Programming and Data Structures Test 3

Number of Questions: 25 **Section Marks: 30**

Directions for questions 1 to 25: Select the correct alternative from the given choices.

1. Dynamic checking is performed (at the time of)
(A) translation (B) execution
(C) before the execution (D) semantic analysis

2. Which variables are preferable for smaller and faster programs?
(A) auto variables (B) static variables
(C) global variables (D) register variables

3. C language implements
(A)Static scoping (B) dynamic scoping
(C) both (A) and (B) (D) None of the above

4. Which of the following language doesnot support recursion
(A) C (B) PROLOG
(C) PASCAL (D) FORTRAN

5. Consider the following program segment:

```
A (int x)
{
if (x = = 0)
return;
else
{
A(x/10);
printf("%d /t", x);
}
}
```

What is the output when A (1 2 3 4) is called
(A) 1 2 3 4 1 2 3 1 1 2 (B) 1 1 2 1 2 3 1 2 3 4
(C) 1 1 2 3 1 2 1 2 3 4 (D) 1 2 3 4 1 2 3 1 2 1

6. What is the return value when *A* ("TIME") is called from given program segment?

```
int A(char * S)
{
char * P = S;
while (*P! = '/0')
P++;
return P - S; }
```

(A) 1 (B) 2
(C) 3 (D) 4

7. The following statement $x + y = z$ in 'C' language is:
(A) correct (B) invalid
(C) impossible (D) None of the above

8. The order in which actual arguments are evaluated in a function call is:
(A) from left to right (B) from right to left
(C) unpredictable (D) None of the above

9. Which of the following is true for the getche ( ) library function?
(A) It returns a character when a key is pressed.
(B) It returns a character when the enter key is pressed.
(C) It doesn't display a character on the screen.
(D) It displays a character on the screen.

10. The following declaration float (**A*) (void *,void *) means:
(A) *A* is function returning a pointer to a float that has two void * arguments.
(B) *A* is a pointer to a function with float as the arguments.
(C) *A* is a function with void * as arguments and returns float pointer.
(D) *A* is a function that has two void * arguments and returns float.

Linked Answer Questions 11 and 12:
Consider the following recursive function:

```
A(m, n)
{
if (m = = 0)
return n + 1;
else if (n = = 0)
A (m - 1, 1);
else
A(m - 1, A(m, n - 1));
}
```

11. What is the value returned when *A* (1, 1) is called:
(A) 2 (B) 3
(C) 4 (D) 5

12. The number of function calls when *A* (1, 1) is called:
(A) 2 (B) 3
(C) 4 (D) 5

13. Pointers are of unsigned:
(A) integer data type (B) character data type
(C) float data type (D) None of the above

Common Data Questions 14 and 15:
Consider the following program segment:

```
int x[3] [5] = {
{1, 2, 3, 4, 5}
{6, 7, 8, 9, 10},
{11, 12, 13, 14, 15}}
int *n = &x;
```

14. The value of *(*(*x* + 1) + 3) is:
(A) 7 (B) 8
(C) 9 (D) None of the above

15. The value of *(*n* + 5) + 1 is:
(A) 7 (B) 5
(C) 3 (D) None of the above

16. Consider the declaration char *A* (int (*) (char, float)) int *B*(char, float)

Which of the following function invocation is valid?
(A) *A* (**B*) (B) *A* (&*B*)
(C) *A* (*B*) (D) None of the above

17. The expression
6 – 2 + 3 – 4 * 2 will evaluate to –1 if
(A) – is left associative and – has precedence over *
(B) – is right associative and – has precedence over *
(C) – is right associative and * has precedence over –
(D) None of the above

18. Which of the following is not the functionality of pre processing?
(A) Macro substitution
(B) Conditional compilation
(C) Inclusion of named files
(D) None of the above

19. Consider the program segment:

```
int x = 10;
A( )
{
int x = 20;
B ( );
}
B( )
{
printf ("%d", x);
}
main ( )
{
A ( )
}
```

What is the out put of above program
(A) 10
(B) 20
(C) prints 10 or 20 (depends on compiler)
(D) compilation error

20. Consider the program segment:

```
int x = 40;
A ( )
{
int y = 60;
B ( );
}
B ( )
{
printf('%d", x);
}
main ( )
{
int x = 50;
A( ) ;
}
```

The output of the above program is:
(A) 40 (B) 50
(C) 60 (D) Compilation error

21. In the above code given in Q. 20, if the above language implements Dynamic scoping then output of the above code is:
(A) 40
(B) 50
(C) 60
(D) None of these

22. Consider the following program:

```
int k;
k = n; // 'n' is some integer
while (k > 0)
k = k/2;
```

The number of comparisons made in the execution of the loop is:
(A) $[\log_2 n]$ (B) $1 + [\log_2 n]$
(C) n (D) $\left[\log\left(\frac{n}{2}\right)\right]+1+1$

23. Consider the following program:

```
A (int x, int y)
{
if (x > = y)
return [1 + A(x – y, y)];
else
return 0;
}
```

What is the functionality of above routine *A*( )?
(A) It returns the number of function calls
(B) It performs the subtraction between two numbers (*x* and *y*).
(C) It performs division of the two given numbers (*x* and *y*).
(D) It returns the greater value among the two numbers (*x* and *y*).

24. What does the following fragment of C-program print;
char* *s* = "TIME = HYD";
char* *p* = *s;*
printf ("%u %u", *p*, *s*);
(A) 2000 2006
(B) 2006 2008
(C) 2010 TIME HYD
(D) 2000 2000

25. Consider the following program segment:

```
main ( )
{
static char a[3] [4] = {"time",
   "gate", "2015"}
putchar (**a);
}
```

What will be the output of above program?
(A) prints time
(B) prints gate
(C) prints 2015
(D) None of the above

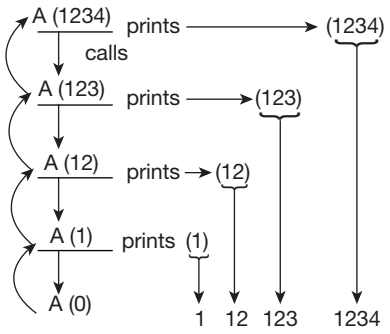
Answer Keys

1. C	**2.** D	**3.** A	**4.** D	**5.** B	**6.** D	**7.** B	**8.** C	**9.** A	**10.** D
11. B	**12.** C	**13.** A	**14.** C	**15.** A	**16.** C	**17.** C	**18.** D	**19.** A	**20.** A
21. B	**22.** B	**23.** C	**24.** D	**25.** D					

Hints and Explanations

1. 'Dynamic checking is performed before the execution.
Choice (C)

5.

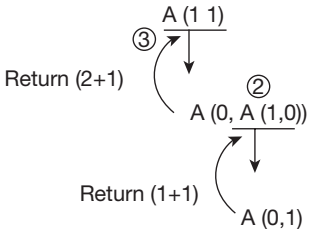


Choice (B)

6. It returns the string length i.e., 4. Choice (D)

7. Left side of assignment operator (=) could not be an expression. Choice (B)

11.

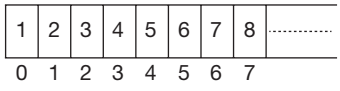


Choice (B)

12. From the above, the function calls are 4.
Choice (C)

14. *(*(*x* + 1) + 3)
This is equivalent to *x*[1] [3], which is 9. Choice (C)

15. * (*n* + 5) + 1



The above pointer expression maps to *n*[6] in memory location which is 7. Choice (A)

16. The function '*A*' means *A* is a function (returning character) whose only argument is a pointer to a function that takes a character and float as arguments and returns as integer. The name of a function can be used as the starting address of the function (i.e., pointer to it).
Choice (C)

17. $6 - 2 + 3 - 4 * 2$
$= 6 - 2 + 3 - 8$
$= 6 - 2 + (-5)$
$= 6 - 2 - 5$
$= 6 - 7 = -1.$ Choice (C)

19. The given program is in 'C' language, it implements static scoping.
When *A*( ) is called which calls *B*( ) it will check the *'x'*, values in *B*( ). As it is not present, it checks for the *'x'* values out of the *B*( ) and it will print *x* as '10'.
Choice (A)

20. As 'C' language implements static scoping, when *A*( ) is called, which will call *B*( ) which has to print *'x'*, first it will check in *B*( ) for the *'x'* value then it goes out of the *B*( ) (global section) and prints 40. Choice (A)

21. If dynamic scoping is implemented, when *B*( ) wants to print *'x'* it, first checks for *'x'* in *B*( ) as it is not present, it checks in the function from where it is called (i.e., in *A*( ))
$\therefore$ It prints 50. Choice (B)

22. Here '*k*' value is *n* from the loop, '*k*' values will be:

$$n, \frac{n}{2}, \frac{n}{4}, \frac{n}{8}, \ldots, 1$$

let the loop is iterated for '*t*' times as the sequence is in G.P. then t^{th} term will be 1.

$$\therefore \quad n\left(\frac{1}{2}\right)^{t-1} = 1 = \frac{1}{n}$$

$2^{t-1} = n$
$(t-1)\log_2 2 = \log_2 n$
$t - 1 = \log_2 n$
$t = 1 + \log_2 n$ Choice (B)

23. The function A( ) returns Quotient.
i.e., it performs division among the two given numbers.
Choice (C)

24. Both *p* and *s* points to same address, prints same values. Choice (D)

25. **a will map to 1st character in the array it prints '*t*'.
Choice (D)