

Hall Ticket No

--	--	--	--	--	--	--	--	--

Question Paper Code: AEC022



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech VI Semester End Examinations (Regular) - May, 2019

Regulation: IARE – R16

MICRO CONTROLLERS AND DIGITAL SIGNAL PROCESSING

Time: 3 Hours

(EEE)

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

UNIT – I

1. (a) What are the advantages of segmented memory? Explain about memory segmentation used in 8086 with a neat diagram. [7M]
(b) Write 8051 program to OR the contents of port 1 and port 2, put the result in external RAM location 0102h [7M]
2. (a) Draw the architecture of 8051 microcontroller and explain each block in detail. [7M]
(b) Write a delay loop which produces a delay of 500µsec on an 8086 with 5-MHz clock. [7M]

UNIT – II

3. (a) Write short notes on [7M]
(i) PCON (ii) IP
(b) Write an ALP to perform average of N bytes using 8051 microcontroller. [7M]
4. (a) Elaborate the following special function registers. i) PSW ii) TMOD iii) TCON [7M]
(b) Use PUSH instruction to put the number 82H in RAM locations 34H to 37H. Also write same program without PUSH instruction. [7M]

UNIT – III

5. (a) Explain how an 8-bit Analog to Digital Converter (ADC) is interfaced to 8051 microcontroller. [7M]
(b) Write an assembly language program for interfacing using DAC converter by 8051. [7M]
6. (a) Explain the external memories in 8051 and draw the interfacing diagram of external memories to 8051. [7M]
(b) Write an assembly language program to exchange the content of FFh and FF00h. [7M]

UNIT – IV

7. (a) Check whether the $y(n)=\log_{10}|x(n)|$ system is [7M]
i) Linear
ii) Causal
iii) Stable
iv) Time invariant
- (b) Compute the circular convolution of the sequences shown below using DFT. [7M]
 $x(n) = \{1, -2, 2, -1, 3, -4\}$ and $h(n)=\{1, -1, 4, -3\}$
8. (a) Explain about Fast Fourier Transforms(FFT) and differentiate between decimation in time FFT and decimation in frequency FFT algorithm. [7M]
- (b) Determine the stability of the system $y(n)-(5/2)y(n-1)+y(n-2)=x(n)-x(n-1)$. [7M]

UNIT – V

9. (a) What are the advantages and disadvantages of FIR filters? What is the reason that FIR filter is always stable. [7M]
- (b) Elaborate how to convert the analog filter with transfer function $H_a(s) = (s+0.1)/[(s+0.1)^2 + 9]$ into a digital filter using the impulse invariant transformation. [7M]
10. (a) Design a digital FIR low-pass filter using rectangular window with a cut-off frequency of 1.2 rad/sec and samples $N=9$. [7M]
- (b) Determine the lowest order of chebyshev filter with 1 dB ripple in the pass band $0 \leq |\omega| \leq 0.3\pi$ and at least 60dB attenuation in the stop band $0.35\pi \leq |\omega| \leq \pi$. Use the bilinear transformation. [7M]

— o o ○ o o —