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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2023 Semester End Main Examinations

Programme: B.E. **Semester: V**
Branch: Computer Science and Engineering **Duration: 3 hrs.**
Course Code: 20CS5PCSEG **Max Marks: 100**
Course: Software Engineering **Date: 01.03.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

UNIT - I

1	a)	Define Software Engineering. Illustrate the professional and ethical responsibilities that a Software Engineer should have.	**6**
	b)	Design a Software Requirements document for an online furniture ordering system.	**8**
	c)	Illustrate the two fundamental types of evolutionary development. Identify the problems existing in evolutionary approach.	**6**

OR

2	a)	List the additional information to be included when a standard form is used for specifying functional requirements.	**6**
	b)	State Code of Ethics and Professional Practice as specified by ACM/IEEE-CS force. Suggest an appropriate example that illustrates each clause.	**8**
	c)	Design a template using structured natural language to capture the requirements of a fuel delivery system.	**6**

UNIT - II

3	a)	Analyze the Library Management System that catalogues copyrighted articles from various countries. Identify the principal viewpoints and organize diagram.	**6**
	b)	i) Draw a context model for a patient information system in a hospital. You may make any reasonable assumptions about the other hospital systems that are available, but your model must include a patient admissions system and an image storage system for X-rays, as well as other diagnostic records. ii) Develop a sequence diagram showing the interactions involved when a student registers course in a university. Courses may have limited enrolment, so the registration process must include checks that enrolements are available or not. Assume that the student accesses an electronic course catalogue to find out about the available courses.	**8**

c) Describe the categories of requirement based on evolution perspective. Demonstrate the classification of requirements that are likely to change. **6**

UNIT - III

4 a) Describe the various proposals to identify object class. Identify object classes in the weather station system **6**

b) Identify and explain an appropriate control model for the following systems: Give reasons for your answer **8**

- A batch processing system that takes information about hours worked and pay rates and prints salary slips and bank credit transfer information
- A set of software tools that are produced by different vendors, but which must work together
- A television controller that responds to signals from a remote-control unit

c) Identify possible objects in the following system and develop an object-oriented design for that system. You may make any reasonable assumptions about the systems when deriving the design. **6**

A petrol (gas) station is to be set up for fully automated operation. Drivers swipe their credit card through a reader connected to the pump; the card is verified by communication with a credit company computer; and a fuel limit is established. The driver may then take the fuel required. When fuel delivery is complete and the pump hose is returned to its holster, the driver's credit card account is debited with the cost of the fuel taken. The credit card is returned after debiting. If the card is invalid, the pump returns it before fuel is dispensed.

UNIT - IV

5 a) Describe the four "organizational paradigms" suggested by Constantine for software engineering teams **6**

b) i) Differentiate between LOC Based Estimation and FP based Estimation. **8**
ii)An organizations average productivity is 12 FP/pm. The average labor rate is $15600 per month. If a proposed project has a count total of 560 and the Value Adjustment factor (VAF) is 34.
Calculate:

(I) Cost per Functional Point
(II) Overall Project Cost
(III) Estimated effort in person-months

c) Consider the task of developing a software for Automated University marks card generation system. The scheduling of this system must account for the following requirement: **6**

- Initially the work should start with design of a control terminal (T0) class for no more than eleven working days.
- Next, the classes for student user (T1) and faculty user (T2) should be designed in parallel, assuming that the elaboration of student user takes

no more than six days, while the faculty user needs four days.

- When the design of student user completes network protocol (T4) is to be developed, it is a subtask that requires eleven days, and simultaneously network management routines (T5) is to be designed that takes up to seven days.
- After the termination of the faculty user subtask, a database directory (T3) should be made for nine days to maintain information about the marks of students and their information.
- The completion of the network protocol and management routines should be followed by design of the overall network control (T7) procedures for up to eight days.
- The Database directory design should be followed by a subtask elaboration of users of the system (T6), which takes eleven days; the software engineering process terminates with testing (T8) for no more than four days.

Design Time-Line chart for the above System along with milestones

UNIT - V

6	a)	Illustrate the principles of agile methods. Identify the reasons why the principles underlying agile methods are sometimes difficult to realize.	**6**
	b)	Differentiate between Whitebox and Blackbox testing with relevant example and diagram.	**8**
	c)	Identify the strategic options when a organization has limited budget for maintaining and upgrading their legacy system evolution. When would you normally replace all or part of a system rather than continue maintenance of the software (with or without reengineering)?	**6**

OR

7	a)	Explain the importance of program inspection. Identify and elaborate inspection process.	**6**
	b)	Illustrate the concept of partition testing approach and apply this concept for a binary search routine with a neat diagram.	**8**
	c)	Demonstrate software testing workbench and the tools that might be included in such a testing workbench.	**6**

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