Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science & Engineering
Final Examination, Summer 2025
Course Code: CSE221, Course Title: Object Oriented Programming
Level: 2 Term: 2

Time: 02:00 Hrs **Marks: 40**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.		***"Online Payment System":*** An **abstract class** Payment defines a method processPayment() and stores amount. Two types of payments are supported: • CreditCardPayment: Requires cardNumber, cardHolderName. • MobilePayment: Requires mobileNumber, provider. Each payment type **calculates charges differently**. The system processes payments through a common interface but calculates and displays charge details based on payment type.		
	a)	**a) Design a UML class diagram for the system including:** • Abstract class and its attributes/methods • Inheritance hierarchy • Method overriding and data members • Association (if any)	**10**	**CO3**
	b)	**Write Java code for:** • Abstract class Payment with processPayment() • CreditCardPayment and MobilePayment overriding processPayment() • A main() method that demonstrates polymorphism using an array or list of Payment objects and processes each payment.	**12**	**CO2**
	c)	Justify why **polymorphism** is appropriate in this design. Explain how adding a new payment method in future would **benefit from this design.**	**03**	**CO2**
2.		***"E-Learning Platform":*** An e-learning platform offers **courses**, each having **multiple modules**. A Course has courseTitle and courseCode. Each Module has moduleTitle and duration. Each student can enroll in **multiple courses**, and for each course, students complete different modules.		
	a)	Analyze the business case and design a **UML class diagram** showing:		

		• Proper class identification • Attributes with types • Relationships (use **association** and **multiplicity**) • Clear modeling of *Student–Course–Module* structure	**10**	CO3
	b)	Discuss two important **UML modeling decisions** you made in Q2(a). For example: Why you used aggregation vs. composition, how multiplicity was determined, or how the enrollment relationship was modeled.	**05**	CO3