**NATIONAL INSTITUTE OF TECHNOLOGY PATNA**
**END SEMESTER EXAMINATION, MAY 2021, SESSION: 2020-21 EVEN SEMESTER**

**Program:** B. Tech. (CSE) **Semester: 4th** **Department:** CSE
**Course Code:** CS4460 **Course Name:** Object Oriented Systems Development
**Full Marks:** 40 Duration of Examination: **2 hours**

## Answer all the questions

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| Q1 a. | Suppose you are designing a computer system to carry out stock control in a large book warehouse. The system should store extensive details of each book, including at least the following information:<br>authors, title, publisher, date of publication, size, number of pages, binding format, shelf location, reorder level, purchase price, sale price. Which of these properties of books do you think are relevant to the conceptual class "Book", and what properties to the concrete class "Book"? Give specific reasons. | [5] |
| b. | Clients wishing to put their property on the market visit the estate agent, who will take details of their house, flat or bungalow and enter them on a card which is filed according to the area, price range and type of property.<br>Potential buyers complete a similar type of card which is filed by buyer name in an A4 binder. Weekly, the estate agent matches the potential buyer's requirements with the available properties and sends them the details of selected properties. When a sale is completed, the buyer confirms that the contracts have been exchanged, client details are removed from the property file, and an invoice is sent to the client. The client receives the top copy of a three part set, with the other two copies being filed. On receipt of the payment the invoice copies are stamped and archived. Invoices are checked on a monthly basis and for those accounts not settled within two months a reminder (the third copy of the invoice) is sent to the client.<br>Create a context diagram for this Estate Agency and also create a Level 1 DFD for the Estate Agency based on the context diagram. | [5] |
| Q2 | There is a collaboration of three entity classes named A, B and C. Each of these classes will be implemented by a (.java) source file. These classes are used across a number of use cases and are grouped together into an ABC component as Java (.class) files. There are two other classes XYZUserInterface and XYZControl. Each of these will be implemented by a (.java) file. The XYZControl component has a dependency on the ABC component and on the XYZUserInterface component.<br>i. Draw a component diagram of the above description showing the source code dependencies.<br>Further, the .class files are grouped together into two (.jar) files. The XYZControl.class component will need to read a configuration file (XYZ.ini) and display a help file (XYZ.hlp) when required. The XYZControl (.java) file also has dependencies on the XYZUserInterface (.java) file and the ABC (.jar) component.<br>ii. Re-draw the component diagram to show the run-time component dependencies. | [5]<br>[5] |
| Q3 a. | Draw a deployment diagram given that the nodes are three client PCs, a server and a printer. The client PC contains ABC.jar component while the server contains XYZ.jar component with the configuration file XYZ.ini and XYZ.hlp. The ABC.jar component has dependencies on the XYZ.jar. The communications protocol between the clients and server is TCP/IP and between the server and printer is a standard parallel printer protocol. The user interface and the control objects will run on the clients. | [5] |
| b. | What is the difference between components in a component diagram and components in a deployment diagram? | [5] |

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| Q4 | A weather mapping system is required to generate weather maps on a regular basis using data collected from remote, unattended weather stations and other data sources such as weather observers, balloons and satellites. Weather stations transmit their data to the area computer in response to a request from that machine.<br>The area computer system validates the collected data and integrates the data from different sources. The integrated data is archived and, using data from this archive and a digitised map database, a set of local weather maps is created. Maps may be printed for distribution on a special – purpose map printer or may be displayed in a number of different formats.<br><br>i. Give the layered architecture for above weather mapping system. The layer name should be shown in a UML package symbol that has been denoted as a sub-system and also give the function of each sub-system.<br>ii. Further expand the architectural model by showing the components of the sub-systems. | [5]<br><br>[5] |