

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

MAKEUP EXAMINATION- 2016

B.Tech(VIII)/ M.Tech (II) Semester

COURSE CODE: 10M11CI213

MAX. MARKS: 25

COURSE NAME: Advanced Software Engineering

COURSE CREDITS: 03

MAX. TIME: 1Hr 30 Min

Note: All questions are compulsory.

Q.1 [2.5 * 2]

- a) You have been asked to prepare and deliver a presentation to a non-technical manager to justify the hiring of a system architect for a new project. Write a list of bullet points setting out the key points in your presentation.
- b) Draw diagrams showing a conceptual view and a process view of the architectures of an automated ticket-issuing system used by passengers at a railway station.

Q.2 [2.5 * 2]

- a) Reliability and safety are related but distinct dependability attributes. Describe the most important distinction between these attributes and explain why it is possible for a reliable system to be unsafe and vice versa.
- b) Imagine you are implementing a software-based control system. Suggest circumstances in which it would be appropriate to use a fault-tolerant architecture, and explain why this approach would be required.

Q.3 [2.5 * 2]

- a) There are two essential safety requirements for the train protection system: The train shall not enter a segment of track that is signaled with a red light. The train shall not exceed the specified speed limit for a section of track. Assuming that the signal status and the speed limit for the track segment are transmitted to onboard software on the train before it enters the track segment, propose five possible functional system requirements for the onboard software that may be generated from the system safety requirements.
- b) What is social engineering? Why is it difficult to protect against it in large organizations?

Q.4 [2.5 * 2]

- a) Explain when it may be cost effective to use formal specification and verification in the development of safety-critical software systems. Why do you think that critical systems engineers are against the use of formal methods?
- b) Using an example of a component that implements an abstract data type such as a stack or a list, show why it is usually necessary to extend and adapt components for reuse.

Q.5 [2.5 * 2]

- a) You are responsible for the design of a communications switch that has to provide 24/7 availability, but which is not safety-critical. Giving reasons for your answer, suggest an architectural style that might be used for this system?
- b) Using a distributed component approach, propose architecture for a national theater booking system. Users can check seat availability and book seats at a group of theaters. The system should support ticket returns so that people may return their tickets for last-minute resale to other customers.