Introduction in Kotlin  
  
**Which of the following variables are deﬁned correctly?**  
b,c,e,f  
  
**What does the following program do?**  
Throw a Compilation Error  
  
**Which of the following calls to the pow2mult function are correct?**

* pow2mult(2.72)
* pow2mult(a = 2.72)
* pow2mult(a = 3.14, b = 1.0)

**What does this program do?**  
Print "4.0"  
  
**What does this code do?**  
Print "OTTLIN"  
  
Object-oriented programming  
  
**What does this program do?**  
Prints: OOP quiz is hard (not)  
  
**What does this program do?**Throws a Compilation Error  
  
**What does this program do?**Prints: Good luck!  
  
**Choose all of the options which will not throw errors.**Quiz().print()

**Select all of the classes that will cause compilation errors.**Opened2  
Opened3

Build systems  
  
**Select all of the correct statements about the Gradle wrapper.**

* If the Gradle wrapper was executed correctly for a project, you DON'T NEED to have Gradle installed on your machine to build the project.
* The version in the Gradle wrapper can be different from the Gradle installed on your machine.
* To run a Gradle project you need to run gradlew script on Unix and gradlew.bat on Windows.

**If I have a multi-module Gradle project in Kotlin, how can I add a dependency for one module to another?**

* Build a jar and put implementation(fileTree("myModuleJarName"))
* Publish jar into the maven local and put implementation("package:myModuleName:version")
* Include myModuleName in settings.gradle.kts and put implementation(project(":myModuleName"))

**Select all off the correct statements.**

* Gradle root project == Idea project
* Gradle project != Idea project
* Gradle module != Idea module
* Gradle project ~ Idea module

**What will be printed after running the following command:** ./gradlew task2?  
task1 new value  
  
**Select all cases where a compilation error will be thrown.**  
2, 5, 6  
  
Generics  
  
**Select the correct statement.**  
This code won't compile  
  
**Let’s assume A <: B means that A is a subtype of B (wherever type B is expected, type A can also be used). Choose all of the correct statements:**

* Consider A <: B, and T<out F> => T<A> <: T<B>
* Consider A <: B, and T<F> => T<in A> :> T<in B>
* Consider A and T<F> => T<A> <: T<in A>

**What will be printed as a result of the following program?**nulla  
  
**Select all of the correct statements.**

* If I call bar(), the text: Text#2 will be printed
* I need to delete return from bar1 because it throws a compiler error

**Which of the expressions will be compiled without errors?**  
b, e  
  
**Select all of the options that will not cause a compilation error.**

* source: out T; target: in R; base: S; how: (R, T) -> R
* source: T; target: in R; base: S; how: (R, T) -> R

Collections and co.  
  
**To which of these collections can you add items?**

* var b = mutableListOf(0)
* val d: MutableList<Any> = mutableListOf(0)
* val e: ArrayList<String> = arrayListOf()
* val f = HashSet<Int>()

**Select the correct statement to describe what will happen when you try to print the result of the following code:**  
Nothing will be printed  
  
**Select all of the correct statements below.**

* In maps a and b, the same order of elements is always guaranteed when traversing.
* Maps a and b contain a different number of elements.
* I cannot add and remove elements to maps a and b.

**What does the following program do?**  
Print 1 2 4 5 6 7 8 10  
  
**Select all of the correct statements below.**

* (1) and (2) print different outputs into the console
* (1) prints A1, B1, C2, A2, A3, B3, C6,
* (2) prints A1, A2, A3, B1, B3, C2, C6

Functional programming  
  
**What function is shown in the picture?**  
foldRight  
  
**What does the following program do?**  
Prints [(LIKE, 4), (KOTLIN, 4)]  
  
**What does the following code do?**Prints 1\n2\nkotlin.Unit  
  
**Select all of the correct statements without compilation errors below.**

* while (a.iterator().hasNext()) { }
* for (item in a.iterator()) { }

**Select all of the functions that do not throw a compilation error.**

* logSport
* logWinterSport
* logSummerSport

Parallel & Concurrent Programming  
  
**Which statements below are true? (Select all that apply.)**

* All threads within the same process share virtual memory
* JVM threads implement preemptive concurrency model
* On the JVM, each object has an intrinsic lock associated with it

**Which values can the following program print?**  
1, 2  
  
**What can the following program print?**  
0 0, 0 1, 1 0, 1 1

**Select all correct possible interleavings of the following code.**

***Below `offer(i)` means the `offer` operation with argument `i` was performed by the ﬁrst thread, `poll():i` means the call to the `poll` operation has returned `i` in the second thread.***

* offer(1), offer(2), offer(3), poll():1, poll():2, poll():3
* offer(1), offer(2), poll():1, poll():2, offer(3), poll():3
* poll(): null, poll(): null, offer(1), offer(2), offer(3), poll():1

**Consider the following code fragment.**

***Assume we observe an execution where each read from shared memory reads the value specified in the comment near it.***

***For such an execution, select all pairs such that there exists a happens-before relationship from the first to the second event.***

(a) → (e), (b) → (h), (c) → (i), (a) → (j)

Asynchronous Programming in Kotlin  
  
**Choose all true statements about asynchronous programming.**

* Long-running operations start without waiting for their execution and blocking.
* All commands can be executed in a multi-threaded version.

**Choose all of the true statements below.**

* Under the hood, Kotlin Coroutines schedule executions using the idea of callbacks
* Kotlin Coroutines work concurrently
* Kotlin Coroutines can be suspended only at specific code locations

**Estimate how many seconds this program will take to finish.**  
9 seconds  
  
**We know of 6 coroutine Job states. Choose all possible one-step transitions from one state to another.**

* A -> B
* B -> C
* C -> D
* E -> F
* A -> F
* C -> E

**What does Kotlin Standard Library provide for programming with coroutines?**

* `Job` interface
* `suspend` keyword

**Choose all of the options which we can use to create a new coroutine.**

* launch { ... }
* async { ... }

**Select all of the correct statements about CoroutineScope.**

* All coroutines can only be run inside a CoroutineScope.
* It is created when runBlocking { ... } is called.

**How many states will the compiled state machine for the function `funny` have? (How many suspension points does `funny` have?)**   
1  
  
The Java Virtual Machine & the Kotlin Compiler  
  
**Select all of the correct statements about JIT-compilers.**

* Kicks in after a long delay
* The performance of the executable code is high
* Can be absent from a specific JVM

**What does the Kotlin compiler back-end do?**  
Optimizes IR  
  
**In which cases will a compilation error occur?**  
2 (foo2)  
  
**Select all of the correct statements.**

* I can specify the `a` type as `String?` and work with it as a nullable type
* I can specify the `a` type as `String` and work with it as a non-nullable type, and NPE can occur
* The real `a` type is `String!`

**Which of the following functions will not throw any compilation errors?**  
foo3