

1. Which arithmetic expression and assignment are incorrectly derived from the following equations:

$$\frac{C}{5} = \frac{R}{4} = \frac{F-32}{9} = \frac{K-273.15}{5}$$

- 1) $C = K-273.15$
 - 2) $R = (K-273.15)/5*4$
 - 3) $K = (F-32)*(5/9)+273.15$
 - 4) $F = R*9/4-32$
 - 5) $C = (F-32)/9*5$
2. Which one gives a different Boolean value from the others?
- 1) True or False and False
 - 2) not True and False or False
 - 3) False or True and True
 - 4) True and False or not not True
 - 5) Cannot determine because some of the above Boolean expressions have syntax error.

3. Which choice correctly find the maximum of four numbers?

1)

```
def max_of_four(a,b,c,d):
    if a > b and c > d:
        if a > c:
            return a
        else:
            return c
    else:
        if b > d:
            return b
        else:
            return d
```

2)

```
def max_of_four(a,b,c,d):
    max = a
    if b > max:
        max = b
    if c > max:
        max = c
    if d > max:
        max = d
    return max
```

3)

```
def max_of_four(a,b,c,d):
    max = a
    if b > max:
        max = b
    elif c > max:
        max = c
    elif d > max:
        max = d
    return max
```

4)

```
def max_of_four(a,b,c,d):
    if a > b and a > c and a > d:
        return a
    else:
        if b > c and b > d:
            return b
        else:
            if c > d:
                return c
    return d
```

5)

```
def max_of_four(a,b,c,d):
    if not(a < b and a < c and a < d):
        return a
    elif not(b < c and b < d):
        return b
    elif not(c < d):
        return c
    else:
        return d
```

4. Which choice correctly calls the following function to find the maximum of four numbers?

```
1: def max2(a,b):
2:     max = a
3:     if b > max:
4:         max = b
5:     return max
```

- 1) `max2(max2(a,b),max2(c,d))`
- 2) `max2(a,max2(b,max2(c,d)))`
- 3) `max2(max2(max2(a,b),c),d)`
- 4) `max2(a,max2(max2(b,d),c))`
- 5) All of the above are correct.

5. Which choice does not check whether `i` is an even number?

- 1) `i%2 == 0`
- 2) `i%2 != 1`
- 3) `not i%2 <= 0`
- 4) `not i%2 != 0`
- 5) `not i%2 > 0`

6. What is the result of the following code fragment?

```
1: import math
2: print(f"{21/5-21%5**1-0}")
```

- 1) 3
- 2) 3.2
- 3) 4
- 4) `{21/5-21%5**1-0}`
- 5) `ValueError: Invalid format specifier`

7. Which of the following choices does not contain Python reserved words (keywords)?

- 1) elif/if/else
- 2) import/from
- 3) def/return
- 4) true/false
- 5) not/and/or

8. What is the output of following code fragment?

```
1: m = 5/2
2: n = 10//2.0
3: o = 16%5
4: print(m+n)
```

- 1) 7.0
- 2) 7.5
- 3) 8
- 4) 8.5
- 5) m+n

9. From the variables declared below, which expression gives **True** value?

```
1: m = 5
2: n = "Hel"
3: i = "HelHel"
4: p = 8
5: q = 3
```

- 1) (q > 0) and (q < m-p)
- 2) not (n == i) and not (p>0)
- 3) not (m > n)
- 4) (p>0) or not (p<=0) or (n*q == n+i)
- 5) length(n+i) and q**2

10. What is the output of the following code fragment?

```
1: def me(m):
2:     if (m < 0):
3:         print("level 1")
4:     elif (m < 15):
5:         print("level 2")
6:     elif (m < 50):
7:         print("level 3")
8:     elif (m < 60):
9:         print("level 4")
10:    elif (m == 0):
11:        print("level m")
12: n = 0
13: me(m=n)
```

- 1) level 1
- 2) level 2
- 3) level 3
- 4) level 4
- 5) level m

11. What is the output of following code fragment?

```
1: def increaseM(m):
2:     m = m + 1
3:     return m
4:     print(m)
5:
6: m = 9
7: print(m)
8: increaseM(m)
9: print(m)
```

- 1) 9
9
- 2) 9
10
- 3) 9
10
9
- 4) 9
9
9
- 5) 9
10
10

12. What is the result of following code fragment?

```
1: def f(x):
2:     if x < 0:
3:         return x**2+1
4:     elif x > 0:
5:         return x-1
6:     else:
7:         return x+1
8:
9: def g(m):
10:    if m <= 0:
11:        return 0
12:    else:
13:        return m
14:
15: x = f(g(-1))+f(g(0))+f(1)+f(g(2))
16: print(x)
```

- 1) 2
- 2) 3
- 3) 4
- 4) 5
- 5) NameError: name 'm' is not defined

13. What is the result of following code fragment?

```
1: def cp(a,b,c):
2:     return a*2 + b + c*3
3: m = 0
4: n = 1
5: p = 2
6: x = cp(b=p,a=n,c=m)
7: print(x)
```

- 1) 4
- 2) 5
- 3) 6
- 4) 7
- 5) There is a syntax error.

14. What is the output of this arithmetic expression?

```
2 ** 3 ** 2 // 10 + 123 % 2
```

- 1) 1
- 2) 7
- 3) 7.4
- 4) 52
- 5) 52.2

15. What is the printout of the following code fragment?

```
1: val1 = 'one'
2: val2 = 'all'
3: print('{val1}' + int('4')*val2)
```

- 1) one4all
- 2) oneallallallall
- 3) {val1}allallallall
- 4) {val1}val2val2val2val2
- 5) This programming part gives error.

16. What is the printout of the following code fragment?

```
1: a = 14
2: mark = True
3: if ((a > 4) and not mark):
4:     print('Ant')
5:     if (mark or 25 < a):
6:         print('Bee')
7: else:
8:     if (not(5 < a or a > 40)):
9:         print('Cat')
10:    if (a != 4 and a == 14):
11:        print('Dog')
```

- 1) Ant
- 2) Ant
Bee
- 3) Cat
- 4) Cat
Dog
- 5) Dog

17. What is the output of the following code fragment?

```
1: def f1(a,b):
2:     return a + b, a // b
3:
4: def f2(a,b):
5:     return a - b, a / b
6:
7: x = float('7.0')
8: y = int('3')
9: if x%y > 1:
10:    x,y = f1(x,y)
11: else:
12:    x,y = f2(x,y)
13: print(f'{x:.2f},{y:.2f}')
```

- 1) 4.00,2.00
- 2) 4.00,2.33
- 3) 10.00,2.00
- 4) 10.00,2.33
- 5) The code fragment gives error in line 12.

18. What is the output of the following code fragment?

```
1: def foo1(y):
2:     x = y + 8
3:
4: def foo2(x,y):
5:     y = x + 2
6:     return y
7:
8: x = 3
9: y = 5
10: foo1(x)
11: print(x)
12: x = foo2(y=x,x=y)
13: print(x)
```

- 1) 3
7
- 2) 13
7
- 3) 13
15
- 4) 3
5
- 5) The code fragment gives error in line 12.

19. What is the printout of the following code fragment?

```
1: import math
2: check = True
3: x = 25
4: y = 10
5: if (x < 30 and check):
6:     check = False
7:     print(f'{math.ceil(math.pi):.2f}')
8: if (y > 10 or check):
9:     print(f'{math.log(math.e)}')
10: else:
11:     print(f'{math.log10(100):.2f}')
```

- 1) 3.00
- 2) 4.00
- 3) 4.00
1.00
- 4) 4.00
2.00
- 5) 4.00
10.00

20. Which code fragment prints **12** as value of area?

A:

```
def compute_area(weight,height):
    return weight*height

w = 3
h = 4
area = compute_area(w,h)
print(area)
```

B:

```
def compute_area(w,h):
    w*h

w = 3
h = 4
area = compute_area(w,h)
print(area)
```

C:

```
def compute_area(w,h):
    return weight*height

weight = 3
height = 4
area = compute_area(w,h)
print(area)
```

D:

```
def compute_area(w,h):
    return weight*height

weight = 3
height = 4
area = compute_area(weight,height)
print(area)
```

- 1) A
- 2) B
- 3) A and D
- 4) A, C and D
- 5) None of above choices is correct.

21. Which choice gives the highest value?

- 1) `math.pow(2,abs(-15))`
- 2) `math.pow(2,math.sin(math.pi/2))`
- 3) `math.pow(2,math.pow(2,math.pow(2,3)))`
- 4) `math.pow(2,-math.pow(2,3))`
- 5) `math.pow(math.pow(2,3),2)`

22. Which statement causes an error?

- 1) `print('sin(30) is equal {1/2}')`
- 2) `print(f'PI is equal {3.14159>.2f}')`
- 3) `print(f""""I love Python.""")`
- 4) `print('{ "I am" } a student.')`
- 5) None of the above choices.

23. Which statement causes an error?

- 1) `x = print(True)`
- 2) `x = input("1/0")`
- 3) `x = int("0.0")`
- 4) `x = float("0.0")`
- 5) None of the above choices.

24. Which statement causes an error?

- 1) `True = 1`
- 2) `Python = 1`
- 3) `math = 1`
- 4) `pi = 1`
- 5) All of the above choices.

25. Which choice can be filled in the blanks (A) and (B) to make the code fragment calculate $\sqrt{3^2 + 4^3}$?

```
1: from math import sqrt
2:
3: def calculate(__ (A) __):
4:     return sqrt(x**2+y**3)
5:
6: a,b = 4,3
7: print(calculate(__ (B) __))
```

- 1) A: x,y
B: a,b
- 2) A: x,y
B: b,a
- 3) A: x=b,y=a
B: b,a
- 4) A: y,x
B: y=b,x=a
- 5) Both choices 2) and 3) are correct.

26. Which choice can be filled in the blanks (A) and (B) to make the code fragment run correctly?

```
1: __ (A) __
2: r = float(input("radius: "))
3: __ (B) __
4: print(area)
```

- 1) A: `import math`
B: `area = pi*pow(r,2)`
- 2) A: `from math import pi`
B: `area = pi*math.pow(r,2)`
- 3) A: `from math import pow`
B: `area = math.pi*pow(r,2)`
- 4) A: `import math`
B: `area = math.pi*pow(r,2)`
- 5) All of the above choices.

27. What is the output of the following statement?

```
print(4*20/8%7-2**3)
```

- 1) -5.0
- 2) 1.0
- 3) 10.0
- 4) 26.0
- 5) 72.0

28. Which choice is equivalent to the following code fragment?

```
1: if a+b > 10:
2:     if b-c < 12:
3:         print('A')
4:     else:
5:         print('B')
```

- 1)

```
if a+b > 10 and b-c < 12:
    print('A')
else:
    print('B')
```
- 2)

```
if a+b > 10 or b-c < 12:
    print('A')
else:
    print('B')
```
- 3)

```
if a+b > 10:
    print('A')
elif b-c < 12:
    print('B')
```
- 4)

```
if a+b > 10:
    print('A')
elif a+b > 10 and b-c < 12:
    print('B')
```
- 5)

```
if a+b > 10 and b-c < 12:
    print('A')
elif a+b > 10:
    print('B')
```

29. Which statement cannot be filled in the blank (A)?

```
1: def func(x,y,z):
2:     tmp = x
3:     x = y/z
4:     z = tmp**2
5:     return z,y,x
6:
7: _____ (A)
```

- 1) `print(func(z=3,y=4,x=5))`
- 2) `print(func(7,6,6))`
- 3) `print(func(2,4,func(3,5,8)))`
- 4) `z,x,y = func(7,12,5.5)`
- 5) All of the above choices are correct.

30. Which arithmetic expression gives 32 as a result?

- 1) `2**4`
- 2) `2(4*2+4*2)`
- 3) `(2+2+2*2**2*2-2*2)*2`
- 4) `(2+4*(4+8))/2-4`
- 5) `2*((30%4)+(3**2))`

31. Given the following variable assignments:

```
a,b,c = 5,2,True
```

Which variable has **False** value?

```
W = a*b+4 > b*14/2
X = c or ((a+b)*2 == 14)
Y = a == 5 and 16/4 != b and not c
Z = (W or X) and Y == W
```

- 1) W
- 2) W and X
- 3) W and Y
- 4) W, X, and Y
- 5) W, X, Y, and Z

32. Which choice will NOT give the same output shown below if we enter **10** as the input?

```
Parking Fee
Hour? 10
250 Baht.
```

- 1)

```
print('Parking Fee')
hour = int(input('Hour? '))
fee = hour*25
print(f'{fee} Baht.')
```
- 2)

```
print('Parking Fee')
print('Hour? ')
hour = int(input())
fee = hour*25
print(f'{fee} Baht.')
```
- 3)

```
def calc_fee(h):
    return h*25
print('Parking Fee')
hour = int(input('Hour? '))
print(f'{calc_fee(hour)} Baht.')
```
- 4)

```
def calc_fee(h):
    print(f'{h*25} Baht.')
```

```
print('Parking Fee')
hour = int(input('Hour? '))
calc_fee(hour)
```
- 5)

```
print('Parking Fee')
hour = int(input('Hour? '))
if hour < 0:
    print(hour*25, 'Baht.')
```

```
else:
    print('No need to pay')
```

Use the following code fragment to answer the next

2 questions.

Blank (A) requires the correct statement to make the program run correctly.

```

1: TAX = 10
2: discount = 0.2
3:
4: def calc_discount(total):
5:     if total >= 500:
6:         total = total*(1-discount)
7:     return total
8:
9: def ____ (A) ____:
10:    print(f'{i}: {p:.2f} baht.')
11:    total = a*p*((100+TAX)/100)
12:    return calc_discount(total)
13:
14: item = input('Item? ')
15: price = float(input('Price? '))
16: amount = int(input('How many? '))
17: total = calc(item,price,amount)
18: print(f'Total is {total:.2f} baht')
```

Example output:

```

Item? Soda
Price? 20
How many? 12
Soda: 20.00 baht.
Total is 264.00 baht.
```

33. What should be put in the blank (A)?

- 1) calc_total(item,price,amount)
- 2) calc(item,price,amount)
- 3) calc_total(i,p,a)
- 4) calc(i,p,a)
- 5) None of the above choices is correct.

34. How to change code of the above program to print 20% discount of total value when we give the same input as given example?

- 1) Change line 2 to

```
discount = 0.8
```

- 2) Change line 12 to

```
return total
```

- 3) Change line 5 to

```
if total >= 250:
```

- 4) Change line 18 to

```
print(f'Total is {total*TAX} baht')
```

- 5) None of the above choices is correct.

35. What is the output of the following program?

```

1: def func(x,y):
2:     x = x*10
3:     y = y*10
4:     return y-x
5:
6: x,y = 1,2
7: y = func(3,4)
8: print(f'{x},{y}')
```

- 1) 1,2
- 2) 1,10
- 3) 1,40
- 4) 30,10
- 5) 30,40

Use the following program to answer the next 3 questions.

```

1: x = 15
2: p,q,r,t = 0,0,0,0
3: if x%3 == 0:
4:     p = 1
5: elif x%5 == 0:
6:     q = 1
7: if x%7 == 0:
8:     r = 1
9: t = 1
10: print(p,q,r,t)
```

36. Which lines of boolean expression get evaluated?

- 1) line 3 then line 7
- 2) line 3 then line 5
- 3) line 3
- 4) line 3 then line 5 then line 7
- 5) line 5 then line 7

37. What is the output of the program?

- 1) 1 1 1 1
- 2) 1 1 0 1
- 3) 1 1 0 0
- 4) 1 0 0 1
- 5) 1 0 0 0

38. If the keyword **if** in line 7 is changed to **elif**, which lines of boolean expression get evaluated?

- 1) line 3 then line 7
- 2) line 3 then line 5
- 3) line 3
- 4) line 3 then line 5 then line 7
- 5) line 5 then line 7

39. Which of the following expressions correctly represents the arithmetic expression $\frac{\sqrt{-D}}{2a}$?

A: `(-D**0.5)/(2*a)`

B: `(-D)**0.5/(2*a)`

C: `math.sqrt(-D)/2*a`

- 1) Only A
- 2) Only B
- 3) Only C
- 4) A and C
- 5) B and C

40. Which statement is correct for the following program?

```
1: def foo(x):
2:     x = x+1
3:     y = x*z
4:     return y*10
5:
6: z = 5
7: p = foo(2)
8: print(p,y)
```

- A: There is an error in line 2 because assigning a new value to the function's parameter `x` is not allowed.
- B: There is an error in line 3 because the variable `z` is referenced but not defined.
- C: There is an error in line 8 because the variable `y` is referenced but not defined.

- 1) Only A
- 2) Only B
- 3) Only C
- 4) A and C
- 5) B and C

41. Which choice is a valid statement in Python?

- 1) `false = True`
- 2) `return = 10`
- 3) `March-2019 = 'third month this year'`
- 4) `12_miles = "12 miles"`
- 5) `US$_per_hours = 10.25`

42. Which values of `i` and `j` give the value of `passed` to be `False`, where

`passed = i/j**3-2<10 or math.sqrt(i*j)>=20`

- 1) `i=10` and `j=20`
- 2) `i=20` and `j=10`
- 3) `i=20` and `j=5`
- 4) `i=20` and `j=1`
- 5) `i=1` and `j=20`

43. What is the correct code fragment to calculate the area of a regular polygon given by the formula:

$$area = \frac{s^2 n}{4 \tan\left(\frac{180^\circ}{n}\right)}$$

where

`s` is the length of any side

`n` is the number of sides

`tan` is the tangent function calculated in degrees

- 1)

```
import math
n=int(input())
s=float(input())
area=(s**2*n)/(4*math.tan(180/n))
```
- 2)

```
import math
n=int(input())
s=float(input())
area=(s**2*n)/(4*math.tan(math.pi/n))
```
- 3)

```
import math
n=int(input())
s=float(input())
area=(s**2n)/(4math.tan(math.pi/n))
```
- 4)

```
from math import tan
n=int(input())
s=float(input())
area=(s**2*n)/(4*tan(180/n))
```
- 5) None of the above choices is correct.

44. In the quadratic equation solving method, given the following subroutine:

```
1: def read_coefficients():
2:     a=float(input('1st coefficient: '))
3:     b=float(input('2nd coefficient: '))
4:     c=float(input('3rd coefficient: '))
5:     return a,b,c
```

Which choice correctly calls the `read_coefficients()` subroutine?

- 1) `read_coefficients(a,b,c)`
- 2) `a,b,c = read_coefficients(a,b,c)`
- 3) `a,b,c = read_coefficients()`
- 4) `a,b,c = read_coefficients(c=c,b=b,a=a)`
- 5) `read_coefficients(c=c,b=b,a=a)`

45. Which code fragment gives the exact same result as the following code fragment?

```

1: mark = int(input('Enter mark: '))
2: if mark >= 80:
3:     grade = 'A'
4: else:
5:     if mark >= 65:
6:         grade = 'B'
7:     else:
8:         if mark >= 50:
9:             grade = 'C'
10:        else:
11:            grade = 'D'
12: print(grade)

```

1)

```
mark = int(input('Enter mark: '))
if mark >= 80:
    grade = 'A'
elif mark >= 65:
    grade = 'B'
elif mark >= 50:
    grade = 'C'
else:
    grade = 'D'
print(grade)
```

2)

```
mark = int(input('Enter mark: '))
if mark < 50:
    grade = 'D'
elif mark < 65:
    grade = 'C'
elif mark < 80:
    grade = 'B'
else:
    grade = 'A'
print(grade)
```

3)

```
mark = int(input('Enter mark: '))
if mark <= 50:
    grade = 'D'
elif mark <= 65:
    grade = 'C'
elif mark <= 80:
    grade = 'B'
else:
    grade = 'A'
print(grade)
```

- 4) Both choices 1) and 2) are correct.
 5) Both choices 1) and 3) are correct.

Use the following code fragment to answer the next 2 questions.

```

1: def test(x,y):
2:     x = x + y
3:     y = y + 1
4:     print(x,y)
5:
6: test(2,1)

```

46. What is the output of the above code fragment?

- 1) 1 3
 2) 2 3
 3) 3 2
 4) 3 3
 5) The code fragment has an error because x and y are not defined.

47. What is the output of the above code fragment if the last line is changed to:

```
6: test(y=2,x=1)
```

- 1) 1 3
 2) 2 3
 3) 3 2
 4) 3 3
 5) The code fragment has an error because x and y are not defined.

48. Which choice is not a logical expression?

- 1) True == False
 2) 5 == 7
 3) 5 >= 7
 4) "True" != "False"
 5) x = 7

49. What is the result of the following code fragment, when y is 300?

```
print(y//2%3//2)
```

- 1) 0
 2) 1
 3) 2
 4) 3
 5) 6

50. What is the result of the following code fragment?

```
X = 16-2*5//3+1
print(X)
```

- 1) 11
 2) 14
 3) 21
 4) 24
 5) None of the above.

51. What is the result of the following code fragment?

```
y = 2**5+2*5<0
print(y)
```

- 1) 20
- 2) 32
- 3) 64
- 4) True
- 5) False

Use the following code fragment to answer the next 2 questions.

```
1: def func(a,b):
2:     if a+10 == b or a > b:
3:         print("Hello")
4:     elif a-5 == b:
5:         print("Bangkok")
6:     else:
7:         print("Thailand")
```

52. What is the result of `func(3,13)`?

- 1) Hello
- 2) Bangkok
- 3) Thailand
- 4) Hello Bangkok
- 5) Hello Thailand

53. What is the result of `func(7,10)`?

- 1) Hello
- 2) Bangkok
- 3) Thailand
- 4) Hello Bangkok
- 5) Hello Thailand

54. What is the result of the following code fragment?

```
1: val = 20
2:
3: def change_to_ten():
4:     val = 10
5:     val = val+1
6:
7: change_to_ten();
8: print(val)
```

- 1) 10
- 2) 11
- 3) 20
- 4) 21
- 5) None of the above.

55. Which code fragment produces error?

- 1)

```
"""
print("Hello "World")
"""
print("say hi!")
```
- 2)

```
print(input("Hello World: "))
```
- 3)

```
def myprint():
    print(a)
a = "Hello World"
myprint(a)
```
- 4)

```
a = print("Hello World")
print(a)
```
- 5)

```
print(print("Hello World"))
```

56. Which Python instruction could receive input from the user and assigns the floating point value to the variable `k`?

- 1) `k = input(float())`
- 2) `k = input()`
- 3) `k = float(input())`
- 4) `k = int(input())/1.0`
- 5) From the above 4 choices, there are more than one correct answer.

57. Which code fragment correctly represents the following mathematical equation?

$$y = \frac{\sin(3^\circ)}{|7x^7 + \sqrt[5]{31}|}$$

- 1)

```
from math import sin
a = sin(3*pi/180)
b = abs(7*x**7+31**(1/5))
y = a/b
```
- 2)

```
from math import sin,fabs,pow,pi
a = sin(3*180/pi)
b = fabs(7*pow(x,7)+31**1/5)
y = a/b
```
- 3)

```
from math import sin,fabs,pow,pi
a = sin(3)
b = fabs(7*pow(x,7)+pow(31,1/5))
y = a/b
```
- 4)

```
from math import sin,fabs,pow,pi
a = sin(3*pi)
b = fabs(7*pow(x,7)+pow(31,1/5))
y = a/b
```

- 5) None of the above choices is correct.

58. What is the output of the following code fragment?

```
1: def myf():
2:     y = 4
3:     z = y + x
4:     return z
5: x,y = 9,7
6: x = myf()
7: print(x,y)
```

- 1) 9 7
- 2) 9 4
- 3) 13 7
- 4) 13 4
- 5) None of the above choices is correct.

59. After the following code execution, which Boolean expression can be put in the blank (A) at line 3 that still let the value of variable c be True?

```
1: a,b = 15,15.0
2: c = True
3: if ____ (A) ____:
4:     c = False
5: print(c)
```

- 1) a == c
- 2) type(a) == type(b)
- 3) a == b and not c
- 4) not not c or b != a
- 5) From the above 4 choices, there are more than one correct answer.

60. Which input makes the following code fragment print the smallest value on the screen?

```
1: def f1(b):
2:     if b > a:
3:         return b
4:     else:
5:         return a*2
6:
7: def f2(b,a):
8:     if a+b > 10:
9:         return(f1(a))
10:    elif b-a < 0:
11:        return b
12:    if a < 0:
13:        return -a
14:    return a
15:
16: a = int(input())
17: print(f2(a,f1(f1(a))))
```

- 1) -3
- 2) -1
- 3) 1
- 4) 5
- 5) 7