

Indian Institute of Technology Patna
CS102: Programming and Data Structure

MidSem
Time: 2 hours

26th February 2018
Full Marks 50

Name (in Capital): _____

Roll No: _____

Signature: _____

Invigilator's Signature: _____

Instruction: Write your name and Roll No and sign in question paper. All question belongs to question number 1 are of MCQ type with four options. Please choose (put a tick) exactly one option. Question will not be evaluated, if there are overwritten choices. 25% marks will be deducted for each wrong answer in MCQ type question. And in question number 2 & 3 you are asked to write output of a code/code snippet. There is no negative marks for wrong answer in the last category of questions, however, be careful about punctuation marks and newline during this category.

For Office Use:

Question1(15)	Question2(10)	Question3(25)	Total(50)

1. Choose the correct option. [15]

(a) Which of the following is not a valid variable name declaration? [1]

- i. int _a3;
- ii. int 3_a;
- iii. int a_3;
- iv. int _3a

(b) int a = 1, b = 2, c = 3, d = 4; what would be the value of following expression ++ a * b - c -- [2]

- i. 1
- ii. 2
- iii. -1
- iv. 0

(c) What would be printed if the following code snippet is executed [2]

```
#include <stdio.h>
int main(){
{
int k,num=100;
k=(num > 50 ? (num <= 10 ? 100 : 200): 500);
printf("%d\n", k);
return 0;
}
```

- i. 100
- ii. 200
- iii. 500
- iv. 50

(d) What would be the output of the following code snippet: [2]

```
#include <stdio.h>
#include <time.h>
static int a;
int fu()
{
int a=10;
printf("%d,",a);
}
```

```
int main()
{
fu();
a=a+12;
printf("%d",a);
}
```

- i. 10,0
- ii. 10,10
- iii. 10,12
- iv. 10,22

(e) What would be the output of following code snippet [2]

```
#include <stdio.h>
void main()
{
int a=10;
switch(a){
case 5+5:
printf("Hello\n");
default:
printf("OK\n");
}
}
```

- i. Hello
- ii. OK
- iii. Hello
OK
- iv. Error

(f) What could be the possible sequence of output if the following code snippet is executed **three** times? [2]

```
#include <stdio.h>
int main(){
printf("%d,rand());
return 0;
}
```

- i. 678, 456, 987
- ii. 347, 546, 190
- iii. 555, 555, 555
- iv. All the above options are possible

- (g) Go through the following code snippet and choose the right option [2]

```
#include <stdio.h>

int main()
{
    int i = 1024;
    for (; i; i >>= 1)
        printf("Hello");
    return 0;
}
```

- i. 10 times Hello will be printed
 - ii. 11 times Hello will be printed
 - iii. Hello will be printed in infinite loop
 - iv. Program will have a compilation time error
- (h) Go through the following code and choose the right option [2]

```
#include <stdio.h>

int main()
{
    int i = 3, j = 1;

    switch (i + j)
    {
        case 4: printf("Even");
                break;
        case 3: printf("Odd");
                break;
        default: printf("Default");
    }

    return 0;
}
```

- i. Odd
- ii. Even
- iii. Default
- iv. Compilation Error

2. Write the correct output. [10]

- (a) Go through the following code and write the output [2]

```
#include <stdio.h>
int main()
{
    int i = 0;
    for (i=0; i<20; i++)
    {
        switch(i)
        {
            case 0: i += 5;
            case 1: i += 2;
            case 5: i += 5;
            default: i += 4;
                    break;
        }
    }
}
```

```
printf("%d ", i);
}
return 0;
}
```

Output:

- (b) Go through the following code and write the output [2]

```
#include<stdio.h>

typedef union{
    int a;
    int b;
} U;

int main(){
    U x;
    x.a=10;
    x.b=15;
    printf("x.a=%d",x.a);
}
```

Output:

- (c) Go through the following code and write the output. [2]

```
#include<stdio.h>
#include<string.h>
struct Test
{
    char str[20];
};

int main()
{
    struct Test st1, st2;
    strcpy(st1.str, "EndSem");
    st2 = st1;
    st1.str[0] = 'M';
    st1.str[1] = 'i';
    printf("%s st2.str);
    return 0;
}
```

Output:

- (d) What will be the output of the below code? [2]

```
#include <stdio.h>
int foo(int n) {
    int sum = 0, i;
    for(i=0; i<n; i++){
        if(i%2 == 0)
            continue;
        sum = sum + i;
    }
}
```

```

    return sum;
}
int main() {
    printf("%d", foo(10));
    return 0;
}

```

Output:

- (e) If following program is executed what would be the output? [2]

```

int main()
{
    int i = 0, limit=3;
    do
    {
        printf("i=%d\n", i);
        if (i++ < limit)
        {
            printf("Hello\n");
            continue;
        }
        printf("Hii\n");
    }while(i<5);
    return 0;
}

```

Output:

3. Write the correct output. [25]

- (a) What will be the output of the following code? [2]

```

#include <stdio.h>
int main()
{
    char p;
    char buf[10] = {1, 2, 3, 4, 5, 6, 9, 8};
    p = (buf + 1)[5];
    printf("%d\n", p);
    return 0;
}

```

Output:

- (b) What will be the result of running this program? [3]

```

#include <stdio.h>
int main()

```

```

{
    int a[][] = {{1,2},{3,4}};
    int i, j;
    for (i = 0; i < 2; i++)
        for (j = 0; j < 2; j++)
            printf("%d ", a[i][j]);
    return 0;
}

```

Output:

- (c) What will be the result of running following program? [5]

```

#include <stdio.h>
int main()
{
    char p[] = "iitpatna";
    char t;
    int i, j;
    for(i=0, j=strlen(p); i<j; i++)
    {
        t = p[i];
        p[i] = p[j-i];
        p[j-i] = t;
    }
    printf("%s", p);
    return 0;
}

```

Output:

- (d) Write down the output of this following program? [5]

```

#include <stdio.h>
int f(int x)
{
    if(x <= 4)
        return x;
    return f(--x);
}
void main()
{
    printf("%d ", f(50));
}

```

Output:

- (e) What will be the output of the following program? [5]

```

#include<stdio.h>
void foo(int n, int sum)
{
    int k = 0, j = 0;
    if (n == 0) return;
    k = n % 10;
    j = n / 10;
    sum = sum + k;
    foo(j, sum);
}

```

```
printf ("%d", k);  
}  
void main ()  
{  
int a = 2048, sum = 0;  
    foo (a, sum);  
printf ("%d\n", sum);  
}
```

Output:

(f) What will be output of the following program? [5]

```
#include<stdio.h>  
int f(int n, int k)  
{  
    if (n == 0)  
        return 0;  
    else if (n % 2)  
        return f(n/2, 2*k) + k;  
    else return f(n/2, 2*k) - k;  
}  
int main ()  
{  
printf("%d", f(19, 1));  
    return 0;  
}
```

Output: