SASTRA
DEEMED TO BE UNIVERSITY
THANJAVUR KUMBAKONAM CHENNAI

School of Computing
First CIA Exam – Feb 2023
Course Code: CSE314R01&CSE215R01
Course Name: Software Engineering Practices&Software Engineering
Duration: 90 mins Max.Marks:50

PART A(10*2=20)

Answer ALL

1. State different roles of software with suitable example.
2. We agree software industry has become a dominant factor in the economies of the industrialized world. Software industries have teams of software specialists, each focusing on one part of the technology required to deliver a complex application and have replaced the lone programmer of an earlier era. Yet, there were some questions asked of the lone programmer, are asked, evennow with the emergence of modern computer-based system, that led to the adoption of software engineering practice. List any of the four questions that set the stage for the adoption of software engineering practice.
3. As a software engineer, having understood the software problem, you are heading towards planning the solution for the software problem. What necessary things will you analyze to plan the solution?
4. Arun, a business analyst, is assigned in a complex software project 'SpaceY'. The project involves many stakeholders, each with the different set of requirements. How does he conduct the communication activity for this project?
5. Identify the uses of stage and task pattern types of process patterns with suitable example.
6. Match the following:

ISO	-	IEC 15504
CBA IPI	-	SEI CMMI
SCAMPI	-	9001:2000
SPICE	-	SEI CMM

7. 'SafeCar' Software is planned to be built using prototyping/spiral/concurrent process models. Recall any two common limitations of these process models in brief.
8. Which software process model is derived from an activity that occurs during the rugby match? Illustrate the logical connection between the activity and the process model.
9. A function in 'AirAmbulance' softwareis validated against fourteen system characteristics-based questionsto compute function points and their sum is 75. Calculate the value adjustment factor.
10. Assume the estimated FPs for an AutoCAD software is 486. A review of historical data indicates that the organizational average productivity for this

type of systems is 50 FP/pm. Labour rate is 8000 USD/pm. Estimate the cost per FP, total project cost and effort (in person-months).

PART B (3*10=30)

Answer ALL

11. Sally is in-charge for conducting the 'Elicitation' action for a larger, more complex project 'ChatGPT' an AI based software. Suggest Sally the best set of task sets, that would be required to gather the requirements of the software.
12. 'HealthTracker' is a software application that serves to track various aspects of daily life contributing to well-being such as physical activity, diet, and sleep. The application can be installed on smart phones. The dashboard is the main display of the application. The table shows on one page, a general overview of the most recent data saved. In addition, it provides direct access to each feature. Its composition and layout are customizable. Some features of the software are tracked by phone sensors and some features are tracked by user input. The main features of the HealthTracker include: pedometer, dietary monitoring, sleep tracker and heart rate measurement. The initial requirement of the software is identified as Pedometer, and there is a compelling need to provide this feature to users quickly and the software is then planned to refine and expand the other features such as dietary monitoring, sleep tracker and heart rate measurement in later software releases. Pedometer is a step counting feature integrated with the software. The default goal is to reach 10,000 steps per day. The number is recommended by World Health Organization. The app calculates other data such as distance travelled, the number of calories burnt and the number of steps taken at a good pace. According to the application information, a good rhythm is obtained when a rate of at least 100 steps per minute is maintained for ten minutes. At the visual level, we can use the data with different graphics: On a 24-hour day with a histogram showing activity (number of steps) in 24-minute increments (60 slices of 24 minutes in one day). Daily, weekly and monthly trends showing the average number of daily steps taken.Identify the suitable model to implement the software. Justify the reason. Explain the process model in detail.
13. The subsystems of the 'HealthTracker' software and the expected LOC for each of the subsystems is shown in a table given below. The historical data indicates that average productivity of commercial software of this type is 1200 LOC/pm. Burdened labour rate is $2100/pm. Based on the LOC and the historical productivity of the organization, compute efforts in person/months. Compare the Effort in person-months for the same software using Software Equation and Putnam and Myer's. (5+5)

Subsystems	Estimated LOC
Pedometer	18000
Dietary monitoring	15500
Sleep tracker	12300
Heart rate measurement	7000

CSE314R01- Software Engineering
CIA I – February 2023
PART A (10*2=20)

Answer ALL the Questions

1. Product (any real time application software) and vehicle for driving a product (Ubuntu)

2. Why does it take so long to get software finished? Why are development costs so high? Why can't we find all errors before we give the software to our customers? Why do we spend so much time and effort maintaining existing programs? Why do we continue to have difficulty in measuring progress as software is being developed and maintained?

3. Have you seen similar problems before? Are there patterns that are recognizable in a potential solution? Is there existing software that implements the data, functions, and features that are required? Has a similar problem been solved? If so, are elements of the solution reusable? Can subproblems be defi ned? If so, are solutions readily apparent for the subproblems? Can you represent a solution in a manner that leads to effective implementation? Can a design model be created?

4. Communication activity might have six distinct actions inception, elicitation, elaboration, negotiation, specification, and validation.

5. Stage pattern – defines a problem associated with a framework of activity. Eg: Establishing Communication; Task pattern – defines a problem associated with a software engineering action/work task and relevant to successful software engineering practice. Eg: Requirement Gathering.

6. Match the following:

ISO	-	9001:2000
CBA IPI	-	SEI CMM
SCAMPI	-	SEI CMMI
SPICE	-	IEC 15504

7. Evolutionary process models: uncertain number of cycles; do not establish the maximum speed of evolution. software processes should be focused on flexibility and extensibility rather than on high quality.

8. Scrum - group of players forms around the ball and the teammates work together (sometimes violently!) to move the ball downfield

10. $13, $561600, 70 person-months

9. 14

PART B (3*10=30)

Answer ALL the questions

11. Elicitation Action for gathering requirements:

1. Make a list of stakeholders for the project. 2. Interview each stakeholder separately to determine overall wants and needs. 3. Build a preliminary list of functions and features based on stakeholder input. 4. Schedule a series of facilitated application specification meetings. 5. Conduct meetings. 6. Produce informal user scenarios as part of each meeting. 7. Refi ne user scenarios based on stakeholder feedback. 8. Build a revised list of stakeholder requirements. 9. Use quality function deployment techniques to prioritize requirements. 10. Package requirements so that they can be delivered incrementally. 11. Note constraints and restrictions that will be placed on the system. 12. Discuss methods for validating the system.

12. **Incremental Process Model**, urgent need for pedometer… other requirements are refined and expanded later. Description about the process model

13. LOC=52800; Cost for 1LOC=1.75; **Cost for the software=92400**; **Effort=44p/m**
Tmin=10.692; Effort=35.65p/m