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MALAYSIAN INSTITUTE OF INFORMATION TECHNOLOGY

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**FINAL EXAMINATION**  
**JANUARY 2016 SEMESTER**

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**SUBJECT CODE** : ISB 41203  
**SUBJECT TITLE** : REUSE AND COMPONENT BASED DEVELOPMENT  
**LEVEL** : BACHELOR  
**TIME / DURATION** : ( 2.5 HOURS ) 2.00 pm – 4.30 pm  
**DATE** : 24 MAY 2016

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**INSTRUCTIONS TO CANDIDATES**

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1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. This question paper consists of ONE (1) section only - Section A.
4. Answer only FOUR (4) questions in Section A.
5. Please write your answers on the answer booklet provided.
6. Answer all questions in English.

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THERE ARE 3 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

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**SECTION A (Total: 100 marks)****INSTRUCTION: Answer any FOUR (4) questions only.****Please use the answer booklet provided.****Question 1**

Component-based development (CBD) is a concept well known (almost inevitable) and proven in development of hardware systems. It is based on developing complex systems out of smaller, well defined components. Although the use of CBD principles in developing software has advanced in the last decade, Component-based software engineering (CBSE) still has a lot of room for improvement. CBSE addresses challenges similar to those encountered elsewhere in software engineering. Many of the methods, tools and principles of software engineering used in other types of system will be used in the same or a similar way in CBSE. There is however one difference. CBSE specifically focuses on questions related to components and in that sense it distinguishes the process of "component development" from that of "system development with components".

- (a) Write the process involved in creating the Java web application. (5 marks)
- (b) The Airlines Reservation System consists of a few components. Draw a component diagram and relate the interactions between the components. (12 marks)
- (c) When developing a component, how can we ensure that the proper standard is used will be valid in five to ten years? Justify your ideas. (8 marks)

**Question 2**

Software reuse is the process whereby an organization defines a set of systematic operating procedures to specify, produce, classify, retrieve, and adapt software artifacts for the purpose of using them in its development activities.

- (a) To give an idea of the broader scope of reuse-based software development compared to component-based development, declare the FIVE items that can be considered as reusable artifacts together with a full explanation. (15 marks)
- (b) Summarize the barriers to reuse. (5 marks)
- (c) Discuss the major advantages of software reuse. (5 marks)

**Question 3**

A web application framework is a type of framework, or foundation, specifically designed to help developers build web applications. These frameworks typically provide core functionality common to most web applications, such as user session management, data persistence, and templating systems. By using an appropriate framework, a developer can often save a significant amount of time building a web site.

- (a) Discuss on the FIVE features of the common frameworks with detail explanation. (15 marks)
- (b) A class wants to decide at run-time what algorithm it should use to sort an array. Which pattern to use as many different sort algorithms are already available. Draw a diagram of the pattern. (5 marks)
- (c) Web enabled banking framework requires a few important things. Identifies the requirements. (5 marks)

**Question 4**

JDBC stands for Java Database Connectivity, which is a standard Java API for database-independent connectivity between the Java programming language and a wide range of databases.

- (a) Briefly explain the following terms: (5 marks)
  - i. Java Naming and Directory Interface (JNDI)
  - ii. Enterprise Java Beans (EJB) Module
  - iii. Message-Driven Beans (MDB)
  - iv. Web Java Server Faces (JSF)
  - v. Web application framework
- (b) Write a SQL statement that creates a table named Supplier with four columns. (5 marks)  
You may define the suitable data fields.
- (c) Write a code segment to query from the database. Assume you have a table (5 marks)  
named tbl\_actor in your database and it has fields with name, actor\_id, reg\_date and email. Open the database connection and start to create a statement and execute the query.
- (d) In terms of commonalities, describe the data field of the patient records. (5 marks)
- (e) Draw the architectural diagram that shows the location of the driver manager with (5 marks)  
respect to the JDBC drivers and the Java application.

**Question 5**

The integration process includes integration of standard infrastructure components that build a component framework and the application components. The integration of a particular component into a system is called a component deployment. In difference to the entire system integration a component deployment is a mechanism for integration of particular components - it includes download and registering of the component.

- (a) Discuss the verification and validation (V&V) process and why it differs from the traditional approach? (5 marks)
- (b) Why should organizational assessment be one of the first steps in implementing software reuse within the organization? (5 marks)
- (c) Write a jsp and servlet code segment for the input and output figures as below: (15 marks)

Figure 5.1 CheckBox.jsp

Figure 5.2 CheckBox.java

```
protected void processRequest(HttpServletRequest request,
    HttpServletResponse response)throws ServletException, IOException
{
    response.setContentType("text/html;charset=UTF-8");
    PrintWriter out = response.getWriter();
    try {
        //TODO here . . .
        //TODO here . . .
    } finally {
        out.close();
    }
}
```

Figure 5.3 Code segment

**END OF EXAMINATION PAPER**