

RAN-2403080103044001
M.Sc. (Sem. - III) Examination October - 2025
Physics (Microcontrollers : PH-534 Elective - 1)
Time: 3 Hours]
[Total Marks: 70
સૂચના : / Instructions

- (1) ઉપરોક્ત દર્શાવેલ વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the above details on your answer book
- (2) Assume the data if required
- (3) Figures to right hand side indicate marks of each question
- (4) Attempt any two of each question

Seat No.:

Student's Signature

- Q. 1**
- (a)
 - (i) Distinguish between Microprocessors and Microcontrollers. 2
 - (ii) Perform the following binary multiplication. 3
 $(10100010)_2 \times (11011000)_2$
 - (iii) Convert the decimal number $(561)_{10}$ into Binary, Octal and Hexadecimal number. 3
 - (iv) Find Two's complement of a $(6C89)_{16}$ hexadecimal number. 1
 - (b)
 - (i) Converting the following binary number into Decimal number. 2
 $(0.001111100)_2$
 - (ii) Converting the following hexadecimal number into Decimal number. 1
 $(F.B)_{16}$
 - (iii) Converting the following decimal number into binary number. 2
 $(40.375)_{10}$
 - (iv) Converting the $(58.1)_{10}$ decimal number into hexadecimal number (Limit the hex fractions to 3 places). 2
 - (v) Converting the following hexadecimal number into Decimal number. 2
 $(3C.5FC)_{16}$
 - (c)
 - (i) Perform the following subtraction operation and convert it into decimal number. 2
 $(11101011)_2 - (10101100)_2$
 - (ii) Perform the following unsigned subtraction operation and convert it into decimal number. 2
 $(00010101)_2 - (01100101)_2$
 - (iii) Perform the following addition operation. 2
 $(5F9CAA67)_{16} + (9E486D8B)_{16}$
 - (iv) Convert $(133)_{10}$ decimal number into number based on radix 8. 2
 - (v) Convert the decimal number $(13)_{10}$ into Gray code. 1

- Q. 2** (a) (i) Explain the function related with each bit in the subsequent the Serial Port Control Special Function Register of 8051 Microcontroller. 6
- | | | | | | | | |
|-----|-----|-----|-----|-----|-----|----|----|
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| SMO | SM1 | SM2 | REN | TB8 | RB8 | T1 | R1 |
- (ii) Describe the operation of Timer Mode-0 and Timer Mode-1 with appropriate diagram. 3
- (b) (i) Draw the block diagram of 8051 Microcontroller. What are the features of 8051 architecture? Explain it in brief. 6
- (ii) Draw the port 1 pin configuration and describe the function of it. 3
- (c) (i) Explain the function associated with each bit in the following TMOD SFR of 8051 Microcontroller. 6
- | | | | | | | | |
|------|-------------|----|----|------|-------------|----|----|
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Gate | $C/\bar{T}$ | M1 | M0 | Gate | $C/\bar{T}$ | M1 | M0 |
- (ii) Draw the port 0 pin configuration and describe dual function of it. 3
- Q. 3.** (a) (i) Explain the function and also identify addressing mode of the following data transfer instructions of 8051 Microcontroller. 4
- (1) MOV A, #0Fh
 - (2) MOV A, R0
 - (3) MOV DPTR, #0ABCDh
 - (4) MOV R5, A
 - (5) MOVR3, #1Ch
- (ii) With diagram and example, explain “PUSH” and “POP” instructions of 8051 microcontroller. 5
- (b) (i) Using mnemonics of 8051 microcontroller, write a program (with comments) to add the unsigned BCD numbers found in internal RAM locations 25h, 26h and 27h together and put the result in BCD form in RAM locations 31h (MSB) and 30h (LSB). 6
- (ii) Write the program to put the number 8Dh in RAM locations 30h to 34h using the immediate number in each instruction uses bytes, use a register to hold the number. 3
- (c) Explain the following addition operations with the examples 9
- (i) Unsigned Addition
 - (ii) Signed Addition
- Q. 4** (a) (i) For 8051 microcontroller, explain all different types of logical instructions corresponding to a byte level ‘AND’ logic operation. 6
- (ii) With example, explain the function of the following instruction of 8051 microcontroller. 2
- (1) SWAP A
 - (2) RRC A
- (b) (i) With example, explain the function of the following byte level instruction of 8051 microcontroller. 6
- (1) XRL A, @R₂
 - (2) CPL A
 - (3) XRL A, R₀

