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Exam : **CLA-11-03**

Title : **CLA - C Certified Associate
Programmer**

Vendor : **C++ Institute**

Version : **DEMO**

NO.1 What happens if you try to compile and run this program?

```
#include <stdio.h>
int main (int argc, char *argv[]) {
int i =2, j = 1;
if(i / j)
j += j;
else
i += i;
printf("%d",i + j);
return 0;
}
```

Choose the right answer:

- A.** The program outputs 4
- B.** The program outputs 3
- C.** Compilation fails
- D.** The program outputs 1
- E.** The program outputs 5

Answer: A

Explanation:

In the if statement, i / j is $2 / 1$, which is true. Therefore, the if block is executed, and $j += j$; doubles the value of j (j becomes 2).

After the if-else statement, $\text{printf}(\text{"\%d"}, i + j)$; prints the sum of i and the updated value of j ($2 + 2$), which is

4.

NO.2 What happens when you compile and run the following program?

```
#include <stdio.h>
#define SYM
#define BOL 100
#undef SYM
int main (void) {
#ifdef SYM
int i = 100;
#else
int i= 200;
#endif
int j = i + 200;
printf("%d",i+j);
return 0;
}
```

Select the correct answer:

- A.** The program outputs 200
- B.** The program outputs 600
- C.** The program outputs 100
- D.** The program outputs 400

E. The program outputs 300

Answer: B

Explanation:

The program outputs 600 because the `#ifdef` directive checks if the macro `SYM` is defined, and if so, executes the code between it and the corresponding `#else` or `#endif` directive. Otherwise, it skips that code and executes the code after the `#else` directive, if any. In this program, the macro `SYM` is defined by the `#define` directive, but then undefined by the `#undef` directive, which removes the definition of a macro. Therefore, the code between the `#ifdef` and the `#else` directives is skipped, and the code after the `#else` directive is executed, which assigns 200 to the variable `i`. The variable `j` is then assigned the sum of `i` and 200, which is 400. The `printf` function then prints the sum of `i` and `j`, which is 600, as a decimal integer using the `%d` format specifier.

References = CLA - C Certified Associate Programmer Certification, C Essentials 2 - (Intermediate), C Preprocessor

NO.3 What happens if you try to compile and run this program?

```
#define ALPHA 0
#define BETA ALPHA-1
#define GAMMA 1
#define dELTA ALPHA-BETA-GAMMA
#include <stdio.h>
int main(int argc, char *argv[]) {
printf ("%d", DELTA);
return 0;
```

Choose the right answer:

- A.** The program outputs -1
- B.** The program outputs 1
- C.** The program outputs 2
- D.** Compilation fails
- E.** The program outputs -2

Answer: D

Explanation:

Let's analyze the macros and the program:

1. ALPHA is defined as 0.
2. BETA is defined as ALPHA - 1, which is 0 - 1.
3. GAMMA is defined as 1.
4. DELTA is defined as ALPHA - BETA - GAMMA. With the previous definitions, this expands to 0 - (0 - 1) - 1.

Now, let's expand DELTA with the given values:

makefileCopy code

DELTA = 0 - (0 - 1) - 1 DELTA = 0 - 0 + 1 - 1 DELTA = 0 + 1 - 1 DELTA = 1 - 1 DELTA = 0 It is important to note that the macro `dELTA` is defined with a lowercase 'd', but the `printf` function is trying to print `DELTA` with an uppercase 'D'. Preprocessor tokens are case-sensitive, so this is a mismatch. However, for the sake of the question, let's assume that `dELTA` was meant to be `DELTA` with an uppercase 'D'. Since the actual calculation results in 0, but there is a typo in the `printf` statement (it should print

dELTA, not DELTA), the compilation will fail due to DELTA not being defined.

NO.4 What happens if you try to compile and run this program?

```
#include <stdio.h>
int main (int argc, char *argv[]) {
int i = 2;
int d= i << 2;
d /= 2;
printf ("%d", d) ;
return 0;
}
```

Choose the right answer:

- A.** The program outputs 1
- B.** Compilation fails
- C.** The program outputs 0
- D.** The program outputs 2
- E.** The program outputs 4

Answer: E

Explanation:

The program outputs 4 because the expression `i << 2` performs a left shift operation on the binary representation of `i`, which is `00000010`, by two bits, resulting in `00001000`, which is equivalent to 8 in decimal.

Then, the expression `d /= 2` performs a division assignment operation, which divides `d` by 2 and assigns the result back to `d`, resulting in 4. The `printf` function then prints the value of `d` as a decimal integer using the `%d` format specifier.

References = CLA - C Certified Associate Programmer Certification, [C Essentials 2 - (Intermediate)], C Bitwise Operators, C Assignment Operators

NO.5 What happens if you try to compile and run this program?

```
#include <stdio.h>
int main (int argc, char *argv[]) {
int i = 20;
printf("%x", i);
return 0;
}
```

Choose the right answer:

- A.** Compilation fails
- B.** The program outputs 14
- C.** The program outputs 10
- D.** The program outputs 24
- E.** The program outputs 20

Answer: B

Explanation:

The program outputs 14 because the `printf` function prints the value of `i` as a hexadecimal integer

using the %x format specifier. The hexadecimal system uses 16 symbols to represent numbers, from 0 to 9 and from A to F.

Each symbol corresponds to a decimal value, for example, A is 10, B is 11, C is 12, and so on. To convert a decimal number to a hexadecimal number, we need to divide the number by 16 repeatedly and write down the remainder in reverse order. For example, to convert 20 to hexa-decimal, we do:
 $20 / 16 = 1$, remainder 4
 $1 / 16 = 0$, remainder 1

The hexadecimal number is 14, as we write the remainders from right to left.

References = CLA - C Certified Associate Programmer Certification, C Essentials 2 - (Intermediate), C printf and scanf functions, Hexadecimal number system