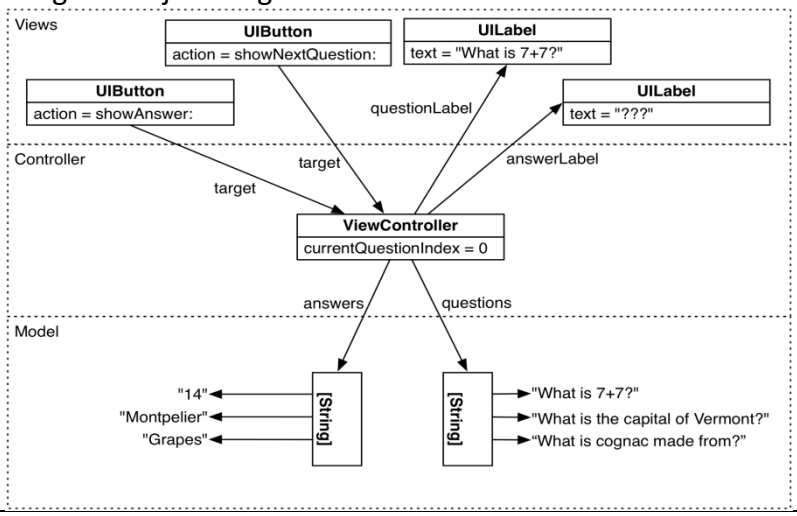
Unit-1

1.	What makes mobile application development different? Discuss special development considerations.
2.	Draw and explain iOS architecture in detail.
3.	Write two purposes of AppDelegate.swift. ExplainAppDelegate Life cycle with diagram.
4.	Write steps with necessary code snippet to achieve following functionalities: • Question and Answers Load from Data Source (Data Source contains String Array) • Contains two buttons (Show Next Question and Show Answer) and two labels (Show Answer and Question) • Display next question on tap of Show Next Question button. • Display answer on tap of Show Answer button
5.	How Swift prevents common programming errors exist in other programming languages? Explain with two appropriate examples.
6.	Write and explain Swift code snippet to develop iOS application based on the given object diagram. 
7.	What is Inferred type? Write code snippet and explain when to use inferred type and when to specify type.
8.	List Swift collection types and explain any two with examples.
9.	What is optional type in Swift? Justify it's usage with example.
10.	Write and ExplainSwift function, which accepts integer array as an argument, and return minimum and maximum value from it.

11.	What would be value of number variable after executing following code and explain output.
	`func Check(num: Int) ->Bool {`
	`if num<2 {`
	`returnfalse`
	`}`
	`for i in 2..<num {`
	`if num % i == 0 {`
	`return false`
	`}`
	`}`

	returntrue
	}
	
	func Generate(len: Int) -> [Int] {
	var results = [Int]()
	while results.count<len {
	let x = Int(arc4random_uniform(10))
	ifCheck(num: x) {
	results.append(x)
	}
	}
	return results
	}
	var number = Generate(len: 5)

12.	What is the use of connection? Explain outlets and actions with appropriate examples.
13.	Write Swift code for “Person” class having property, initializer, and function. Create another class “Student” which inherits from “Person” class and overrides one function.
14.	Describe protocols in Swift using example.
15.	What is view? With diagram explain view hierarchy in detail.
16.	With respect to auto layout write example and explain “Align” and “Add New Constrictions”.
17.	List different loop structures of Swift programming language and explain any two with appropriate examples.
18.	With at least two examples, explain dictionary data structure of Swift programming.
19.	Explain the use of “Embed in Stack” and “Resolve Auto Layout Issues” of auto layout.
20.	Write three different syntaxes of “for” loop in Swift programming language and explain any two with appropriate example.
21.	Write and explain Swift code for the following: • Create a protocol “Movable”. • Declare two methods “moveToX” and “moveByDx” each having two Int arguments. • Create a class “Shape” which conforms to protocol “Movable”. • Write code for necessary methods of “Shape” class. • Instantiate object of “Shape” class and call a method.
22.	With code snippet, explain three basic Swift types.
23.	Explain property overriding With appropriate example and Swift code snippet.

Unit-2

1.	What is the use of UITextField? Write code snippet and explain any four useful properties of it.
2.	Explain "Color", "Alignment", "Placeholder", "Correction", and "Keyboard Type" attributes of UITextField.
3.	Write name of the view that displays one or more lines of read-only text,

	often used in conjunction with controls to describe their intended purpose. Write code snippet and explain any four useful properties of it.
4.	Explain "Font", " Lines", " Baseline", " Autoshrink", and "Shadow" attributes of UILabel.
5.	What is the use of UIImageView? Write code snippet and explain any two useful properties of it.
6.	Explain "Highlighted", and "State" attributes of UIImageView with appropriate examples.
7.	List different states of UIButton. Write code snippet and explain any two states of it.
8.	What is the use of UIButton? Write code snippet and explain any two useful properties of it.
9.	Explain "Type", and "Image" attributes of UIButton with appropriate examples.
10.	Write Swift code and explain how to dismiss keyboard in iOS application.
11.	Write Swift code for following scenario: “When the user types into a text field, that text field will ask its delegate if it wants to accept the changes that the user has made or not”.
12.	What is use of property observer? Write Swift code and explain property observer using “willSet” and “didSet”.
13.	List at least four events related to TextField. Explain any two with code snippet.
14.	With example and code snippet explain the use of “becomeFirstResponder( )” and “resignFirstResponder( )”.
15.	Discuss steps to dismiss keyboard when user taps outside UITextField.
16.	What are responsibilities of view controller? Explain “Lazy Loading” with respect to view controller.
17.	Write steps to replace UIView with MKMapView and Set it as Inial View Controller. Also write steps to add MapKit Framework in the project.
18.	With example, explain UITabBarController and Tab Bar Items.
19.	With example and code snippet explain the use of “viewWillAppear( )” and “viewDidAppear ( )”.
20.	Step by step explain how to create view programmatically.

Unit-3

1.	Draw diagram and explain when to use static table view and dynamic table.
2.	With respect to table view, what are delegate and data source? Draw the diagram and explain relationship between them.
3.	Related to table view, which two protocols needs to conform by ViewController? Write and explain sample Swift code for "numberOfRowInSection" and "cellForRowAtIndexPath".
4.	Draw diagram and explain use of "dequeueReusableCell" with respect to TableView.
5.	Draw diagram and explain use of any UITableViewCellStyle.
6.	Draw the diagrams and explain what are "table view", "table view cell", "table data", "plain table", and "grouped table".
7.	With appropriate examples, explain creation and usage of designated initialize and convenience initialize.
8.	Write Swift code to call following "createItem" function with at least two different syntaxes. What is the significance and use of @discardableResult? **@discardableResult func createItem() -> Item {** **let newItem = Item(random: true)** **allItems.append(newItem)** **return newItem** **}**
9.	A class "ItemsViewController" conforms to UITableViewController. List and explain functions need to be implemented in "ItemsViewController" class.
10.	Discuss the uses of UITableView editing mode.
11.	Write and explain Swift code for updating row from UITableView.
12.	UITableView is Model or View or Controller? Discuss with appropriate example.
13.	Write Swift code for inserting and deleting row from UITableView.
14.	What are the usages of UIAlertController? Discuss "alert" and "actionSheet" styles of it.
15.	Write and explain Swift code to accept Student name using UIAlertController and set value in the instance of student class.

16.	Analyze following Swift code and explain meaning of each line.
	overridefunctableView(_ tableView: UITableView,
	commiteditingStyle: UITableViewCellEditingStyle,
	forRowAtindexPath: IndexPath) {
	ifeditingStyle == .delete
	{
	let item = itemStore.allItems[indexPath.row]
	let title = "Delete \(item.name)?"
	let message = "Are you sure you want to delete this item?"
	let ac = UIAlertController(title: title, message: message, preferredStyle: .actionSheet)
	letcancelAction = UIAlertAction(title: "Cancel", style: .cancel, handler: nil)
	ac.addAction(cancelAction)

	letdeleteAction = UIAlertAction(title: "Delete", style: .destructive, handler: { (action) -> Void in self.tableView.deleteRows(at: [indexPath], with: .automatic) }) ac.addAction(deleteAction) present(ac, animated: true, completion: nil) } }
17.	Write Swift code to create "ItemCell" class, which inherits from UITableViewCell and provides customize cell view using at least two sub views.
18.	"My iOS Solutions" company is developing iOS mobile application to display product name, image, price in UITAbleView. Write and explain Swift code snippet required to implement cellForRowAtIndexPath.

19.	Analyze following Swift code and explain meaning of each line.
	override func awakeFromNib ( ) {
	super.awakeFromNib( )
	nameLabel.adjustsFontForContentSizeCategory = true
	valueLabel.adjustsFontForContentSizeCategory = true
	}

20.	Write code snippet and explain "customize appearance of UITableViewCell subclasses".
21.	With appropriate example, explain the use of "tableView.rowHeight" and "tableView.estimatedRowHeight".
22.	Write Swift code and explain concept of Dynamic type with respect to UITableViewCell.
23.	Step-by-step explain how to use "dynamic type" in table view.
24.	Table view cell should not under lap the status bar. Write sample code snippet and explain your solution.

Unit-4

1.	Step by step explain how to use horizontal stack and vertical stack view.
2.	With appropriate example and diagram explain "Content Hugging Priority" and "Content Compression Priority".
3.	Analyze following Swift code and explain meaning of each line. **let numberFormatter: NumberFormatter = {** **let formatter = NumberFormatter()** **formatter.numberStyle = .decimal** **formatter.minimumFractionDigits = 2** **formatter.maximumFractionDigits = 2** **return formatter** **}()** **let dateFormatter: DateFormatter = {** **let formatter = DateFormatter()** **formatter.dateStyle = .medium** **formatter.timeStyle = .none** **return formatter** **}()**
4.	Write and explain Swift code to pass data one view controller to another view controller using segue.
5.	Analyze following Swift code and explain meaning of each line.

	override func prepare(for segue: UIStoryboardSegue, sender: Any?) {
	switch segue.identifier {
	case "showItem"?:
	if let row = tableView.indexPathForSelectedRow?.row {
	let item = itemStore.allItems[row]
	let detailViewController
	= segue.destination as! DetailViewController
	detailViewController.item = item
	}
	default:
	preconditionFailure("Unexpected segue identifier.")
	}
	}

6.	What is use of UINavigationController? Write steps to use UINavigationController in your application.
7.	With appropriate example and diagram explain navigation controller.
8.	Step by step explain how to dismiss the keyboard if user hits return key in TextField.

9.	Which protocol consists of following function? With appropriate example, demonstrate its usage.
	func textFieldShouldReturn(_ textField: UITextField) -> Bool {
	textField.resignFirstResponder()
	return true
	}

10.	Step by step explain how to dismiss the keyboard if user taps outside of the TextField.
11.	Write and explain Swift code to create property observer, which removes digit 9 if entered in TextField.
12.	What is use of UIImagePickerController? List and explain use of at least two different UIImagePickerControllerSourceType.
13.	How to use permissions in iOS application? Write steps for same.
14.	What is UIGestureRecognizer? List at least four sub classes of UIGestureRecognizer and explain use of any two.
15.	Write Swift code to detect pinch gesture and display scale, velocity. Also write Swift code to detect rotation gesture and display radians, velocity.
16.	With example, explain use of UISwipeGestureRecognizer and UITapGestureRecognizer.
17.	Write and explain swift code to display “Menu1” and “Menu2” using UIMenuController.
18.	With example, explain use of UIPanGestureRecognizer and UILongPressGestureRecognizer.
19.	Write Swift code snippet to show use of computed property and property observer. Discuss your solution.
20.	Write and explain Swift code to pass data from one view controller to another view controller using segue.
21.	Analyze following touch related Swift code and explain meaning of each line.

```
func stroke(_ line: Line) {
    let path = UIBezierPath()
    path.lineWidth = 10
    path.lineCapStyle = .round

    path.move(to: line.begin)
    path.addLine(to: line.end)
    path.stroke()
}
```

22. What is @IBInspectable? Write Swift code and explain its use.

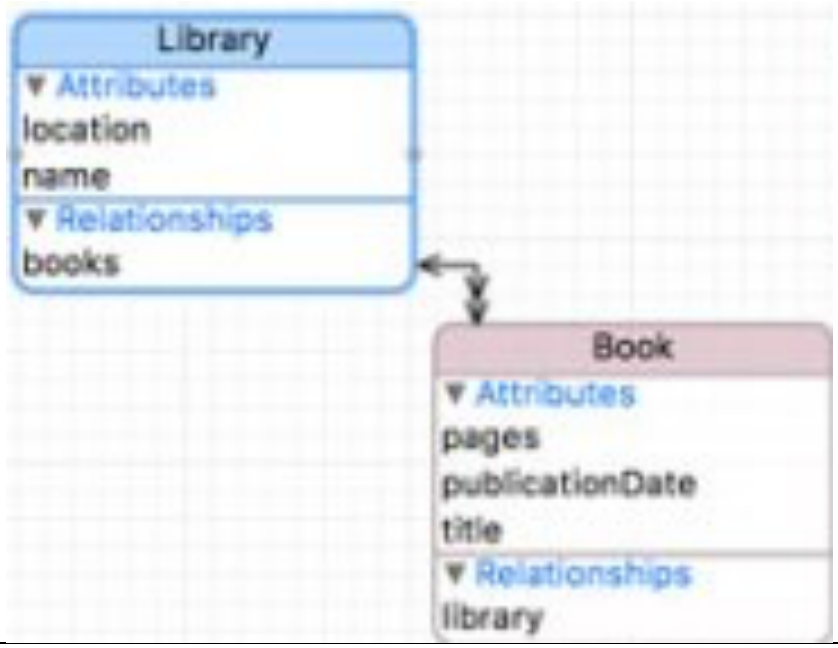
23. Analyze following Swift code and explain meaning of each line.

```
@IBAction func buttonTapped(_ sender: UIButton) {
    becomeFirstResponder()
    let menu = UIMenuController.shared
    let clearItem = UIMenuItem(title: "Clear Text",
                               action:
        #selector(ViewController.clearLabel))
    menu.menuItems = [clearItem]
    menu.setTargetRect(CGRect(x: 0, y: 0, width: 20, height: 20),
                       in: statusLabel)
    menu.setMenuVisible(true, animated: true)
}
```

Unit-5

1.	What is "Archiving" and "Unarchiving"? Classes whose instances need to be archived must conform to which protocol? Write Swift code snippet and explain "Archiving" and "Unarchiving" considering "Book" class.
2.	Write Swift code create student class having properties “enrollmentNumber”, “name”, and “age”. Also write and explain swift code to store and retrieve instance of “Student” class using “Archiving”.
3.	Write Swift code snippet to display employee information (employee name and employee designation) into collection view. Store and fetch employee details using archiving. Discuss your solution.
4.	What is iOS application sandbox? List and explain content/use of each directory available in application sandbox.
5.	Draw iOS application state-transition diagram and explain transition among any three states.
6.	Which iOS application method will be called when application transit from "Active" state to "Inactive" State, "Suspended" state to "Active" State? Write Swift code snippet and explain use of those methods.
7.	Which iOS application method will be called when application transit from "Inactive" state to "Active" State, "Suspended" state to "Not Running" State? Write Swift code snippet and explain use of those methods.
8.	List three iOS application states where code execution is permitted. Write two cases where iOS application code is in execution but state is NOT "Active".
9.	Write and explain sample code snippet to load image from file system to ImageView and delete image from file system.
10.	When to use collection view? Write steps to create collection view and configure view controller as it’s delegate and data source.
11.	Write and explain Swift code snippet to dynamically set cell width and layout of collection view.
12.	Write and explain steps with required code snippet to create custom UICollectionViewCell class and use it in ViewController.
13.	Explain collection view layout object and its attributes with appropriate example.
14.	Compare table view and collection view. Write at least two similarities and two differences.
15.	A Swift class “ViewController” conforms to UICollectionViewDataSource. Write Swift code to implement required methods.

16.	Analyze following code and explain each line.
	func collectionView(_ collectionView: UICollectionView, cellForItemAtindexPath: IndexPath) ->UICollectionViewCell {
	letcell:StudentCell = collectionView.dequeueReusableCell(withReuseIdentifier: "StudentCell", for: indexPath) as! StudentCell
	cell.enrollment.text = self.students[indexPath.row]["enrollment"]
	cell.name.text = self.students[indexPath.row]["name"]
	cell.studnetImage.image = UIImage(named: self.students[indexPath.row]["imageName"]!)
	return cell
	}

17.	Compare “Archiving” and “Core Data” to store persistence data. Explain at least two differences and two similarities.
18.	Write and explain Swift code to store instance of “Employee” class using core data.
19.	Write and explain Swift code to retrieve instance of “Employee” class from core data.
20.	Write Swift code snippet to display student name, student image and student enrollment number into collection view. On tap of student, another view will display student details like age, and contact number. Discuss your solution.
21.	With appropriate example and Swift code snippet, explain NSManagedObjectContext.
22.	Mr. Mahesh is working as iOS application developer in a software development company named "My Mobile App Solutions". Marketing manager of the company has received suggestion from customer to remember favorite greeting message of each user and provided list of greeting messages. Design and discuss your solution to remember favorite greeting message of each user using core data and greet the user with favorite message whenever app launches.
23.	Step-by-step explain creation of data model in XCode.
24.	Write and explain Swift code to delete an object from core data.
25.	Write steps to create following data model: 
26.	With respect to core data deletion rule, justify use of “Casecade” and “Deny”.
27.	With respect to core data deletion rule, justify use of “No Action” and “Nullify”.
28.	Analyze following Swift code and explain meaning of each line. extension ViewController: UITableViewDataSource { func tableView(_ tab leView: UITableView,

```
                numberOfRowsInSection section: Int) -> Int {
    return students.count
  }

  func tableView(_ tableView: UITableView,
                cellForRowAt indexPath: IndexPath)
                -> UITableViewCell {
    let student = students[indexPath.row]
    let cell =
      tableView.dequeueReusableCell(withIdentifier: "Cell",
                                    for: indexPath)
    cell.textLabel?.text = student.value(forKeyPath: "name") as? String
    return cell
  }
}
```

29. Analyze following Swift code and explain meaning of each line.

```
  guard let appDelegate =
    UIApplication.shared.delegate as? AppDelegate else {
    return
  }
let managedContext =
  appDelegate.persistentContainer.viewContext
let entity =
  NSEntityDescription.entity(forEntityName: ”Student",
                             in: managedContext)!
let student = NSManagedObject(entity: entity,
                             insertInto: managedContext)
student.setValue(name, forKeyPath: "name”)
do {
  try managedContext.save()
  students.append(student)
} catch let error as NSError {
  print("Could not save. \(error), \(error.userInfo)")
}
```

Unit-6

1.	What is the use of CocoaPods? Discuss advantages and limitations of using external libraries.
2.	What is CocoaPods? List alternatives of CocoaPods and explain use of any two.
3.	Write steps and explain installation and use of CocoaPods in iOS project.
4.	What is REST? Explain RESTful architecture and components of RESTful Web service.
5.	Draw diagram and explain working of RESTful Web Service.
6.	Write sample JSON data and XML data. Write and explain at least two differences.

7.	Analyze and explain following Swift code:
	
	guard let url = URL(string: "http://utu.ac.in/studentWebService.php") else
	{
	return
	}
	
	var request = URLRequest(url: url)
	request.httpMethod = "GET"
	request.addValue("application/json", forHTTPHeaderField: "Content-Type")
	
	Alamofire.request(request).responseJSON {response
	let json = response.data
	do {
	let decoder = JSONDecoder()
	self.students = try decoder.decode([Student].self, from: json!)
	print(self.students.count)
	} catch {
	print("Parsing failed...")
	}
	}

8.	Analyze the given API mapping and explain use of URI to name resources. **Route** / **HTTP Verb** / **Description** /api/user — GET — Get all the users. /api/user — POST — Create a new user. /api/user/{id} — GET — Get a single user. /api/user/{id} — PUT — Update a user with new info. /api/user/{id} — DELETE — Delete a user.
9.	In your iOS application JSON data is received. Write and explain Swift code for parsing JSON data.

10.	What is JSON? How Strings and Arrays are used in JSON? Explain with appropriate JSON code.
11.	Team leader has assigned PHP Web service development task to Mr. Keyur. Help Mr. Keyur in developing Web service which retrieves product information from MariaDB database and send the information as JSON to consumer iOS app. Write and PHP code snippet and explain your solution.

12.	With respect to Apache Web server, explain meaning of each line and use of following ".htaccess" file:
	
	`# Turn rewrite engine OFF`
	`Options +FollowSymlinks`
	`RewriteEngine on`
	
	`RewriteRule ^student/list/$ websrv.php [nc,qsa]`
	`RewriteRule ^student/list/([0-9]+)/$ websrv.php?enrollment=$1 [nc,qsa]`

13.	Design your solution to retrieve images from Internet and display in CollectionView. Write major steps and explain with sample code snippet.
14.	Compare SwiftUI with UIKit and explain two major differences.
15.	Discuss two advantages and two limitations of SwiftUI.
16.	How Text view in SwiftUI is configured from source editor, canvas, and inspectors? Explain with appropriate example and diagram.
17.	What are Spacer( ) and Divider( ) in SwiftUI? Explain with appropriate example and diagram.
18.	Write Swift code snippet and explain use of Image(_:) in SwiftUI.
19.	