- **Be sure to enter your student ID and your answers to questions on your answer sheet.**
- Do not turn this page until instructed to do so.
- There are 30 questions, worth 1 point each.
- Each question has only **one** correct answer.
- You must not communicate with other students during this test.
- No books, notes, or electronic devices are permitted. In other words, you are not allowed to use a dictionary on your mobile phone or other electronic devices. However, if you don't understand the meaning of a particular English word in this exam, please raise your hand and the instructor will explain the meaning of the English word to you.
- This is a 120-minute exam but you can finish the exam earlier than this 120-minute period.

1. (1 point) Consider the following program:

```
s="ECTOR"
t="GAWAIN"
x=len(str(s.isupper()))-t.find("A")
```

What is the **type** of `x` after this program is executed?

(A) `Boolean`

(B) `String`

(C) ★

`Integer`

(D) `None`

(E) `Float`

Solution.

---

2. (1 point) Consider the following incomplete program.

```
sum=0
for i in range(0,100):
    ???
```

The program is intended to sum all of the integers between 1 and 100 (inclusive). What should replace the three question marks to complete the program?

(A) `sum=sum+1`

(B) ★

```
sum=sum+i+1
```

(C) `sum+1=sum`

(D) `sum=sum+i`

Solution.

---

3. (1 point) For this problem, you should compose a function which accomplishes a given task using the available code blocks arranged in the correct functional order. *We ignore indentation for this problem.*

`find_max` should accept a `list` and return the value of the maximum item in the `list`. (`None` is always the lowest value in any numeric comparison, so you may use it as an initializer.)

```
def find_max(my_list):
```

1 `max_val = i`

2 `max_val = None`

3 `for i in range(len(my_list)):`

4 `if i > max_val:`

5 `max_val = my_list[i]`

6 `return max_val`

7 `for i in range(my_list):`

8 `if my_list[i] > max_val:`

9 `print(max_val)`

(A) 2, 3, 8, 1, 6

(B) 2, 7, 4, 5, 6

(C) 2, 3, 4, 1, 6

(D) ★ 2, 3, 8, 5, 6

(E) 3, 2, 8, 5, 9

Solution.

---

4. (1 point) How can the following mathematical equation be implemented as a Python expression? Assume `a`, `b`, and `sin` have already been defined.

$$a \sin(a^b - b)$$

(A) None of the other answers are correct.

(B) `a*sin(a^b - b)`

(C) `a sin(a**b - b)`

(D) ★

`a*sin(a**b - b)`

(E) `a*sin(b^a - b)`

Solution.

---

5. (1 point) Consider the following program:

```
x=3
a=5
if (a%3)==2:
    x=x**3
elif(a%3)==1:
    x=x**2
else:
    x=x**1
```

What is the **value** of `x` after this program is executed?

(A) `9`

(B) ★

`27`

(C) None of the other answers are correct.

(D) `3`

(E) `1`

Solution.

---

6. (1 point) Consider the following program:

```
x=0
for i in range(4,10):
    if i%3==0:
        x+=3
    elif i%2==0:
        x+=2
    else:
        x+=1
```

What is the **value** of `x` after this program is executed?

(A) `10`

(B) ★

`12`

(C) `11`

(D) `14`

(E) `13`

Solution.

---

7. (1 point) Evaluate the following expression:

```
[1,2]+[len("3")]
```

What value is produced?

(A) ★

```
[1,2,1]
```

(B) `[1,2,"3"]`

(C) `[1,2,1,2,1,2]`

(D) `[1,2,3]`

Solution.

---

8. (1 point) Consider the following program.

```
kay = 2
wart = 3

def knight(kay,wart):
    wart += 2
    kay += 3
    return wart + kay

wart = knight(kay, kay) + knight(wart, wart)
```

After it is run, what is the final **value** of `wart`?

(A) `5`

(B) ★ None of the other answers are correct.

(C) `2`

(D) `3`

Solution.

---

9. (1 point) Consider the following program:

```
a=3
b=4
if a==3:
    b=a
elif a==4:
    a=5
else:
    a=b
```

What is the **value** of a after this program is executed?

(A) `7`

(B) None of the other answers are correct.

(C) `4`

(D) ★

`3`

(E) `5`

Solution.

---

10. (1 point) Consider the following program.

```
s="ABCBA"
x=0
y=len(s)-1
while s[x]==s[y] and x<=y:
    x+=1
    y-=1
```

After it is run, what is the final **value** of `x`?

(A) ★

```
3
```

(B) `0`

(C) `1`

(D) `4`

(E) `2`

Solution.

---

11. (1 point) Consider the following program:

```
pi="3.14159"
e="2.71828"
x=pi*len(e)+pi
```

What is the **type** of `x` after this program is executed?

(A) `None`

(B) ★

`String`

(C) `Integer`

(D) `Boolean`

(E) `Float`

Solution.

---

12. (1 point) Consider the following program:

```
x="KING ARTHUR-MORGANA LEFAY-SIR BEDIVERE".split("-")
y=x[:]
y.reverse()
```

What is the **value** of `x` after this program is executed?

(A) `['KING', 'ARTHUR-MORGANA', 'LEFAY-SIR', 'BEDIVERE']`

(B) `['SIR BEDIVERE', 'MORGANA LEFAY', 'KING ARTHUR']`

(C) ★

`['KING ARTHUR', 'MORGANA LEFAY', 'SIR BEDIVERE']`

(D) `None`

(E) `['BEDIVERE', 'LEFAY-SIR', 'ARTHUR-MORGANA', 'KING']`

Solution.

---

13. (1 point) What is the result of the following expression?

```
[ 1, 2, 3 ] * 3.0
```

(A) `[1.0, 2.0, 3.0, 1.0, 2.0, 3.0, 1.0, 2.0, 3.0]`

(B) ★

`[1, 2, 3, 1, 2, 3, 1, 2, 3]`

(C) `None of the above.`

(D) `[3.0, 6.0, 9.0]`

(E) `[3, 6, 9]`

Solution.

---

14. (1 point) Consider the following program:

```
s="-B-O-R-S-"
x=s.split("-")[2:-2]
```

What is the **value** of `x` after this program is executed?

(A) `'ORS'`

(B) `''`

(C) `False`

(D) `None`

(E) ★

```
['O', 'R']
```

Solution.

---

15. (1 point) Consider the following program.

```
def artificing(s):
    return s+"%i" % 2
    return s*2
    return s

s=artificing("MERLIN")
```

After it is run, what is the final **value** of s?

(A) `None`

(B) `0`

(C) `"MERLINMERLIN"`

(D) ★

`"MERLIN2"`

(E) `"MERLIN%i"`

Solution.

---

16. (1 point) Consider the following program.

```
x=[]
for j in range(0,5):
    if (j%4)==0:
        x.append("-")
    if (j%5)==0:
        x.append("*")
```

After it is run, what is the final **value** of `x`?

(A) ★

```
["-","*","-"]
```

(B) None of the other answers are correct.

(C) `["-","-","*"]`

(D) `["-","*"]`

(E) `["-","*","*"]`

Solution.

---

17. (1 point) Consider the following program:

```
a=["merlin","sir agravaine","king pellinore"]
b=[ ]
for i in range(0,3):
    b.append(a[0-i].title())
```

What is the **value** of b after this program is executed?

(A) `[ ]`

(B) `['Sir Agravaine', 'King Pellinore']`

(C) `['King Pellinore', 'Sir Agravaine']`

(D) `['King Pellinore', 'Sir Agravaine', 'Merlin']`

(E) ★

`['Merlin', 'King Pellinore', 'Sir Agravaine']`

Solution.

---

18. (1 point) Consider the following program:

```
x=[1,2,3]
def f(a):
    s=""
    a.append(4)
    for i in a:
        s+=str(i)
    return s

x.append(f(x))
```

What is the **value** of `x` after this program is executed?

(A) ★

```
[1, 2, 3, 4, '1234']
```

(B) `[1, 2, 3, '123']`

(C) `[1, 2, 3, 10]`

(D) `[1, 2, 3]`

(E) `[1, 2, 3, '1234']`

Solution.

---

19. (1 point) Consider the following program:

```
a=["S","T","U","P","E","F","Y"]
a=a[0:4]
a.sort()
x=""
for e in a:
    x=e+x
```

What is the **value** of `x` after this program is executed?

(A) None of the other answers are correct.

(B) ★

`"UTSP"`

(C) `"PSTU"`

(D) `"STUP"`

(E) `"PUST"`

Solution.

---

20. (1 point) Consider the following incomplete Python program.

```
s="".join(["2","2","0","1"])
x=0
for i in range(len(s)-1):
    x+=int(???)
```

What should replace the three question marks so the resulting value of `x` is 43?

(A) `s[i:i-1]`

(B) `s[i+1:i+2]`

(C) `s[i:i+1]`

(D) ★

```
s[i:i+2]
```

Solution.

---

21. (1 point)

```
x=str(3)+"str(3)"
```

What is the **value** of `x` after this program is executed?

(A) ★

```
"3str(3)"
```

(B) None of the other answers are correct.

(C) `"33"`

(D) `33`

(E) `"333"`

Solution.

---

22. (1 point) Consider the following Python program.

```
e=[1,3,5,7,9,11]
d=[0,0,0]
for i in range(0,len(e)):
    d[i%3]+=e[i]
x=d[1]
```

After it is run, what is the final **value** of `x`?

(A) `16`

(B) `3`

(C) `8`

(D) `0`

(E) ★

`12`

Solution.

---

23. (1 point) Consider the following program:

```
x=[1,2,3,4,5,6,7,8,9]
x=x[2:-2]
i=1
while i < 3:
    x[i]+=1
    i+=1
```

What is the **value** of `x` after this program is executed?

(A) ★

```
[3, 5, 6, 6, 7]
```

(B) `[3, 5, 6, 6, 7, 8]`

(C) `[2, 4, 5, 6, 6, 7]`

(D) `[3, 5, 6, 6]`

(E) `[2, 4, 5, 5, 6, 7]`

Solution.

---

24. (1 point) Consider the following program:

```
i=3
x=2
while i < 7:
    x+=i
    i+=2
```

What is the **value** of `x` after this program is executed?

(A) `14`

(B) `13`

(C) `12`

(D) ★

`10`

(E) `11`

Solution.

---

25. (1 point) Consider the following program:

```
def fix(s):
    a=list(s)
    a.sort()
    return ''.join(a)

x=["one","two","eleven","twelve"]
s1=fix(x[0]+x[-1])
s2=fix(x[1]+x[-2])

if s1<s2:
    x.sort()
elif s1==s2:
    x.reverse()
else:
    x.append("six")
```

What is the **value** of `x` after this program is executed?

(A) `['one', 'two', 'eleven', 'twelve']`

(B) `['one', 'two', 'eleven', 'twelve', 'six']`

(C) `['two', 'twelve', 'one', 'eleven', 'six']`

(D) ★

`['twelve', 'eleven', 'two', 'one']`

(E) `['eleven', 'one', 'twelve', 'two']`

Solution.

---

26. (1 point) Consider the following incomplete function.

```
def ismultiple(m,n):
    if ???:
        return False
    else:
        return True
```

The function is intended to return True if the input parameter m is a multiple of parameter n and False otherwise. For example, `ismultiple(4,2)` should return `True`, but `ismultiple(5,3)` should return `False`. What should replace the three question marks to complete the function?

(A) `(m // n) != 0`

(B) `(n % m) == 0`

(C) `(n // m) == 0`

(D) ★

`(m % n) != 0`

Solution.

---

27. (1 point) Consider the following program:

```
s="Hobbes"
i=0
x=-1
while i<len(s):
    if s[i]=='b':
        x=i
    i+=1
```

What is the **value** of `x` after this program is executed?

(A) `5`

(B) `4`

(C) `2`

(D) `-1`

(E) ★

`3`

Solution.

---

28. (1 point) Consider the following program.

```
x=1
i=0
while(x*x)<=9:
    i=i+(x*x)
    x=x+1
```

After it is run, what is the final **value** of `x`?

(A) ★

`4`

(B) `5`

(C) `14`

(D) `3`

(E) `30`

Solution.

---

29. (1 point) Consider the following program:

```
s="TRIS %i"
t="ISEU"
x=len(s) % len(t[2:-1])
```

What is the **type** of `x` after this program is executed?

(A) `Boolean`

(B) `None`

(C) `Float`

(D) ★

`Integer`

(E) `String`

Solution.

---

30. (1 point) Evaluate the following expression:

```
len("ABCDE"[1:4])
```

What value is produced?

(A) 1

(B) ★ 3

(C) 4

(D) 5

Solution.
