Q.P. Code : 581502

(3 Hours) [Total Marks : 80

N.B. : (1) Question No. **1** is **compulsory**.
      (2) Attempt any **three** from the remaining questions.
      (3) Assume suitable **data** if **necessary**.
      (4) **Figures** to the **right** indicate **full** marks.

1. (a) What is Handle pruning?   5
   (b) What is role of finite automata in compiler theory?   5
   (c) What are different type of attributes in SDD? Explain with examples.   5
   (d) Backpatching with example.   5

2. (a) Explain two pass macro processor with flowchart and databases.   10
   (b) Explain various loop optimization techniques with example.   10

3. (a) a) Construct SLR parsing table for following grammar. Show how parsing   12
      actions are done for the input string ( ) () $. Show stacks content , i/p buffer,
      action.
      S -> (S)S
      S -> ε

   (b) What are various databases used in two pass assembler design. Explain with   8
      example.

4. (a) Discuss various intermediate code forms in detail.   10
   (b) What is Loader ? Explain functions of loader with examples.   10

5. (a) For the given grammar below, constmct operator precedence relations matrix,   10
      assuming*. + are binary operators and id as terminal symbol and E as non
      terminal symbol.
      E → E + E
      E → E * E
      E → id
      Apply operator precedence parsing algorithm to obtain skeletal syntax tree
      for the statement
          id + id * id

   (b) Explain Run time organization in detail.   10

6. Write short notes.
      (a) LEX andY ACC   5
      (b) Design of an Editor   5
      (c) Syntax Directed Translation   5
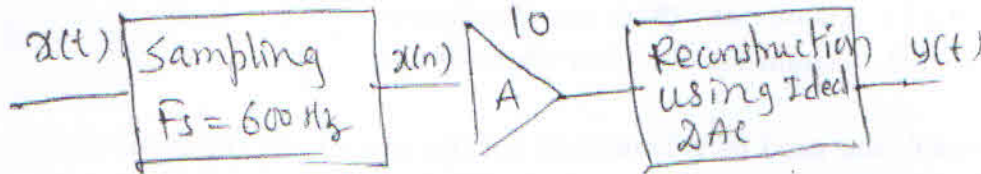   (d) Recursive Descent parsing   5

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N. B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **three** out of remaining **five** questions.
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1. (a) Justify the need of z-Transform for the analysis of DT system and Laplace Transform for the analysis of CT system in transform domain. **5**

   (b) Show that the O/P of LTI system is linear convolution of input signal $x(n)$ and impulse response $h(n)$. **5**

   (c) Find the autocorrelation of $x(n) = (0.2)^n u(n)$ and comment on the value of autocorrelation function at $n = 0$. **5**

   (d) Derive the expression for power of a periodic signal using Parseval's theorem. Calculate the average power of the following signal $x(t)$. **5**
   $x(t) = \sin(3000\,\pi t) + \cos(2000\,\pi t)$

2. (a) Classify the following signals as periodic/Non periodic. If periodic then find period. **4**
   (i) $x(t) = 12\cos(3t) + 31\sin(7t)$
   (ii) $x(n) = 2.3\sin(0.4\,\pi n) + 4.5\cos(0.3\,\pi n)$

   (b) Classify the following signals as energy signal/power signal/neither energy nor power signal **4**
   (i) $x(t) = e^{-2t} u(t)$
   (ii) $x(n) = n\, u(n)$

   (c) Classify the following systems as linear/non-linear system, Time invariant/time variant system, Static/dynamic system **12**

   (i) $y(t) = 4\,x(t) + 2\,\dfrac{dx(t)}{dt}$

   (ii) $y(n) = x(2n) + x(n-1) + 10$

3. (a) Given that $x_1(t) = e^{-at}$ $0 \le t \le T$ **10**
   $x_2(t) = 1$ $0 \le t \le 2T$
   Perform the convolution of $x_1(t)$ and $x_2(t)$ using Graphical method.

[TURN OVER

(b) The signal x(t) = 10 sin (720 πt) + 40 sin(480 πt) is sampled with   **10**
sampling freqency Fs = 600 Hz and the sampled signal is upscaled by
a factor of 10 as shown in figure below

Find the reconstructed continuous Time signal y(t) using ideal
interpolation technique of reconstruction.

4. (a) The Differential equation of system is given below

$$\frac{d^2 y(t)}{dt^2} + 4\frac{dy(t)}{dt} + 3y(t) = \frac{d\,x(t)}{dt} + 2.x(t)$$

   (i) Find impulse response of system.   **5**
   (ii) Find step response of system.   **5**

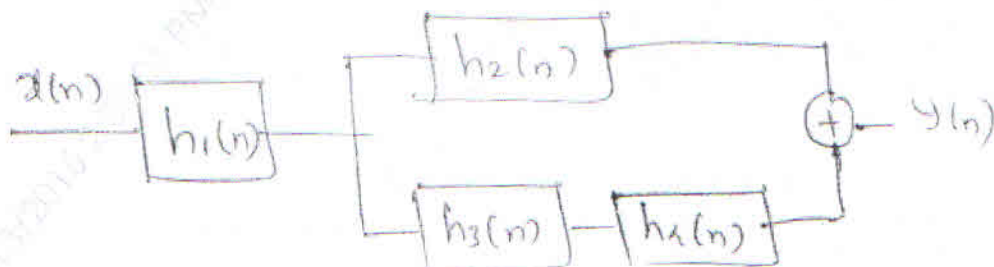(b) Determine the complete response of the system described by the   **10**
equation

$$\frac{d^2 y(t)}{dt^2} + 5\frac{dy(t)}{dt} + 4y(t) = \frac{d\,x(t)}{dt}$$

With initial conditions $y(0) = 0$

$$\left.\frac{dy(t)}{dt}\right|_{t\,=\,0} = 1$$

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5. (a) Consider a DT system as shown in figure below   **10**

Given that $h_1(n) = \{1, 2, 4\}$
$$\uparrow$$

$h_2(n) = u(n) - u(n - 3)$
$h_3(n) = \delta(n - 1)$
$h_4(n) = \delta(n) + 2\delta(n - 1) + 3\delta(n - 3)$
Find overall transfer function of system.   **10**

(b) A certain LTI system is given below

$$H(z) = \frac{3 - 4z^{-1}}{1 - 3.5z^{-1} + 1.5z^{-2}}$$
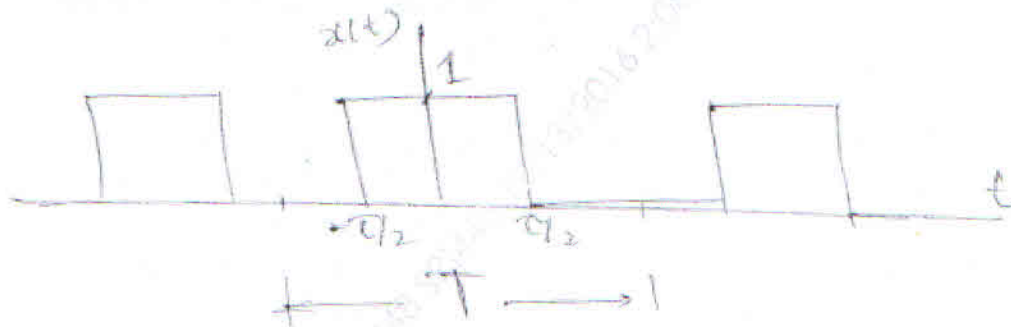
Specify ROC and determine h(n) for the following cases :
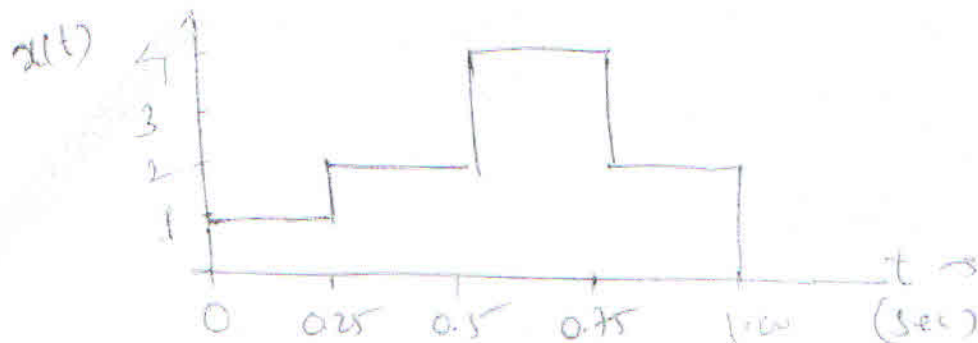   Case 1 System is causal
    Case 2 System is stable   **10**

6. (a) Determine the Fourier series representation of the periodic pulse function given below with period T = 1 sec and pulse width $\tau = 0.25$ sec. Plot magnitude spectrum.

     10

(b) Find Fourier transform of the following signal using properties of Fourier Transform.

(3 Hours)   [Total Marks : 80

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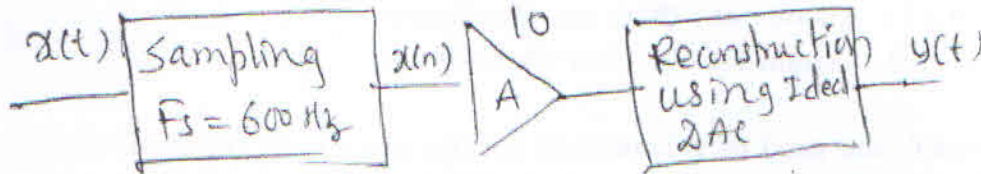   (b) Explain Run time organization in detail.   10

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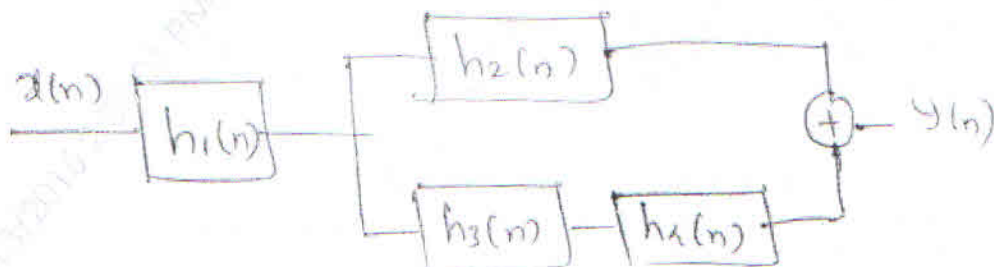equation

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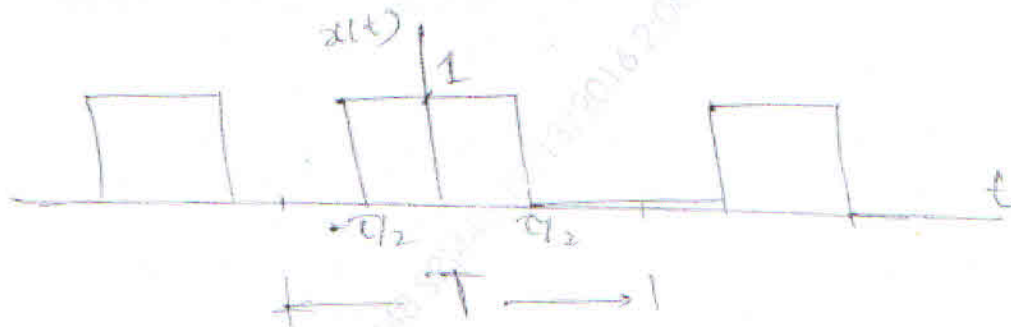
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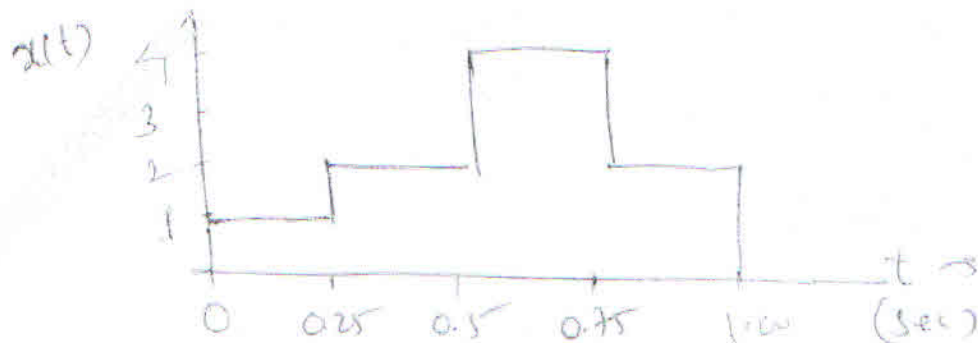   Case 1 System is causal
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QP Code : 588700

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- (4) Assumption made should be clearly stated.

1. (a) What is an operating system? Explain the different functions of OS.   5
   (b) What is a file directory? Describe methods of organizing directories in an OS. 5
   (c) What are the characteristics of a Real Time OS?   5
   (d) What is system call? Explain any five system calls.   5

2. (a) Define the meaning of a race condition, use an execution sequence to illustrate your answer.   10
   (b) Explain clearly how UNIX performs file management using I-nodes.   10

3. (a) Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 125. The queue of pending requests, in FIFO order is 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130 starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all a pending requests, for each of the following disk scheduling algorithms?   10
   (i) FCFS   (ii) SSTF   (iii) SCAN (iv) LOOK
   (b) Explain the different allocation method for file.   10

4. (a) Consider the following process   10

Process	Arrival Time	Service Time
P1	0	8
P2	1	4
P3	2	9
P4	3	5

   Solve the above given problem with shortest remaining time first by drawing gantt chart and also calculate the average waiting time, turn around time, and throughput.
   (b) Explain RAID with different levels.   10

5. (a) Explain the working of EDF and RMA real time scheduling algorithms.   10
   (b) Describe process management in Linux.   10

6. (a) What is deadlock? Explain deadlock prevention and avoidance.   10
   (b) What is Semaphore? Give an implementation of bounded buffer producer consumer problem using semaphore.   10