**M S RAMAIAH INSTITUTE OF TECHNOLOGY**

(Autonomous Institute, affiliated to VTU)

**DEPARTMENT OF INFORMATION SCIENCE & ENGINEERING**

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| **Term:** | 22nd Jan – 12th May, 2018 | **Course Code:** | IS 642B |
| **Course:** | OO based Analysis and Design Patterns | **Semester:** | 6 A, B, C |
| **CIE:** | Test – II | **Max Marks:** | 30 |
| **Date:** | 05-04-2018 | **Time:** | 2 – 3 pm |

**Portions for Test:** Lecture Nos. from 14 to 30 as per lesson plan.

**Instructions to Candidates:** Answer ***any two*** full questions. Mobiles are not allowed.

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| **Sl. #** | **Question** | **Marks** | **Bloom’s Level #** | **COs** |
| **1a)** | The Gang of Four calls a pattern you have studied - **“Template Method”**. Is the name justified? Why do you think they used that name? Explain using either UML or code or both, for any case-study of your choice. | 7 | L5  (Evaluate) | CO3 |
| **1b)** | In the generic structure of the **Factory Method** pattern there are *two interfaces* – ‘Product’ and ‘Creator’. Why do we need them? Using a case-study example, appropriate UML design and code-snippets explain your answer. | 8 | L4  (Analyze) | CO3 |
| **2)** | The tax calculations in the US and European countries are different from that in India. The Menu & Billing system must be able to process these varying tax calculations for the customers from different countries. Apply the appropriate design pattern to adhere to the design principle – *“Decouple an abstraction from its implementation so that the two can vary independently”.* Make sure you model the Menu System of countries as Abstractions and Tax Calculation in the Billing System of these countries as Implementations. E.g. You will have a Menu System in India, Pakistan and Bangladesh with a specialty called “Ramadan Menu” with slight variations between the food items in these three countries. During Ramadan, a common festival for the Muslim community of these countries, the tax-calculation for Indian, Pakistani and Bangladeshi menu items could be the same. During other times, the tax-calculation of these three countries would be using a different implementation.   * Which design pattern would you use and why? Give your justification. * Draw the UML Class Model of your design. Write the implementation in either C++ or Java. (**Note**: You can give the outline / skeletal code depicting the usage of the pattern, instead of filling in all the logic.) | 15 | L6  (Create) | CO3 |
| **3a)** | Discuss the key features of **‘Abstract Factory’** pattern. Draw and explain the general UML diagram for this pattern. Highlight an example scenario of its usage. | 10 | L3  (Apply) | CO4 |
| **3b)** | With appropriate examples describe ***any one*** of the following two terms w.r.t **Bridge** Pattern:   1. Commonality Analysis and Variability Analysis 2. The Principle of Healthy Skepticism | 5 | L2  (Understand) | CO4 |