Course Code: 20CI0605 **R20**

SIDDHARTH GROUP OF INSTITUTIONS:: PUTTUR
(AUTONOMOUS)
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QUESTION BANK (DESCRIPTIVE)

Subject with Code: Software Engineering &Testing (20CI0605) **Course & Branch**: B.Tech - CSIT

Year & Sem: III-B.Tech & I-Sem **Regulation:** R20

UNIT –I
INTRODUCTION SOFTWARE METRICS

1	**a**	Define software crisis? Identify the reasons for software crisis.	[L1][CO1]	**[5M]**
	b	Explain Waterfall model with a neat diagram and list out the merits and demerits of waterfall model.	[L2][CO1]	**[5M]**
2	**a**	Explain evolutionary process models in software engineering.	[L2][CO1]	**[5M]**
	b	Discuss the prototyping model. What is the effect of designing a prototype on the overall cost of the software project?	[L5][CO1]	**[5M]**
3	a	What do you understand by term software development life cycle? Why it is important to while developing a software product?	[L1][CO1]	**[5M]**
	b	Describe the rapid application development (RAD) model. Discuss each phase in detail.	[L5][CO1]	**[5M]**
4	**a**	List the process maturity levels in SEI's CMM. Explain each level.	[L2][CO1]	**[5M]**
	b	Analyze Functional Point Analysis (FPA) with an example.	[L2][CO1]	**[5M]**
5	**a**	Explain the spiral model of software development. What are the limitations of such model?	[L2][CO1]	**[5M]**
	b	Explain the Halstead theory of software science. Is it significant in today's scenario of software development?	[L5][CO1]	**[5M]**
6	**a**	Explain in detail the following software metrics with example. i) Size metric. ii) Token Count.	[L2][CO1]	**[6M]**
	b	Write a program in C language. List out the operators and operands and also calculate the values of software science measures like η, N, V, E, and λ?	[L5][CO1]	**[4M]**
7		Explain in detail the following software metrics with example. i) Design Metrics ii) Data structure Metrics	[L2][CO1]	**[10M]**
8	**a**	An application has the following: 10 external inputs, 12 high external outputs, 20 low internal logical files, 15 high external interface files, 12 average external enquiries. And a value of complexity adjustment factor of 1.10. What are the unadjusted and adjusted function pint counts?	[L6][CO1]	**[6M]**
	b	Is software metrics required in software engineering? Why do we really need metrics in software.	[L1][CO1]	**[4M]**
9		Explain in detail the following software metrics with example. i. Function count ii. Information flow metrics	[L2][CO1]	**[10M]**

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10	Consider a project with the following functional units: Number of user inputs = 50 Number of user outputs = 40 Number of user enquiries = 35 Number of user files = 06 Number of external interfaces = 04 Assume all complexity adjustment factors and weighting factors are average. Compute the function points for the project.	[L6][CO1]	**[10M]**

UNIT –II
SOFTWARE PROJECT PLANNING, SOFTWARE REQUIREMENT ANALYSIS AND SPECIFICATIONS

1	a	Explain the cost estimation models.	[L1][CO2]	[5M]
	b	A database system is developed. The effort has been estimated to be 100 persons- months. Calculate the number of lines of code and productivity in LOC/ persons- month.	[L6][CO2]	[5M]
2	a	Compare the Walton-Felix model with the SEL model on a software development expected to involve 12 person-years of effort Software Project Planning. (i) Calculate the number of lines of source code that can be produced. (ii) Calculate the duration of the development. (iii) Calculate the productivity in LOC/PY (iv) Calculate the average manning	[L6][CO2]	[5M]
	b	Identify typical software risk factors. Explain the risk management activities.	[L2][CO2]	[5M]
3	a	What is COCOMO Model? Explain Basic COCOMO model in detail.	[L2][CO2]	[5M]
	b	Suppose that a project was estimated to be 400 KLOC. Calculate the effort , development time for each of the three modes (i.e., organic, semidetached and embedded and analyze.	[L6][CO2]	[5M]
4	a	Explain Intermediate COCOMO model in detail.	[L2][CO2]	[5M]
	b	A new project with estimated 400 KLOC embedded system has to be developed. Project manager has a choice of hiring from two pools of developers: very highly capable with very little experience in the programming language being used or developers of low quality but a lot of experience with the programming language. What is the impact of hiring all developers from one or the other pool?	[L5][CO2]	[5M]
5	a	Compare various types of projects modes in the COCOMO Model.	[L6][CO2]	[5M]
	b	A project size of 200 KLOC is to be developed. Software development team has average experience on similar type of projects. The project schedule is not very tight. Calculate the effort, development time, average staff size and productivity of the project.	[L5][CO2]	[5M]
6	a	Interpret the Putnam resource allocation model.	[L2][CO2]	[5M]
	b	A software development project is planned to cost 95 MY in a period of 1 year and 9 months. Calculate the peak manning and average rate of software team build up.	[L6][CO2]	[5M]
7	a	Differentiate functional and non-functional requirements.	[L2][CO2]	[5M]
	b	Define problem analysis. Explain what are the five steps for problems analysis?	[L5][CO2]	[5M]
8	a	A university registrar's office maintains data about the following entities: i. Courses, including number, title, credits, syllabus, and prerequisites; ii. Course offerings, including course number, year, semester, section number,	[L2][CO2]	[5M]

		instructor(s), timings, and classroom; iii. Students, including student-id, name, and program; iv. Instructors, including identification number, name, department, and title. Further, the enrolment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modelled. Construct an E-R diagram for the registrar's office. Document all assumptions that you make about the mapping constraints.		
	b	Elaborate Data dictionary in software engineering.	[L6][CO2]	[5M]
9	a	Explain Software Prototyping in software engineering.	[L2][CO2]	[5M]
	b	Model a Dataflow diagram for a "Library Management System". State and explain the functional requirements you are considering.	[L6][CO2]	[5M]
10	a	List the characteristics of good SRS document and their requirements	[L2][CO2]	[5M]
	b	Consider a project to develop a full screen editor.The major components identified are: i. Screen edits ii. Command Language Interpreter iii. File Input & Output iv. Cursor Movement v. Screen movement the size of these are estimated to be 4k, 2k, 1k, 2k and 3k delivered source code lines. Use COCOMO to determine 1. Overall cost and schedule estimates (assume values for different cost drivers, with at least three of them being different from 1.0) Cost & Schedule estimates for different phases.	[L6][CO2]	[5M]

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UNIT –III

SOFTWARE DESIGN, SOFTWARE RELIABILITY

1	a	Describe the various strategies of design. Which design strategy is most popular and practical?	[L2][CO3]	[5M]
	b	Define cohesion and coupling. Explain relationship between cohesion and coupling.	[L1][CO3]	[5M]
2	a	Discuss the difference between object-oriented designs and function oriented design.	[L2][CO3]	[5M]
	b	What is modularity? List the important properties of a modular system.	[L1][CO3]	[5M]
3	a	Discuss the objectives of software design. How do we transform an informal design to a detailed design?	[L6][CO3]	[5M]
	b	What is module cohesion? Classify different type of module cohesion.	[L4][CO3]	[5M]
4	a	Define module coupling and explain different types of coupling.	[L1][CO3]	[5M]
	b	Demonstrate relationship between module cohesion and module coupling for process of good software design.	[L1][CO3]	[5M]
5	a	Discuss object-oriented software design approach.	[L6][CO3]	[5M]
	b	Describe the various strategies of design. Which design strategy is most popular and practical?	[L2][CO3]	[5M]
6	a	Explain function-oriented software design approach.	[L1][CO3]	[5M]
	b	Define software reliability. Explain the significance of bath tube curve of reliability with the help of a diagram	[L1][CO3]	[5M]
7	The following parameters for basic and logarithmic poisson models are given: ***Basic execution time model*** | ***Logarithmic poisson execution time model*** λ_0=10 failures/CPU hr. | λ_0=30 failures/CPU hr. V_0=100 failures | θ=0.025/faluire i. Determine the additional failures and additional execution time required toreach the failure objectives of 5failures/CPU hr for both models. ii. Repeat this for an objective function of 0.5 failure/CPU hr. Assume that westart with the initial failure intensity only.		[L6][CO3]	[10M]
8	Assume that a program will experience 200 failures in infinite time. It has now experienced 100. The initial failure intensity was 20 failures/CPU hr. i. Determine the current failure intensity. ii. Find the decrement of failure intensity per failure. iii. Calculate the failures experienced and failure intensity after 20 and 100 CPU hrs. of execution. iv. Compute addition failures and additional execution time required to reach the failure intensity objective of 5 failures/CPU hr. Use the basic execution time model for the above-mentioned calculations		[L6][CO3]	[10M]
9	Explain the following software reliability models. i) Logarithmic poisson execution time model ii) Calendar Time Component Model.		[L2][CO3]	[10M]
10	a	Discuss the basic model of software reliability. How $\Delta\mu$ and $\Delta\tau$ can be calculated	[L6][CO3]	[10M]
	b	Compare hardware reliability with software reliability	[L2][CO3]	[5M]

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UNIT –IV

SOFTWARE TESTING

1	**a**	What is software testing? What is the deference between verification and validation	[L1][CO4]	**[5M]**
	b	Define the following terminologies: i) Error, Mistake, Bug, Fault and Failure. ii) Test, Test case and Test suite.	[L1][CO4]	**[5M]**
2	What is the difference between i. Alpha testing & beta testing ii. Functional & structural testing		[L2][CO4]	**[10M]**
3	Discuss various types of functional testing techniques.		[L5][CO4]	**[10M]**
4	a	Consider a program for the determination of the nature of roots of a quadratic equation. Its input is a triple of positive integers (say a,b,c) and values may be from interval [0,100]. The program output may have one of the following words. [Not a quadratic equation; Real roots; Imaginary roots; Equal roots] Design the boundary value test cases.	[L6][CO4]	**[5M]**
	b	Explain the boundary value analysis testing techniques with the help of an example.	[L2][CO4]	**[5M]**
5	a	Illustrate Equivalence class testing technique.	[L2][CO4]	**[5M]**
	b	Consider a program for the determination of the nature of roots of a quadratic equation. Its input is a triple of positive integers (say a,b,c) and values may be from interval [0,100]. The program output may have one of the following words. [Not a quadratic equation; Real roots; Imaginary roots; Equal roots] Identify the equivalence class test cases for output and input domains.	[L6][CO4]	**[5M]**
6	Elaborate various types of structural testing technique.		[L5][CO4]	**[10M]**
7	a	Explain decision table-based testing technique.	[L2][CO4]	**[5M]**
	b	Simplify data flow testing technique with an example.	[L2][CO4]	**[5M]**
8	a	What is the purpose of integration testing? How is it done?	[L1][CO4]	**[5M]**
	b	Differentiate between integration testing and system testing.	[L4][CO4]	**[5M]**
9	a	What are the objectives of testing? Why is the psychology of a testing person important?	[L1][CO4]	**[5M]**
	b	Summarize an effect graphing testing technique.	[L2][CO4]	**[5M]**
10	a	Explain mutation testing technique.	[L2][CO4]	**[5M]**
	b	Compare various debugging technique.	[L2][CO4]	**[5M]**

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UNIT –V

SOFTWARE MAINTENANCE

1	**a**	Explain the following teams: i) Reverse engineering ii) Regression testing	[L2][CO5]	**[5M]**
	b	Differentiate between re-engineering and new development.	[L2][CO5]	**[5M]**
2	Explain the phases of software maintenance with help of a diagram.		[L5][CO5]	**[10M]**
3	What is software maintenance? Describe various categories of maintenance. Which category consumes maximum effort and why?		[L2][CO5]	**[10M]**
4	Discuss Reverse engineering and Re-engineering.		[L6][CO5]	**[10M]**
5	What is regression testing? Differentiate between regression and development testing.		[L2][CO5]	**[10M]**
6	List out system documentation and also explain their purpose.		[L1][CO5]	**[10M]**
7	a	Explain the following software maintenance. i) Boehm's Model ii) Iterative enhancement model	[L2][CO5]	**[5M]**
	b	What are the appropriate reverse engineering tools? Discuss any two tools in detail.	[L1][CO5]	**[5M]**
8	a	What is reverse engineering? Discuss levels of reverse engineering.	[L6][CO5]	**[5M]**
	b	What are configuration management activities? Draw the Performa of change request form.	[L6][CO5]	**[5M]**
9	Identify various software maintenance models and explain in details.		[L2][CO5]	**[10M]**
10	a	Classify different categories of software documentation.	[L1][CO5]	**[5M]**
	b	Compare New software development and Re-engineering	[L4][CO5]	**[5M]**

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