

TEST

PROGRAMMING AND DATA STRUCTURE (PART I)

Time: 60 min.

Directions for questions 1 to 30: Select the correct alternative from the given choices.

1. What is the behavior of following code?

```
auto int I;
int main( )
```

```
{
}
```

- (A) Compiler error (B) No error
(C) Linker error (D) Runtime error

2. What is the output of following code:

```
#define scanf "%S is a string"
```

```
int main( )
```

```
{
printf(scanf, scanf);
}
```

- (A) is a string is a string
(B) %S is a string is a string
(C) %S is a string %S is a string
(D) Syntax error

3. void rec_fun (int n, int sum)

```
{
int k = 0, j = 0;
if(n == 0) return;
k = n%10; j = n/10;
sum += k;
rec_fun(j, sum);
printf("%d\t", k);
}
```

```
main ( )
```

```
{
int a = 2048; sum = 0;
rec_fun(a, sum);
printf("%d", sum);
}
```

What does the above program print?

- (A) 8 4 0 2 14
(B) 8 4 0 2 0
(C) 2 0 4 8 18
(D) 2 0 4 8 0

4. int fun (int * p, int n)

```
{
if (n <= 0) return 0;
```

```
else
if(*p % 2 == 0)
return *p + fun(p + 1, n - 1);
else
return *p - fun(p + 1, n - 1);
}
```

```
main( )
```

```
{
int arr[ ] = {56, 48, 55, 10, 49, 14};
printf("% d", fun(arr, 6));
}
```

Which of the following is the output of above function?

- (A) 110 (B) -122
(C) 114 (D) 108

5. Consider the function:

```
int fun (int n)
{
static int i = 1;
if (n >= 5) return n;
n = n + i;
i ++;
return fun (n);
}
```

The value returned by $f(3)$ is

- (A) 6 (B) 7
(C) 8 (D) 9

6. Which of the following code will change a lower case letter to an upper case?

- (A) $\text{char } C_2 = (C_1 \geq 'A' \ \& \ C_1 < 'Z') ? 'a' + 'C_1' - 'A' : C_1;$
(B) $\text{char } C_2 = (C_1 \geq 'a' \ \& \ C_1 \leq 'z') ? 'A' - 'a' + 'C_1' : C_1;$
(C) $\text{char } C_2 = (C_1 \geq 'a' \ \& \ C_1 \leq 'z') ? 'A' + 'C_1' - 'a' : C_1;$
(D) $\text{char } C_2 = (C_1 \geq 'A' \ \& \ C_1 \leq 'Z') ? 'A' - 'C_1' + 'a' : C_1;$

7. The following is a program to find the average length of several lines of text. What should be the lines of code corresponding to 'SecA' and 'SecB'.

```
main( )
{int n, count = 0, sum = 0;
float avg;
secA
```

```

{
count++;
sum + = n;
}
avg = (float) sum/count;
}
int linecount (void)
{
char line [80];
int count = 0;
while (secB)
{
count ++;
}
return (count);
}

```

- (A) Sec A: while ($n > 0$)
Sec B: line [count]! = 0
- (B) Sec A: while (linecount () > 0)
Sec B: (line [count] = getch () != '\n')
- (C) Sec A: while (($n = \text{linecount}()$) > 0)
Sec B: (line [count] = getch () != '\n')
- (D) None of these
8. What is the meaning of following declaration? $\text{int}(*f_1)$ ();
- (A) f_1 is a function which returns a pointer to an integer number.
- (B) f_1 is a pointer to a function which returns an integer number.
- (C) f_1 is a function which takes an integer pointer.
- (D) f_1 is a pointer to an integer number.
9. Which of the following represents the statement: “x is a pointer to a group of one dimensional 20 element arrays”.
- (A) $\text{int } *x[20];$ (B) $\text{int } *x[10][20];$
- (C) $\text{int } **x[20];$ (D) $\text{int } (*x)[20];$
10. What will be the output of the following code?

```

int number[ ] = {18, 20, 22, 24};
main( )
{
int *q;
q = number;
q + = 4;
printf("%d", *q);
}

```

- (A) 24 (B) Compiler error
- (C) syntax error (D) -24

```

11. main( )
{
char fname[ ] = "TIME 4 EDUCATION";
time4(fname);
}
time4(char fname[5])
{
fname + = 7;
printf("%s", fname);
fname = 2;
printf("%s", fname);
}

```

What is the output of above code?

- (A) 4 EDUCATION
- (B) EDUCATION
- (C) TIME 4 EDUCATION
- (D) EDUCATION ME 4 EDUCATION
12. What will be output of following code?
- ```

int main()
{
extern int x;
x = 13;
printf ("%d", x);
return 0;
}

```
- (A) 13
- (B) Vary from compiler
- (C) Linker error
- (D) Undefined symbol

13. What is the output of the following code?

```

main()
{
int x = y = z = 100;
int i;
i = x > y < z;
printf("% d", i);
}

```

- (A) 0 (B) 1
- (C) error (D) No output

14. In the following code, how many times ‘while’ loop will be executed?

```

int count = 0;
while (count < 32767)
count++;

```

- (A) 32767
- (B) 32766
- (C) infinite times
- (D) varies from compiler to compiler

15. `#define SUM(x)x + x * x`

`#define DIF(x)x * x - x`

```
int main()
{
float y = SUM(5) /DIF(5);
printf("%f", y);
}
```

- (A) 1.5 (B) 0  
(C) 2 (D) 1

16. Which of the following is a correct description of void (\*ptr[10])();

- (A) ptr is an array of 10 pointers to functions returning type void.  
(B) ptr is an array of 10 functions returning pointers of type void.  
(C) ptr is an array of 10 functions returning void\*.  
(D) ptr is an array of data elements of type void.

17. `int main( )`

```
{
int p = 2, g = 2;
printf(" %d%d", p < < g, p > > g);
}
```

Output of above code is

- (A) 1 16 (B) 4 0  
(C) 16 4 (D) 8 0

18. Which of the following is equivalent expression for  $P = a * 16 + b/8$ ;

- (A)  $P = (a << 4) + (b >> 2)$   
(B)  $P = (a >> 4) - (b << 2)$   
(C)  $P = (a << 4) + (b >> 3)$   
(D)  $P = (a << 4) + (b << 3)$

19. What is the output of the below code?

```
main()
{
int I = 0, *j = &I;
fl(j);
*j = *j + 10;
printf(" %d%d", I, j);
}

fl(int *k)
{
*k+ = 15;
}
```

- (A) 20 55 (B) 25 25  
(C) 45 55 (D) 35 35

20. `int rec_f2(int r)`

```
{
if (r == 1 || r == 0)
```

```
return 1;
if (r % 2 == 0)
return(rec_f2 (r/2)+ 2);
else return ((rec_f2(r - 1) + 3);
}
```

```
main()
{
printf ("%d", rec_f2(7));
}
```

Which of the following is the output of above program?

- (A) 10 (B) 11  
(C) 13 (D) 0

21. `int guest(int a);`

```
int host(int b);
main()
{
int p = 50, q = 100, r ;
for (r = 0; r < 2; r ++)
```

```
{
q = guest(p) + host(p);
printf(" %d", q);
}
```

```
int guest (int a)
{
int y;
```

```
y = host(a);
return(y);
}
```

```
int host (int a)
{
static int y = 0;
y = y + 1;
return (a + y);
}
```

The output of above code will be

- (A) 103 107 (B) 107 103  
(C) 110 107 (D) 107 110

22. Choose the best matching between groups A and B:

| Group A            | Group B          |
|--------------------|------------------|
| 1 Volatile         | P Queue          |
| 2 Function pointer | Q Auto           |
| 3 Default          | R Guest and host |
| 4 FIFO             | S Switch-case    |

- (A) 1 – S, 2 – Q, 3 – R, 4 – P  
(B) 1 – Q, 2 – P, 3 – R, 4 – S

- (C) 1 – Q, 2 – R, 3 – S, 4 – P  
 (D) 1 – R, 2 – Q, 3 – P, 4 – S

23. Which of the following expression represents the statement: “P is a function that accepts a pointer to a character array”.

- (A) `int p(char *a[ ]);`      (B) `int (*p)(char (*a)[ ]);`  
 (C) `int *p(char *a);`      (D) `int p(char (*a)[ ]);`

24. `void arr_fun(int [ ] [3]);`

```
main()
{
 int x[3][3] = {{10, 20, 30}, {40, 50, 60}, {70, 80, 90}};
 arr_fun(x);
 printf("%d", x[2][1]);
}

void arr_fun (int y[][3])
{
 ++y;
 y[1][1] = 9;
}
```

What is the output of the above code?

- (A) 80      (B) 90  
 (C) 70      (D) None of these

25. `#define F - 1`

`#define T 1`

`#define N 0`

```
main()
{
 if(N)
 printf(" %s", "GOOD");
 else
 if(F)
 printf(" %s", "MORNING");
 else
 printf(" %s", "GOOD NIGHT");
}
```

Output of above code will be

- (A) GOOD  
 (B) MORNING  
 (C) GOOD MORNING  
 (D) GOOD NIGHT

26. An external variable

- (i) is defined once and declared in other functions.  
 (ii) is globally accessible by all functions.  
 (iii) cannot be static  
 (iv) is defined after `main()`  
 (A) (i) and (ii)      (B) (i), (ii) and (iii)  
 (C) (ii), (iii) and (iv)      (D) (i), (ii), (iii), (iv)

### Common Data for Questions 27 and 28:

Consider the following code:

```
int f(int P)
{
 if(P <= 0) return 1;
 if(P%10 == 0)
 return f(P - 2); //X
 else
 return f(P - 3); //Y
}

main()
{
 printf(" %d", f(30));
}
```

27. What will be the output of above code?

- (A) 10      (B) 50  
 (C) 100      (D) 1

28. What will be the output if the lines labeled X and Y are changed as follows:

X: `return 3 + f(P/2);`

Y: `return 2 + f(P/3);`

- (A) 4      (B) 6  
 (C) 8      (D) 10

### Common data for Questions 29 and 30:

1. `float fn1(float n, int a)`

2. {

3. `float P, S;`

`int I;`

4. `for(S = x, P = 1, I = 1; P = P * x * x;`

5. `I < a; I ++)`

`S = S + P/(1);`

6. `return (S);`

7. }

8. `int f(int x)`

9. {

10. `int f = 1;`

11. `for (int i = 1; i <= n; i++)`

12. `f = f * i;`

13. `return (f);`

14. }

29. Output of above code for `fn1(2.1, 20)` is

(A)  $x + \frac{x^2}{2!} + \frac{x^4}{4!} + \dots + a + 2.1$

(B)  $\frac{x - x^3}{3!} + a + 2.1$

$$(C) \ 1 + \frac{x}{1!} + \frac{x^2}{2!} +$$

$$(D) \ 1 + \frac{x}{1!} + \frac{x^3}{3!} + \frac{x^5}{5!} + \dots + a + 2.1$$

30. When the statement numbered 4, 5, 6, 7 are replaced by  
 {for (S = 1, P = -x, I = 1; I < a; i++)  
 P = P \* x \* x - 1;

S = S + P/f(I);

}

What will be the approximation of  $f(x)$ ?

$$(A) \ 1 + x - x^2 + x^3 \dots$$

$$(B) \ 1 - \frac{x}{1!} + \frac{x^3}{3!} -$$

$$(C) \ 1 - \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$$

$$(D) \ 1 - \frac{x}{1!} + \frac{x^2}{2!} - \frac{x^3}{3!} + \dots$$

### ANSWER KEYS

- |       |       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1. A  | 2. B  | 3. A  | 4. C  | 5. A  | 6. C  | 7. C  | 8. B  | 9. D  | 10. B |
| 11. D | 12. C | 13. B | 14. C | 15. D | 16. A | 17. D | 18. C | 19. B | 20. B |
| 21. A | 22. C | 23. B | 24. A | 25. B | 26. B | 27. D | 28. D | 29. A | 30. D |