



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 <u>abstract class</u> <u>Payment</u> defines a method <u>processPayment()</u> and stores amount. Two types of payments are supported: • ✓ <u>CreditCardPayment</u>: Requires <u>cardNumber</u>, <u>cardHolderName</u>. • ✓ <u>MobilePayment</u>: Requires <u>mobileNumber</u>, <u>provider</u>. 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 <u>Payment</u> with <u>processPayment()</u> • <u>CreditCardPayment</u> and <u>MobilePayment</u> overriding <u>processPayment()</u> • A <u>main()</u> method that demonstrates polymorphism using an <u>array</u> or <u>list of</u> <u>Payment</u> 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 <u>courses</u> each having <u>multiple modules</u>. A Course has <u>courseTitle</u> and <u>courseCode</u>. Each Module has <u>moduleTitle</u> and <u>duration</u>. Each <u>student</u> can enroll in <u>multiple courses</u>, and for <u>each course</u>, students complete different modules.		
d)	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 <i>Student–Course–Module</i> structure	10	CO3
b)	Discuss <u>two</u> 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