1-

```
void main() {
final items = const {
 101: 'Pencil',
 102: 'Pen',
 103: 'Eraser',
 104: 'Ruler',
 105: 'Glue'
 };
 items.forEach((sku, item) => print('$sku is ${item}'));
 print(items.keys);
 print(items.values);
 print(items.length);
}
```

What will be the output for the above code? And why?

ANSWER

101 is Pencil

102 is Pen

103 is Eraser

104 is Ruler

105 is Glue

[101, 102, 103, 104, 105]

[Pencil, Pen, Eraser, Ruler, Glue]

5

2- What are the outputs for the following code?

```
void main(){
var str1 = "\tMy name is abu bakar";
var str2 = "That is Ali's house";
var str3 = r'today's result looks promising';
var str4 = "He is in my class\t" "I know him since last semester\t" "He has beard\n";
var str5 = """
this class will be hard,
nonetheless, I will try my best,
I believe I can do it """;
print(str1);
print(str2);
print(str3);
print(str4);
print(str5);
}
```

And explain why.

   My name is abu bakar // 't' will create a tab space at the start of the sentence

That is Ali's house //Will work probably because it start with ", and end with ", so will not effect on ' in the middle.

Error – today's result looks promising

He is in my class   I know him since last semester   he has beard //1st sentence end with '/t' so will create tab space, same with 2nd sentence, and the third sentence end with '/n' so which means skip one line before next sentence.

This class will be hard,

Nonetheless, I will try my best,

I believe I can do it // start with """ and end with """ which enable the output to be exact same of code.

3-

```
void main(){
var cars - new List(3);
cars. add("Honda");
 cars.add("Toyota");
cars.add("Nissan");
for (var car in cars){
print (car);
}
```

What is wrong the above code? How do you fix it? Provide code example for your answer.

the wrong is in new list because it contains only 3,

and to fix it just delete the 3. var cars - new List 0;

and then can add new items to the list by cars.add and declare car in cars and print car.

or Fixed with manual assignment cars|0] = "Honda",

4- Differentiate between final and const. In what condition that both final and const are needed? Provide code examples to justify your answers.

Const - Value must be known at compile-time.

For example const myday = "Tuesday" and cannot be changed after initialized

Final - Value must be known at run-time.

For example final myday – getDay() and cannot be changed after initialized.

5-

```
void main() {

var cars = new List();

cars. add("Honda");

cars. add("Toyota");

cars.add("Nissan");


for (var car in cars) {

print("List: ${car}");

print(cars .first);

print (cars.last);

print (cars.length);

        }

}
```

What will be the output of the above code? Why do get the output?

List: Honda

Honda

Nissan

3

List: Toyota

Honda

Nissan

3

List: Nissan

Honda

Nissan

3

6- Differentiate between unary and ternary operators. In what condition they are preferred? Justify your answer with code examples.

Unary: increment, decrement, invert value of boolean. - loop, counter

Ternary: if-else equivalent. -conditional

Example:

```
void main(){

var ans = 10;

ans == 10 ? print("Answer is 10") : print("Oh no!");

}
```

7-

```
void main(){

var name = "Aminah Hassan";

var dob = 1973;

var age = 2020 - dob;

var cgpa = 3.56;

print("${name} is ${age} years old with ${cgpa} CGPA");

}
```

1. Convert the above code using the appropriate data type.

2. Which data type (inferred or pre-defined data type) is preferred in Dart programming and why?

```
void main(){

String name = "Aminah Hassan";

int dob = 1973;

int age = 2020 - dob;

double cgpa = 3.56;

print("${name} is ${age} years old with ${cgpa} CGPA");

}
```
2. Pre-defined data type is preferred in Dart programming because the data type of the variable cannot be changed after initialization & also because the compiler does not need to use any additional computing power to determine the data type of the variable as it is pre-determined by the user

8- Given the following menu:

1. Addition

2. Subtraction

3. Division

4. Multiplication

Please enter any of the above option:

1. Which loop is the best for the above menu to work and explain why?

2. What is the second best loop that can be used to implement the above menu and explain why?

1. Do while loop because it will execute at least once before checking the condition
2. While loop or switch but requires condition for user selection on the menu.

9- What makes function with optional named arguments is different than function with optional parameters? Provide code examples to

justify your answer.

Function with optional named arguments requires a developer to specify the arguments in key-pair (name:value) values in order to be used inside the function.

Example:

```
bool threshold({int value, int min, int max}) {

return min <= value && value <= max;

}

print(threshold(min:1, max:10, value:11));
```

QUIZ 2 QUESTIONS:

1- What do you understand by widget tree? Give an example for your answer.

widget tree containes all the widgets and each widget corsider as a node. each node have children and parent. example: the home page widget have a child called button and the button have child called text.

2- What do you understand by widget keys? Why GlobalKey is important in using a Flutter form?

Widget keys are unique identifiers for widgets. They are used to identify widgets in the Flutter framework.
globalKey helps to access the widget key from outside of the method so we pass values globally and to know which fields are validated and which fields have errors.

3- Compare and contrast between mobile web and native mobile application.

Mobile web uses mobile web browser and internet to access and easier to create applications for both IOS and Andriod.

Native mobile application: uses native mobile language like SWIFT for IOS. harder to develop application for both mobile platforms because it need to know 2 languages and not all the features in one platform can be applied on the other platform.

4- What do you understand by COMPOSITION OVER CLASS INHERITANCE? Provide example.

Reduce complexity of what can be included (Parent-child) in a mobile app. Composition allows developer to include whatever necessary.

Example:

```
class Computer{
 final CPU cpu;
 final RAM ram;
 Computer(this.cpu, this.ram);
}
```

5- How do you align text to center of the screen using Column widget? Provide example

<mark>ANSWER</mark>

By "mainAxisAlignment: MainAxisAlignment.center"

Example:

```
        body: Center(

          child: Column(

            mainAxisAlignment: MainAxisAlignment.center,

            children: <Widget>[

                Text('You have pushed the button this many times:'),
```


6- What type of mobile app is cost effective in the long run?

<mark>ANSWER</mark>

Hybrid Mobile Application because one code for all platforms

7- Why every widget created in Flutter must contain a build method? What is the alternative to build methods?

ANSWER

Build method will render the included widgets.

The alternative is StatefulWidget and RenderObject classes

8- What is the key concept used in Flutter for mobile app development? Why it is important?.

<mark>ANSWER</mark>

the concept of "everything is a widget"

it is important because A widget can define any aspect of an application such as:

Layout, Structures and Styles

9- Compare and contrast between stateful and stateless widget. Provide an example of a widget that can represent stateful and stateless widget.

Stateful widget: It manages data that keep changes in the widget and associated with "setState" method.

For example, FormField widgets

Stateless Widget: No information is kept in it and Its job is to display information and UI.

For example, AddToCartButton widget.

10- In what way that Flutter is different than hybrid mobile application?

hybrid mobile application: It uses next generation JavaScript framework such as React, Angular, Vue.js, node.js, etc.

Flutter: is using its own framework that uses Dart programming language (alternative to JavaScript)

11- What is the purpose of pubspec.yaml in Flutter? Give an example what you can do with it.

App overall configuration including packages and plugins. For example, add images from local or from internet.

12- Explain the difference between container and row/column implementation in Flutter?

A container: is a box with no alignment.

Row: box consists of widget in horizontal alignment.

Column: box consists of widget in vertical alignment.

QUIZ 3 QUESTION:

1- What is the purposed of pubspec. yaml file in flutter project?

ANSWER

contain the main configuration and assets of the application such as images, audio and video. in also holds the default font used in the application.

2- Differentiate between TextFormField and TextField?

ANSWER

TextField: does not need global key, take the user input but can't check if his input correct or not.

TextFormField: handle all the data from input users, able to return errors and check if the user input is correct such as returning error if the user entered his email without the @ sign. need global key so it can pass it's value globally.

3- How do you pass data or arguments to a named route?

ANSWER

By using onGenerate() to pass and MaterialPageRoute() to capture the data or argument.

4- Compare and contrast between Scaffold and AppBar widgets.

ANSWER

Scaffold: provides structure or basic Material Design visual layout.

AppBar: Used Scaffold properties, placed to the top of the screen with a certain height. It and also includes navigation automatically

5- In which situation you need to call onChanged method in TextFormField or TextField?

ANSWER

Set a value from TextField or TextFormField to a local variable using setState() method.

6- what is the purpose of having routing in Flutter application.

ANSWER

To navigate from one page to another,

for example,

navigate.push() to route to next page

navigate.pop() to return to previous page.

7- For IOS application which structural widgets (theme, styling and functionality) is used by default?

CupertinoApp

8- What is the purpose of AutoFocus in FocusNodes widget?

Set focus on the selected TextField or TextFormField.

9- For android application which structural widgets (theme, styling & functionality) is used by default?

MaterialApp widget

10- Compare and contrast between Navigator.push() and Navigator.pop() in Navigator widget.

Both are use to navigate from one page to the other.

Navigator.push(): to route to next page

Navigator.pop(): to return to previous page.

11- List down 4 common gestures used in Flutter application?

1- OnTap
2- onTapUp
3- onTapDown
4- onLongPress
5- onDoubleTab

12- How Navigator widget works in Flutter?

By storing or maintain the stack based on history of routs, such as:

Navigator.push() to route to a new screen.

Navigator.pop() to return to the previous screen.

LAP TEST QUESTIONS:

1-

Given the following code:

```
void main() {
 int a = 0;
 var b = a;
 var c = b ?? 1;
 print(a);
 print(b);
 print(c);
}
```

1- What is the output of a, b and c?
2- Why do you get the output?
3- In what condition that ?? operator is useful?

1- 0

0

0

2- A is defined as 0 and b = a and c=b as well
3- When it's null will take the number after ??, in this example, if c = null, then c will equal 1

2- in your own words, explain what do you understand what does it means by "everything is widget" in flutter.

In flutter most widgets either statefull or stateless and nothing can be created without defined one or both of them.

3-what are the aspect of mobile application that widget can represent?

ANSWER

Layout, Structures, Styles, animation and position and alignment.

4-How do you include a local image into your Flutter mobile app?

ANSWER

By using image.asset and modify pubspec.yaml

5-Why Form widget is preferred for validating or authenticating a user sign in?

ANSWER

To prevent the user from entering a wrong value, for example the email address without @ or "."

6- Compare and contrast between Hybird and native mobile application.

ANSWER

Hybird mobile application: It uses next generation JavaScript framework such as React, Angular, Vue.js, node.js and other for all platforms.

Native mobile application: you need to learn and master each platform programming language to develop. Such as: Java for android, Swift for IOS, C# for Windows.

Native mobile application performs better than mobile web and hybrid mobile application except flutter.