

**PGIVS - 1546 A - 16**  
**M.Sc.IVth Semester (CBCS) Degree Examination**  
**Applied Electronics**  
**(Microcontrollers and Interfacing)**  
**Paper : HCT 4.1**

Time : 3 Hours

Maximum Marks : 80

**Instructions to Candidates:**

1. Write question numbers clearly
2. Answer the questions as per the Instructions.

**PART - A**

1. Answer any **eight** of the following. **(8×2=16)**
  - a) List number of 16-bit timers/counters and number of vectored interrupts of 8031 and 8051
  - b) List the specification of digital I/Os and full duplex serial I/Os of 89c51.
  - c) Enlist the various flags in the PSW register.
  - d) Define quasi bi-directional port. Why port 0 of 8051 is true bidirectional?
  - e) Name the SFRs required for programming the serial port. Mention their modes.
  - f) List the various power saving options in Atmel 89c51.
  - g) Explain the importance of pin P3.2 of 89c2051.
  - h) List the CPU registers of 8051 microcontroller.
  - i) Give the memory organization of 16c61
  - j) List any four industrial application of microcontroller

**PART - B**Answer any **four** of the following. **(4×7=28)**

2. Explain the working registers of 8051
3. Explain the use of 8051 assembler and its directives.
4. Explain the memory organization of 8051.
5. Draw the test circuit of 89c2051 to check the port pins and write necessary ALP.

6. Explain the functions of option register of PIC.
7. Discuss the addressing modes of PIC microcontroller.

### PART - C

Answer any **three** of the following.

(3×12=36)

8. Define addressing modes. With suitable example explain the addressing modes of 8051.
  9. Define interrupts. List the number of interrupts available in 8051. Explain the procedure to initialize the interrupt and write necessary ALP.
  10. Draw the internal architecture of 89c2051 and mention its significances.
  11. With a neat block diagram explain the various units of 16c61.
  12. Write short notes on any **two** of the following (2×6=12)
    - a) Interrupts of 8051.
    - b) Power saving options.
    - c) Seven segment LED display interfacing
    - d) LED interfacing.
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**PGIVS 1548 A - 16**  
**M.Sc. IVth Semester (CBCS) Degree Examination**  
**Applied Electronics**  
**(Digital Signal Processing)**  
**Paper : SCT 4 .1**

Time : 3 Hours

Maximum Marks : 80

**Instructions to Candidates :**

1. Write the Question number clearly
2. Draw a neat labelled diagram wherever necessary

**Part - A**

1. Answer any **EIGHT** questions **(2×8=16)**
- a) What do you mean by even and odd signals?
  - b) Give graphical representation for signal  $x(n) = \{-1, 1, 0, -4\}$
  - c) What do you mean by linear and nonlinear discrete time system?
  - d) Find the Z-transform of sequence  $x(n) = \{2, 1, 3, -2, 0, -1, 5\}$
  - e) Define inverse Z-transform.
  - f) Obtain the transfer function for the second order feed forward system given by,  $y(n) = b_0x(n) + b_1x(n-1) + b_2x(n+2)$
  - g) Define Signal Flow Graph.
  - h) The unit sample response of an FIR filter is :  $h(n) = \alpha^n$  for  $0 \leq n \leq 6$  and  $= 0$  elsewhere. Draw the direct form representation of this system.
  - i) Mention the basic forms of network structures for FIR system.
  - j) Define all pass filter.

**Part - B**

Answer any **FOUR** questions **(7×4=28)**

2. If  $x(n) = \{-2, 1, 3, 2, 0, 1, 2, 1, 3\}$ , draw a neat labelled discrete time signal graph for: (i)  $x(n)$ , (ii)  $x(n-1)$ , (iii)  $x(n+2)$ , (iv)  $x(-n-1)$ .

3. Compute the convolution  $y(n)$  if the signals are  $x_1(n)=\{1,-1,0,2,-2\}$  and  $x_2(n)=1$  for  $0 \leq n \leq 4$  and 0 elsewhere.
4. Find the inverse Z-transform of  $X(Z)=1/(1-1.5z^{-1}+0.5z^{-2})$  when a)  $ROC : |Z| < 0.5$ , and b)  $ROC : |Z| > 1$ .
5. Write a brief account on overlap-save approach.
6. Consider the causal LTI filter with system function-  $H(z)=(1+0.5z^{-1})/(1+0.3z^{-1}+0.8z^{-2})(1-0.75z^{-1})$  Draw a signal flow graph for this system using - a) Direct form -I; b) Direct form-II; and a cascade of 1<sup>st</sup> and 2<sup>nd</sup> order systems realized in direct form -II.
7. Distinguish between IIR and FIR digital filter.

### Part - C

Answer any **THREE** questions

(3×12=36)

8. a) Show the graphical representation of  $x_1(n)$  and  $x_2(n)$ . Compute the convolved signal  $y(n)=x_1(n)*x_2(n)$ . (6)

$x_1(n)$	-3	-2	0	1	2	3	6	8	$x_2(n)$	-2	-1	0	2	3	5	6	8
$n$	-4	4	-3	2	-1	0	-2	3	$n$	-1	-2	-3	-4	1	3	0	2
- b) How a discrete time signal is manipulated by various transformations? Explain with suitable examples. (6)
9. a) Discuss the properties of z-transform. (6)  
 b) Perform circular shift operation on  $x(n)=\{1,2,0,4,-3,5,-2,6\}$  to obtain:  
 i)  $y(n)=x(n)$ ; ii)  $y(n)=x(n+2)$ ; iii)  $y(n)=x(n-3)$ ; iv)  $y(n)=x(-n)$ ; v)  $y(n)=x(-n-1)$ ;  
 vi)  $y(n)=x(-n+1)$ ; vii)  $x(n)*x(n-1)$ . (6)
10. a) Discuss the decimation in frequency FFT algorithm. (6)  
 b) Obtain a parallel form of a IIR system given by system function  
 $H_1(z)=(1+2z^{-1}+5z^{-2})/(1+4z^{-1}+5z^{-2})$  and  $H_2(z)=(1+4z^{-1}+8z^{-2})/(1+3z^{-1}+6z^{-2})$  (6)
11. a) For a given sequence  $x(n)$ ,  $x(0)=1$ ,  $x(1)=2$ ,  $x(2)=3$ ,  $x(3)=4$  and  $x(n)=0$  elsewhere. Find the DFT for the first four points. (6)  
 b) Find the IDFT using DIF method for the above  $x(n)$ . (6)
12. **Write short notes on any two** (2×6=12)
  - a) Properties of DFT's
  - b) Common z-transform pairs
  - c) SFG of transposed structure
  - d) Notch filter

**PGIVS 1547 A - 16**  
**M.Sc. IV Semester (CBCS) Degree Examination**  
**Applied Electronics**  
**(Microwave Electronics and Applications)**  
**Paper : HCT 4.2**

Time : 3 Hours

Maximum Marks : 80

*Instructions Candidates :*

1. *Answer the Questions as per instructions*
2. *Write Question numbers clearly*

**PART - A**

1. Answer **Eight** questions of the following (8×2=16)
- a) Define Radar, Mention its two advantages and limitations
  - b) What do you understand by pulse repetition frequency (prf) of the Radar?
  - c) Define Doppler effect
  - d) Who proposed the concept of Satellite Communication?
  - e) Define LEO and MEO
  - f) Define uplink and down link w.r.t. Satellite communication
  - g) Mention the advantages and limitations of Cordless phone
  - h) What do you understand by CW Radar
  - i) What is INTELSAT and SARSAT?
  - j) What is Paging System?

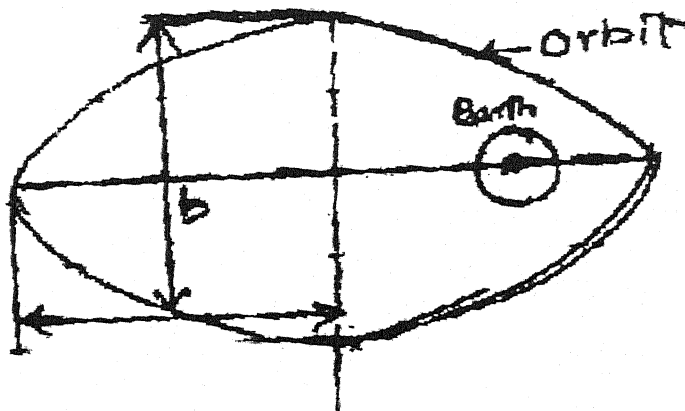
**PART - B**

Answer any **Four** questions of the following (4×7=28)

2. With neat block diagram explain the working of an Improved Radar.
3. A marine radar Operating at 10GHz has a maximum range of 50 kms with an antenna gain of 4000. If the transmitter has a power of 250 KW and minimum detectable signal of  $10^{-11}W$

Determine the cross section of the target the radar can sight

4. Write a brief history of satellite communication
5. Write a note on DBS
- 6.



A satellite moving in an elliptical orbit has a semimajor axis of the orbit equal to 16000 km, If the difference between the apogee and perigee is 30,000km, Determine the orbit eccentricity

7. Write a note on Cellular Telephone systems

### PART - C

Answer any **Three** Questions of the following

(3×12=36)

8. What are the basic differences between search Radar and Tracking Radar? Discuss the various scanning techniques and tracking mechanism.
9. Discuss in detail about uplink and downlink budget calculations in Satellite Communication.
10. With a neat block diagram, explain the working of an MTI Radar.
11. Write Short notes on (Any Two)
  - a) Radar Range equation
  - b) Satellite Orbits
  - c) INTELSAT
  - d) Wireless Communication Systems.