

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**FIFTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 2019**

**Course Code: IT301**

**Course Name: SOFTWARE ARCHITECTURE AND DESIGN PATTERN**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer any two full questions, each carries 15 marks.*

- |   |   | Marks |
|---|---|-------|
| 1 | a) Briefly explain about different software application domains.  | (4)   |
|   | b) What is an incremental development software model? Explain.  | (5)   |
|   | c) Discuss the need for correctness and robustness in software design.  | (6)   |
| 2 | a) Illustrate and explain prototyping model. What process adaptations are required if the prototype will evolve into a deliverable system or product? | (6)   |
|   | b) What is the need for software architecture while developing software?  | (3)   |
|   | c) What are the various design principles required for a good software design? Explain any two.   | (6)   |
| 3 | a) What are the generic process frame work activities that are present in every software process?   | (5)   |
|   | b) Explain Rapid Application development (RAD) in detail. List out its limitations.   | (5)   |
|   | c) What are the benefits of reusability? Explain some methods for reusability.  | (5)   |

**PART B**

*Answer any two full questions, each carries 15 marks.*

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|---|--|-----|
| 4 | a) Create an activity diagram based on the following narrative.  | (6) |
|   | <p>The purchasing department handles purchase requests from other departments in the company. People in the company who initiate the original purchase request are the "customers" of the purchasing department. A case worker within the purchasing department receives that request and monitors it until it is ordered and received. Case workers process the requests for purchasing products under \$1,500, write a purchase order, and then send it to the approved vendor. Purchase requests over \$1,500 must first be sent out for a bid from the vendor that supplies the product. When the bids return, the case worker selects one bid. Then, the case worker writes a purchase order and sends it to the approved vendor.</p> |     |
|   | b) Explain aggregation and composition and generalization with examples.   | (3) |
|   | c) Briefly explain about interpreter and layered architectural style. Give examples  | (6) |

for each architectural style.

5 a) What is the use of interaction diagrams? Briefly explain on the various types of interaction diagrams with examples. (4)

b) To give an exam, an instructor first notifies the students of the exam date and the material to be covered. She then prepares the exam paper (with sample solutions), gets it copied to produce enough copies for the class, and hands it out to students on the designated time and location. The students write their answers to exam questions and hand in their papers to the instructor. The instructor then gives the exam papers to the TAs, along with sample solutions to each question, and gets them to mark it. She then records all marks and returns the papers to the students. (6)

Draw a sequence diagram that represents this process.

c) Explain MVC architectural style in detail. (5)

6 a) Suppose we want to develop software for an alarm clock. The clock shows the time of day. Using buttons, the user can set the hours and minutes fields individually, and choose between 12 and 24-hour display. It is possible to set one or two alarms. When an alarm fires, it will sound some noise. The user can turn it off, or choose to 'snooze'. If the user does not respond at all, the alarm will turn off itself after 2 minutes. 'Snoozing' means to turn off the sound, but the alarm will fire again after some minutes of delay. This 'snoozing time' is pre-adjustable. (7)

Model this with a use case diagram.

b) Explain about the multi-tier architecture style. (3)

c) Which are the two major subcategories of repository style architecture? Explain the blackboard architecture in detail. (5)

### PART C

*Answer any two full questions, each carries 20 marks.*

7 a) What are design patterns and explain its use in detail. (5)

b) Explain about singleton pattern. What are the benefits of singleton pattern? (7)

c) Explain on chain of responsibility pattern and its applicability. What are the uses of this pattern? (8)

8 a) Explain the step-by-step approach of applying a design pattern efficiently. (4)

b) Explain the following with examples (6)

i) Abstract factory pattern

- ii) Prototype pattern
- c) Explain template pattern in detail with its structure, participants and uses. (10)
- 9 a) Briefly explain about structural patterns. Explain about the uses of any two (8)  
structural patterns.
- b) Explain the interpreter pattern in detail. (5)
- c) What is ATAM? Explain about the outputs of ATAM. (7)

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