FOURTH SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2022
(Regular/Improvement/Supplementary)

PHYSICS
FPHY4E20 - MICROPROCESSORS, MICROCONTROLLERS AND APPLICATIONS

Time: 3 Hours   **Maximum Weightage: 30**

Part A: Short answer questions. Answer *all* questions. Each carries *one* weightage.

1. Explain the concept of stack. How is it managed?

2. Explain how IC 74138 is used as an address decoder.

3. Sketch opcode fetch machine cycle and explain the operation.

4. With the help of a block diagram show how a seven segment LED display is interfaced with Intel 8085 for displaying a decimal digit.

5. With the help of a block diagram show how AVR general purpose registers, ALU and status register are interconnected.

6. Discuss the format of following instructions of AVR microcontroller.

   1. LDI   2. STS   3. OUT   4. JMP

7. What is meant by I/O port bit addressability? Explain any two instructions used for this in an AVR microcontroller.

8. What are the main advantages and disadvantages of programming AVR microcontroller in assembly and C.

(8 × 1 = 8 weightage)

Part B: Essay questions. Answer any *two* questions. Each carries *five* weightage.

9. Draw the internal block diagram of Intel 8255 and explain in detail the function of the device.

10. Explain the branch and call instructions in AVR microcontroller. Illustrate their uses with suitable program segments.

11. With the help of a labelled block diagram, discuss the internal architecture of Intel 8085.

12. Explain in detail the features and programming of AVR I/O ports.

(2 × 5 = 10 weightage)

(P.T.O.)

Part C: Problems. Answer any *four* questions. Each carries *three* weightage.

13. Code a program in assembly language for finding the product of two one byte numbers at locations 2500 H and 2501 H. Store the two byte result at 3000 H and 3001 H.

14. Write an assembly language program for AVR microcontroller to alternately switch an LED connected to a port pin ON and OFF.

15. Illustrate the use of any three assembler directive for AVR microcontroller.

16. Write an assembly language program for AVR microcontroller to calculate the result of X + Y – Z where X, Y and Z are one byte unsigned numbers. Assume X + Y to be one byte and final result positive.

17. Write a C program for AVR microcontroller for adding two one byte numbers.

18. Explain how Intel 8253 is used to generate five milliseconds time delay between two events.

19. List the machine cycles and total T states associated with the following assembly language instructions of Intel 8085.

    1. MOV A,M   2. INX H   3. JNC <mem.add>

(4 × 3 = 12 weightage)