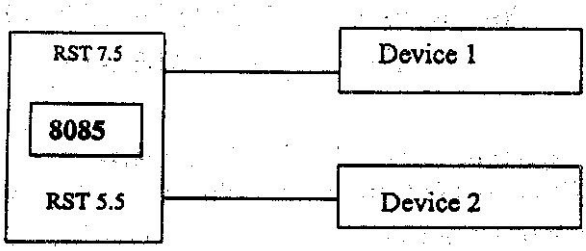
(b) Two devices are connected to 8085 interrupts as shown in fig 6.b. If device 2 is presently being serviced by 8085 and the Device 1 interrupt occurs, explain what the user needs to do in the service routine of Device 2 in order that Device I will be serviced before Device 2.

Fig. Q 6 b)



(8 Marks)

(c) It is required to use the μp for the measurement of frequency and period of a given square wave. Write the setup and an ALP for the purpose. Discuss, limitations, if any. **(8 Marks)**

7. (a) In the context of using 8251 for communication purpose, write a subroutine HEX BYTE that reads two ASCII characters by calling the subroutine RDASKY, converts them into binary valued by calling ASCBIN and combines the binary values in a byte. **(6 Marks)**

(b) Using 8279 KB/Display controller, program it to display characters on the display. Display the status as below.

In a temperature process, temperature is to be maintained between limits T_0 and T_0^*. If the measured temperature is between T_0^* and T_0 buzzer, if OFF, lamp is OFF and fan is OFF. If $T > T_0$ buzzer is ON, lamp is OFF, fan is ON. If $T \leq T_0^*$, buzzer is ON, lamp is ON and fan is OFF. OFF may be represented by a – and ON by a 0.
Initialize 8279 and write an ALP for performing the above function. **(10 Marks)**

(c) Why should a DMA request have higher priority than other interrupts ? On what basis priorities are assigned to the devices on the DMA channel. **(4 Marks)**

8. (a) In an 8085 based system, how would an I/O device distinguish whether the address sent out is for an input or output operations (assume I/O mapped I/O). Note that an input and output device can be assigned indentical addresses. **(4 Marks)**

(b) The memory address space of 8085 is limited to 64K owing to address bus width. It is desired to expand this addressing space to 128K. Suggest a suitable interface so that this expansion is possible. After the expansion, how would an instruction, address any byte from the expanded address space. **(8 Marks)**

(c) Write an ALP for performing the following (fig 8.c). Start a process tomorrow at X pm. Process to be finished at Y pm on the same or another day. Press two keys : X_1Y : START TIME and DURATION TIME. You may use a timer 8253 or a delay program for the purpose. **(8 Marks)**

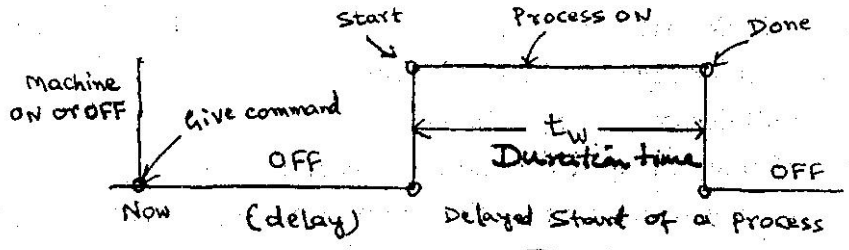


Fig. 8.c

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