SUNBEAM

Pre-CAT

Dear Student,

Your Check Points

Submit your sunbeam copy of challan and collect your identity card & course material on first day.

Collect your following course material

- Black Book - C Programming, Data Structures OOPS using C++ and Test Series.
- Aptitude Book by RS Agarwal.
- Operating System, Networking Notes.

Grab Technical knowledge on.....

- C Programming
- Data Structure
- Object Oriented Concepts using C++
- Operating System Concepts
- Data Communication and Networking
- Computer Architecture
- Digital Electronics
- Microprocessors and Aptitude

Practice Tests streamlined with topics asked on C-CAT

1. Practical Topic Wise Practice Test
2. Module End Practice Test
3. Three TestSeries - In last week of course during lab session.
   - 3.1. TestSeries – I (Section A + B)
   - 3.2. TestSeries – II (Section A + B) **Sunbeam PreCAT-Certificate Exam (Can attend own batch exam only)**
   - 3.2. TestSeries – III (Section C - optional)

Please note If you can't attend testseries of your own batch you can attend paid testseries and receive certificate.

C-CAT Sectional Distribution

Section A : 50 Questions	Section B : 50 Questions	Section C (50 Questions)
1. English Aptitude: 20 2. Quantitative Aptitude: 15 3. Critical Reasoning : 15	1. C Programming: 15 2. Data Structure : 07 3. DCN : 10 4. OOPS: 09 5. Operating Systems : 09	1. Computer Architecture: 15 2. Digital Electronics: 20 3. Microprocessor : 15

- Student need to wear I-card once he/she enters sunbeam premises.
- Follow lecture/lab time strictly. Late comers are not allowed.
- No student is allowed inside premises other than his/her pre announced schedules.
- Usage of mobile, USB drive is strictly prohibited.

Day 1 – Lab

Step 1: Power on machine

Step 2: Use login Credentials as username: precat password: precat

Step 3 : Click Files Icon --> Select Other locations --> specify network folder path as

For A & B Bldg Labs : smb://sunbeama/precatassign For C Bldg Labs : smb://sunbeamc/precatassign

---> click on connect

Step 4: Access your batch folder for assignments and class demos

Use following steps to open eclipse and create new project .

Step 1 : Select Files -->home -->eclipse --> double click diamond shape icon of eclipse executable file

Step 2 : Specify workspace path as /home/sunbeam/<batchcode> and click ok

Step 3 : Close welcome screen of eclipse

Step 4 : Select Window Menu --> Open Perspective -->C / C++ Perspective

Step 5 : Click on File ---->New----> C Project menu.

Step 6 : Specify Project Name as e.g.Assign1_1 -->Specify Project Type -->Executable -->HelloWorld Ansi C Project -->Click Finish

Step 7 : To build project Select Project Menu --> Build Project option Or use shourtcut key ctrl + b .

Step 8 : Select Run Menu ---> Run Configuration option --> Double click on C/C++ application --> Select latest build application -->click on Run

Step 9 : To execute same project repeatedly use ctrl + F11

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CDAC - Common Admission Test - Syllabus

Section A - English (20 Questions)

- Synonyms, Antonyms
- Reading Comprehension(Passage)
- Sentence completion
- Prepositions (of, by, on, at, with etc.)
- Articles (A, An, The)
- Choosing Appropriate Filler with appropriate phase or part of sentence
- Arrangement of Sentences (Given 4 Sentences in PQRS form and arranged them)
- Spotting Errors
- Idioms and Phrases
- Active and passive voice

Section A - Quantitative Aptitude (15 Questions)

- Number Systems:
- HCF & LCM, Decimal Fractions,
- Square Root and Cube Root
- Average, Problems on Numbers
- Ages,
- Surds & Indices
- Percentages, Profit & Loss, Ratio & Proportion, Partnership
- Chain Rule
- Allegation & Mixture
- Simple Interest & Compound Interest
- Area: Volume and Surface Area
- Calendar, Clocks
- Races & Games of skills
- Permutation & Combinations, Probability
- Height & Distances
- Pipe and Cisterns
- Time & Work, Time & Distance
- Boats & Streams
- Train
- Odd Man Out and Series

Section A- REASONING (15 Questions)

- Verbal Reasoning: Analogy
- Blood Relation (sentence form, A+B –>A is sister of B)
- Puzzle Test
- Direction Sense Test
- Sitting Arrangement (Circular Table, Straight Line)
- Series (Number)
- Direction Sense (North East West South)
- Coding Decoding (A-Z)
- Data Sufficiency

Section B - C Programming (15 Questions)

- **History** Of C, Keywords In C, Standards, Data Types, Type Modifiers, Qualifiers
- **Operators**: Priority and Associativity
- **Decision Control**: If ..else and switch case
- **Iteration**: while, do..while ,for ,Jump Statements
- **Function**:
  - Built-in, User defined
  - Pass by Value and Pass By address
  - Recursion, Storage Classes In C
- **Pointer**: Wild Pointer, NULL Pointer, Void Pointer
  - Scale Factor, Pointer Arithmetic's, Function Pointer
- **Array**: 1D & 2D Array
  - Static and Dynamic Implementation
  - Memory Allocation
  - Accessing members using array and Pointer Notation
- **String**: Library Functions, String size and length
  - String access using pointer and pointer arithmetic
  - Multiple Strings and Command Line Argument using two D Array, Array of Pointers

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- **PreProcessor Directives:**
  - #include, #define, #pragma
  - Operators # and ##
  - Difference Macro and Function
- **Structure:**
  - Memory Allocation
  - Access of structure members using dot(.) and arrow (->) operator
  - Array of Structure
  - Bit Field
- **Union:** Memory Allocation
  - Accessing Different type of members in shared memory
- **File Handling:**
  - Types of Files, Modes of Files
  - Sequential & Random Access File
  - Byte Read / Write, Buffer size data Read / Write, Binary Data Read / Write

Section B - Data Structure (7 Questions)

- **Introduction to Data Structure**
- **Algorithms:** Divide and conquer algorithms
  - Greedy Algorithm
- **Time Complexity:**
  - Best Case, Average Case, Worst Case
- **Sorting:** Selection Sort, Bubble Sort, Insertion Sort, Merge Sort, Quick Sort
- **Searching:**
  - Binary Search, Linear Search
- **Stack:**
  - Applications of Stack
  - Expression Conversion, evaluation and balancing
  - Operations of Stack
- **Queue:**
  - Types of Queue
  - Applications of Queue
  - Operations of Queue
- **LinkedList :**
  - Singly Linear /Circular LinkedList operations and time complexity
  - Doubly Linear /Circular LinkedList time complexity
- **Tree :**
  - Tree Terminologies
  - Types of Tree Binary Tree and its types, AVL Tree, Spanning Tree
  - Traversal: Inorder, Preorder, PostOrder
- **Graph:**
  - Basic Terminologies of graph

Section B - Object Oriented Concepts (9 Questions)

- Difference Between Structure in C & C++
- POP Vs OOP
- Class, Object
- Inspectors, Mutators, Facilitators, Constructor and Destructor
- cin, cout, Default Arguments, Inline Functions.
- Array of objects, new/delete Operator, references, Constructor/Destructor revisited, Dynamic Array of Objects.
- Static Data Members and Member Functions
- Introduction to Exception Handling
- Composition, Friend Function and Friend class
- Function overloading, Operator Overloading Introduction
- Copy constructor and Assignment operator.

- Inheritance, Types, Modes, virtual inheritance
- Virtual Functions, Pure Virtual Functions
- Abstract Class, Interface Concept
- Template programming: With Functions and Class.
- File Handling intro, RTTI and Casting Operators Basics

Section B - Operating System (9 Questions)

- **Introduction**
  Introduction to Operating System, What is OS, Booting the System
- **Introduction** to **Computer Hardware** and its major components (CPU, Memory, IO): Memory Technologies and its characteristics, IO Module Structure, External Devices tructure and IO techniques.
- **System Architecture Design** of **OS**: System Calls, Dual Mode Operation: System mode and Kernel mode
- **Process Management**: What is Process, States of the Process, PCB, CPU Scheduling, CPU Scheduling Algorithms, Inter Process Communication, Process Synchronization /Coordination, Deadlocks and Deadlock Handling Methods.
- **Memory Management**: What is memory management, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Virtual Memory Management, Demand Paging, Thrashing.
- **File & Storage Management**: What is File, What is File System, File System Structure, File System Architecture, Disk Space Allocation Methods, Disk Scheduling algorithms.

Section B - Data Communication and Networking (10 Questions)

- **NETWORK:**
  Centralized Computing, Decentralized Computing
  Server-client, Cloud computing
- **Common Types of Networks:**
  LAN,WAN,WLAN,MAN,SAN,CAN
  Primary and Main Types of Networks
  Basic types of LAN
  Token Ring,
  Ethernet
  MAC Address
  IPV4,IPV6, Port Numbers
  Switch, Switch Techniques and Bridges
  Router, OSI Layer
  IP Addressing:
- **Common TCP/IP stack Protocols:**
  ARP (Address Resolution Protocol)
  IP (Internet Protocol)
  ICMP (Internet Control Message Protocol)
  TCP (Transmission Control Protocol)
  UDP (User Datagram Protocol)
  FTP (File Transfer Protocol)
  Telnet (Telecommunications Network)
  DNS (Domain Name System)
  HTTP (Hypertext Transfer Protocol)

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Section C - Digital Electronics (20 Questions)

- **Introduction**
  Signal, Analog Signal, Digital Signal
  Number System
  Decimal number, Binary number, Octal number, Hexadecimal number
  Converting from Another Base to Decimal
  Converting from Decimal to Another Base
  Converting from a base Other than 10 to Another Base Other than 10
  Octal to binary, Binary to octal
  Hexadecimal to binary, Binary to hexadecimal, BCD
  Laws, Boolean Algebra, K-Map, Logic Gates, Universal gate
  Binary Addition, Binary Subtraction
  1's complement,2's complement,9's complement,10's complement, Multiplication, Division
  Gray code,Excess-3 code
- **Combinational Circuit**
  Half Adder ,Full Adder, Half Subtractor, Full Subtractor
  Multiplex, Demultiplexer
  Decoder, Encoder
- **Sequential Circuit**
  RS Flip-flop, D Flip-flop, JK Flip-flop, T Flip-flop
  Counter, Shift Register
- **Logic Family in short**
  Circuit of each logic family
  Advantages, Disadvantages
- **Resolution Problems**

Section C - Computer Architecture (15 Questions)

- Machine Instructions
  Memory-Reference Instructions
  Register-Reference Instructions
  I/O Instructions
  Addressing Modes
- ALU Data Path
- CPU Control Unit Design, Memory Interfacing, Pipelining
- Memory (cache memory, main memory , secondary memory)
  Register Memory
  Primary Memory/Main Memory (RAM)
  Types of RAM
  SRAM, DRAM, SDRAM, DDR SDRAM
  Secondary Memory (ROM)
  Types of ROM
  ROM, PROM, EPROM, EEPROM, Flash

Section C - Microprocessor (15 Questions)

- **Introduction**, Basic Concept, What is Microprocessor, Basic Microcomputer

Classification of Microprocessor
RISC Architecture, CISC Architecture
Harvard Architecture, Von Neumann Architecture
Microprocessor 8085
8085 Architecture
Bus Structure in 8085, Registers
8085 PIN DESCRIPTIONS
Interrupt
Classification of Interrupts, Interrupt Handling Procedure
8085 Instruction

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Instruction Set Classification, Instruction Format
Addressing Modes in Instructions
INSTRUCTION EXECUTION AND TIMING DIAGRAM
Opcode fetch, Memory Read, Memory Write, I/O read, I/O Write Counter and Delay
Microprocessor 8086

- **Architecture of 8086**
  - 8085 PIN DESCRIPTIONS, addressing modes, Instruction Set Classification
  - Brief Introduction to Microprocessor Interfacing
  - 8255 =>Programmable Peripheral Interface
  - 8254/8253 =>Programmable Interval timer
  - 8259 =>Programmable Interrupt controller
  - 8279 => Programmable Keyboard/Display Interface
  - 8257 => DMA (Direct memory access) controller
  - 8251 => Programmable communication Interface(USART)

PreCAT Batch Topic Wise Distribution of Hrs

Topic	8 weeks		6 Weeks		3 Weeks		Super Batch		WeekEnd Batch (7 weekends)	
	Theory	Lab	Theory	Lab	Theory	Lab	Theory	Lab	Theory	Lab
C Programming	34.5	30	30.5	26	17.5	14	11	10	17.5	14
Data Structure	18.5	16	15	12	8	8	6.5	6	8.5	6
Oops Using C++	18	18	12	12	6	6	4	4	8	8
Operating System + Computer Fundamentals	18	0	12	0	9	9	4	0	9	0
Data Communication & Networking	9	0	9	0	6	0	6	0	6	0
Aptitude	15	0	15	0	15	15	15	0	15	0
TESTSERIES	0	5	0	5	0	5	0	5	0	5
A. Actual Total No. Hrs	182		148.5		118.5		71.5		97	
B.Section C Digital Electronics & Microprocessor (Parallel To Aptitude)	15		15		15		15			
Total A+ B	197		163.5		133.5		86.5		97	

for Further Queries Contact

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