

# INTRODUCTION TO COMPUTING—2009

## SEMESTER - 2

Time : 3 Hours

Full Marks : 70

### Group A

#### (Multiple Choice Type Questions)

1. Choose the correct alternatives for any ten of the following :

10×1=10

- i) Which one of the following declaration is invalid ?  
 (a) int 2A                      (b) int A2A                      (c) in A2                      (d) int AA2
- ii) Which one is the right output ?  

```
int x = 9 ;
if (10)
    printf(“%d”, ++x);
else
    printf(“%d”, x++);
```

 (a) 9                      (b) 10                      (c) 11                      (d) 12
- iii) Which one is the right output ?  

```
char a [50] = “computer” ;
printf(“%d”, strlen(a));
```

 (a) 9                      (b) 10                      (c) 8                      (d) 11
- iv) Which one is the right output ?  

```
#define int char
main()
{
    int i = 65;
    printf(“sizeof(i)=%d”, sizeof(i));
}
```

 (a) sizeof(i)=1                      (b) sizeof(i)=2                      (c) sizeof(i)=4                      (d) sizeof(i)=8
- v) Which one is the right output ?  

```
main()
{
    int i = 5, j = 6, z;
    printf(“%d”, i+ ++j);
}
```

 (a) 12                      (b) 10                      (c) 11                      (d) 13
- vi) In Hexadecimal number system, E is equivalent to the number in decimal  
 (a) 10                      (b) 12                      (c) 14                      (d) 15
- vii) What is the range of unsigned short int ?  
 (a) 0 to 65535                      (b) 0 to 255                      (c) – 128 to 127                      (d) none

- viii) Operating system is  
 (a) Application Software (b) System Software (c) Firmware (d) None of these
- ix) ALU is a part of  
 (a) Memory (b) CPU (c) Output device (d) Input device.
- x) Member of a union uses  
 (a) different storage location (b) same storage location  
 (c) no storage location (d) none of these
- xi) What will be the value of  $i$  and  $m$  after executing the following code ?  
 $\text{int } i = 1, m;$   
 $m = i ++;$   
 (a) 6, 5 (b) 5, 5 (c) 5, 6 (d) 6, 6

Ans. (i) a ; (ii) b ; (iii) c ; (iv) b ; (v) a ; (vi) c ; (vii) b ; (viii) b ; (ix) b ; (x) b ; (xi) 2, 1.

### Group - B

#### (Short Answer Type Questions)

Answer any *three* of the following.

$3 \times 5 = 15$

2. (a) Convert  $(17.25)_{10}$  to Binary. 1  
 (b) What are 2's complement numbers ? How do you use this system to perform  $(51)_{10} - (27)_{10}$  in binary? 1+2  
 (c) What are the main differences between RAM & ROM? 1

Ans. (a)

$$(17.25)_{10} = (?)_2$$

Q R

$$17 \div 2 = 8 \cdot 1$$

$$8 \div 2 = 4 \cdot 0$$

$$4 \div 2 = 2 \cdot 0$$

$$2 \div 2 = 1 \cdot 0$$

$$1 \div 2 = 0 \cdot 1$$

$$(17)_{10} = (10001)_2$$

$$.25 \times 2 = 0.50 \text{ 1st Part } 0$$

$$.50 \times 2 = 1.00 \text{ 1st Part } 1$$

$$(.25)_{10} = (.01)_2$$

$$\therefore (17.25)_{10} = (10001.07)_2$$

Ans. (b) Binary Numbers are represented two ways—

(1) Fixed Point, (2) Floating Point.

Fixed point number can be represented in three ways—

(1) Sign magnitude, (2) 1's Complement, (3) 2's Complement.

In 2's complement -5 can be represented as-

$$(5)_{10} = (00000101)_2 \Rightarrow \boxed{0}0000101 \text{ (8 bit represent)}$$

↓  
Sign bit

$$\Rightarrow 1\text{'s} \quad 1 \ 1 \ 1 \ 1 \ 1 \ 0 \ 1 \ 0$$

Complement

$$\Rightarrow 2\text{'s} \quad 1 \ 1 \ 1 \ 1 \ 1 \ 0 \ 1 \ 0$$

Complement + 1

$$1 \ 1 \ 1 \ 1 \ 1 \ 0 \ 1 \ 1$$

↓

-5 in 2's complement

$$(51)_{10} = (00110011)_2$$

$$(27)_{10} = (00011011)_2$$

$$0 \ 0 \ 0 \ 1 \ 1 \ 0 \ 1 \ 1$$

1's

$$\text{Complement} \quad 1 \ 1 \ 1 \ 0 \ 0 \ 1 \ 0 \ 0$$

ation)

$$2\text{'s Complement} \quad \quad \quad + 1$$

$$1 \ 1 \ 1 \ 0 \ 0 \ 1 \ 0 \ 1$$

Sign bit  $\rightarrow \boxed{0}0 \ 1 \ 1 \ 0 \ 0 \ 1 \ 1 \Rightarrow +51$  in 2's complement.

Sign bit  $\rightarrow \boxed{1}1 \ 1 \ 1 \ 0 \ 0 \ 1 \ 0 \ 1 = 0 - 27$  in complement.

$$1 \quad 0 \ 0 \ 0 \ 1 \ 1 \ 0 \ 0 \ 0 \text{ complement}$$

↓

↓

$$\text{Discarded} \quad + 24$$

in 2's complement

Ans. (b) see the answer of 2005 Q.no 1(b).

Ans. (c)

RAM

ROM

Random Access Memory

Read Only Memory

i. Random Access Memory

i. Read only Memory

ii. Read and write Memory

ii. Read only

iii. Volatile Memory

iii. Non volatile Memory

3. (a) What is ternary operator? Explain with example.

2+1

(b) Write down the difference between compiler and interpreter.

2

Ans. (a) See the answer of 2002, Q.no 6(c).

Ans. (b) See the answer of 2005, Q.no 3(b).

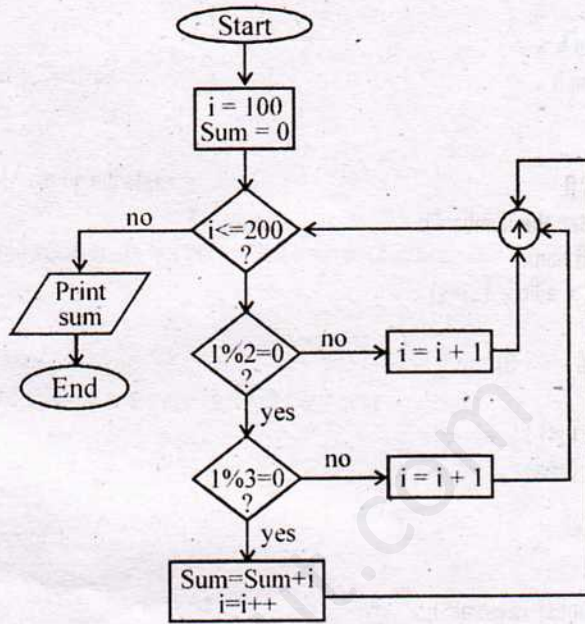
4. (a) Write down the main characteristics of algorithm.

2

(b) Write a flowchart to find the sum of the all integers ranging from 100 to 200 and divisible by both 2 and 3.3

Ans. (a) See the answer of 2003 Q.no, 3(a).

Ans. (b)



5. Briefly describe the function of different components of a conventional digital computer with a suitable block diagram. 5

Ans. See the answer of 2002 Q.no 3(a).

6. Write a C program to find out the G.C.D of two numbers. 5

Ans. See the answer of 2002 Q.no 5(b).

### Group - C

#### (Long Answer Type Questions)

Answer any *three* of the following.

3 × 15 = 45

7. (a) Differentiate between "do-while" and "while" statements with suitable examples. 4  
 (b) Differentiate between "break" and "continue" statement with example. 4  
 (c) What is the difference between structure and union in C programming ? 4

Supplement with examples. 4

- (d) Explain recursion with an example. 3

Ans. (a) See the answer of 2002 Q.no 4(c).

Ans. (b) See the answer of 2004 Q.no 10(iii).

Ans. (c) See the answer of 2005 Q.no 4(a).

Ans. (d) See the answer of 2003 Q.no 4(b).

8. (a) Write a C program to check whether a given number is prime number or not. 5  
 (b) Write a program to compute factorial of a number read from keyboard. 4  
 (c) What are auto, external and static variables ? Explain their uses with suitable examples. 6

**Ans. (a)**

```
# include <stdio.h>
# include <conio.h>
void main()
{
    int num, i, f = 0;
    Printf("\n Enter the number");
    Scanf("%d", & num);
    for (i = 2 ; i <= num - 1 ; i++)
    {
        if (num % i == 0)
        {
            f = 1;
            break;
        }
    }
    if (f == 0)
    Printf("\n The number is prime");
    else
    Printf("\n The number is not Prime");
    getch();
}
```

**Ans. (b)** See the answer of 2006 Q.no, 5

**Ans. (c)** See the answer of 2002 Q.no, 7(b).

9. (a) **What is array of pointers ? Explain with example.**

(b) **Explain call by value and call by reference with examples.**

(c) **Write a program in C to find the real roots of a quadratic equation using user defined function Quad().**

**Ans. (a)** See the answer of 2002 Q.no, 8(ii).

**Ans. (b)** See the answer of 2003 Q.no, 8(a).

**Ans. (c)**

```
# include <stdio.h>
# include <conio.h>
void Quad (float, float, float);
void main()
{
    float a, b, c;
    Printf ("\n Enter the co-eff a, b, c of equ" ax^2 + bx + c");
    Scanf ("%f%f%f", &a, &b, &c);
    Quad (a, b, c);
}
```



```

getch();
}
void Quad (float a, float b, float c);
{
float d;
d = b*b-4*a*c; // discriminates
if (d==0)
Printf ("\n Two real and equal roots are root 1 = % f and root2 = % t",

```

$$\left( \frac{-b}{2 \times a} \right), \left( \frac{-b}{2 \times a} \right)$$

```

else if (d>0)
Printf ("\n Two real and unequal roots are root 1=%f and root

```

$$2\%t", \left( \frac{-b + \sqrt{d}}{2 \times a} \right)$$

```

else
Printf ("\n Imaginary roots");
getch();
}

```

10. (a) Explain two input Exclusive OR gate using truth table.

 $\frac{1}{2}$ 

(b) Why NAND gate is called universal gate?

 $\frac{1}{2}$ 

(c) Simplify :  $(A + \bar{B}) \cdot (A \cdot C) + (A \cdot \bar{B} + \bar{A} \cdot C) \cdot (\overline{A + D})$

4

(d) Convert :


i)  $(2AD)_8 = ( )_2$

ii)  $(1110011101)_2 = ( )_{16}$

iii)  $(25 \cdot 125)_{10} = ( )_2$

Ans. (a)

$= A\bar{B} + \bar{A}B$



A	B	A ⊕ B
0	0	0
0	1	1
1	0	1
1	1	0

Ans. (b) NAND gate is universal gate because by NAND gate we can implement any type of boolean expression or circuit.

Ans. (c)  $(A + \bar{D})(AC) + (\bar{A}\bar{B} + \bar{A}C)(\overline{A + D})$

$$A \cdot AC + \bar{B}AC + 0 + \bar{A}C\bar{A}\bar{D}$$

$$AC(1 + \bar{B}) + \bar{A}C\bar{D}$$

$$AC + \bar{A}C\bar{D}$$

Ans. (d)(i)  $(2AD)_{16} = (?)_2$

$$= \left( \begin{array}{ccc} 0010 & 1010 & 1101 \\ 2 & A & D \end{array} \right)_2 = (0010 \ 1010 \ 1101)_2$$

(ii)  $\left( \begin{array}{ccc} 111 & 0011 & 1101 \\ 7 & 3 & D \end{array} \right)_2 = (?)_{16}$

$$= (73D)_{16}$$

(iii)  $(25 \cdot 125)_{10} = (?)_2 = (11001 : 001)_2$

	Q	R	fraction	int	Part	Part
$25 \div 2 =$	12	1	$\cdot 125 \times 2 =$	250	0	
$12 \div 2 =$	6	0	$\cdot 250 \times 2 =$	500	0	
$6 \div 2 =$	3	0	$\cdot 5 \times 2 =$	10	0	
$3 \div 2 =$	1	1	$(\cdot 25)_{10} =$	$(\cdot 001)_2$		

$$(25)_{10} = (11001)_2$$

11. Write short notes on any three of the following :

3 x 5

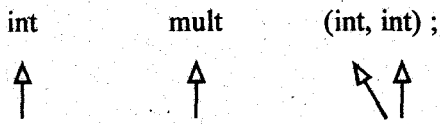
- (a) Void pointer and null pointer
- (b) Dynamic memory allocation function
- (c) Function prototype
- (d) Bitwise operator
- (e) Macro.

Ans. (a) **Void Pointer** : Void pointer is a pointer which can point to any type of data or can hold any type of address.

**Null Pointer** : Null pointer is a pointer which holds the NULL.

Ans. (b) See the answer of 2005, Q.no 8(c).

Ans. (c) **Function Proto type** : Whenever user want to create any function then user has to declare the function as follows :



return type    function name    argument type

Compiler want this declaration. This function declaration is called function prototype.

Ans. (d) See the answer of 2003 Q.no 12(ii).

Ans. (e) See the answer of 2004 Q.no 12.