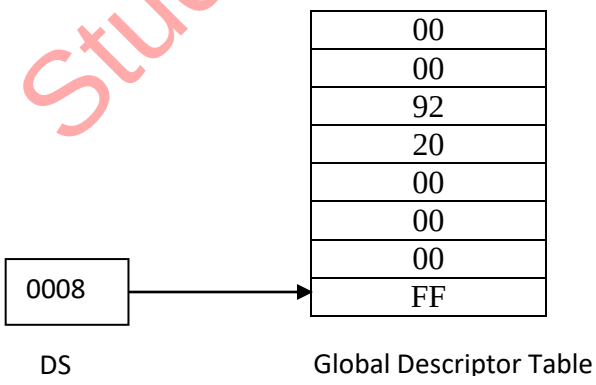
Unique Paper Code	: 32347504
Name of the Paper	: Microprocessor (DSE)
Name of Course	: B.Sc. (H) Computer Science
Semester	: V
Duration of Examination	: Three Hours
Maximum Marks	: 75 Marks

Attempt any four questions
All questions carry equal marks

1. How does the real mode memory addressing scheme work? Explain using an example. What is the first and the last address that can be accessed in the Data segment when DS = 0008H?
   Given DS = 3200H, BX = 0120H, SI = 0020H, ARRAY = 0015H. Determine the data addressing mode used and the source address accessed by each of the following instructions, considering real mode memory addressing scheme:
   a) MOV AX, [BX+SI+140H]
   b) MOV AX, [34H]
   c) MOV AX, ARRAY[SI+3H]

   Explain how the following descriptor stored in the global descriptor table can be used to find the first and last address that can be accessed when DS = 0008H in protected mode memory addressing scheme of 80286. Find the requested privilege level (RPL) and the descriptor privilege level (DPL). Explain the access control provided for this segment, given the value of the access right byte provided in the descriptor.



2. Write the machine language instruction format for the 16 bit instruction mode. Convert the assembly language instruction MOV AX, BX into corresposnding machine language form for 16 bit instruction mode. What will be the value of the MOD field in the machine language instruction for MOV BL, [SI+4]?

   Given below are some instructions. If the instruction is valid, explain the function performed by it; if not valid, justify.

   a) JMP [4]
   b) POP CS
   c) MOV AX, BL
   d) MOV AX, 'RX'
   e) MOV [SI], [AX]
   f) MOV AX, OFFSET DX

3. Differentiate between JMP SI, JMP [SI] and JMP FAR PTR [SI] instructions. How does the CALL instruction differ from the JMP instruction? Explain the working of Near and Far call instructions using an example. Also, show how RET instruction is used to return from a procedure.
   What are the steps followed whenever a software interrupt instruction INT executes? How is it different from a Far CALL?

4. Give the functions of the following pins of 8088 microprocessor:

   a) $\overline{RD}$
   b) DT/$\bar{R}$
   c) DEN
   d) IO/$\bar{M}$

   Using a diagram, illustrate the minimum mode 8088 bus timing for a Read operation and show the signals for the pin connections a) to d) given above. Name the pins of 8088 microprocessor which are available in minimum mode but not in maximum mode.

   Describe the error correction and detection circuit built using 74LS636 with the help of a diagram.

5. Explain Mode 2 operation of the 82C55 programmable peripheral interface. Which Port is used for this mode and what bit combination in the Command Byte A register is used to select this mode?
   Explain two conditional software interrupt instructions available to the microprocessor. Differentiate between the two hardware interrupt inputs NMI and INTR. Describe the Operation Command Words (OCW) for Programmable Interrupt Controller 8259A. Which OCW should be programmed to read the interrupt request register and what should be the required bit values in the OCW for the same?

6. Describe the improvements brought in by the Pentium Pro microprocessor when compared with the earlier microprocessors. Explain with the help of diagram how dynamic execution architecture of Pentium Pro functions.

   Discuss the three software commands used to control the operation of the 8237 DMA controller. How is memory to memory DMA transfer accomplished?