ive	QUESTION BANK	BL	CO	PO	PSO	Marks
	UNIT-1					
1	What is Software Engineering? List the needs of becoming an experts at managing complexity	1	1	1	2	6
2	Outline essential attributes of good software	1	1	1	2	6
3	List and elaborate different types of software applications	1	1	1	2	6
4	Mention software engineering fundamentals that apply to all types of software systems	1	1	1	2	6
5	Software organization has had a major effect on software engineering for web-based systems. Give Examples	2	1	1	2	6
6	Outline general process models	2	1	1	2	8
7	Discuss Waterfall model with a neat diagram. Mention where it can be used or applied. Give 3 examples	3	1	1	2	8
8	Explain advantages and disadvantages of water fall model	2	1	1	2	8
9	Discuss Incremental Development model with a neat diagram. Give example projects where one can apply the incremental development process model	3	1	1	2	8
10	Explain advantages and disadvantages of Incremental Development model	2	1	1	2	8
11	Explain reusability and configuration process model in software engineering	2	1	1	2	6
12	Outline activities in the requirements engineering process and explain process in detail with a neat diagram	3	1	1	2	8
13	Discuss the general model of the design process with a neat diagram	2	1	1	2	8
14	Illustrate Testing phases in a plan-driven software process with a neat diagram	2	1	1	2	8
15	Explain Software system evolution with a neat diagram	2	1	1	2	8
16	What are the Two related approaches may be used to reduce the costs of rework and justify why	2	1	1	2	8
17	What is prototyping? Mention its importance in software engineering . Give Prototype development life cycle diagram and explain in brief	2	1	1	2	8
18	What is incremental delivery? Illustrate its phases with a neat diagram. What are its advantages and also mention key problems	2	1	1	2	8
19	Differentiate between plan driven approach and Agile Specification	2	1	1	2	6
20	Outline the principles of agile methods	2	1	1	2	6
21	What is Extreme Programming? Illustrate XP release cycle with a neat diagram	2	1	1	2	8
22	Analyze XP practices	4	1	1	2	8
23	Mention Industrial XP practices and explain each in detail	2	1	1	2	8
24	Explain User stories with an example	2	1	1	2	6
25	Discuss Refactoring with an example	2	1	1	2	6
26	Illustrate Test Driven Development with an example. List the problems with TDD	2	1	1	2	8
27	What is pair programming. Mention its advantages	2	1	1	2	6
28	Define SCRUM. Analyze its phases. Illustrate Scrum sprint cycle with a neat diagram	2	1	1	2	8
29	Analyze advantages of scrum model	2	1	1	2	6

30	Elaborate Project Management Knowledge Areas and Project Management Body of Knowledge in detail	1	1	1	2	6
	UNIT-2					
1	Define User Requirements and System Requirements. Distinguish between them. Give example for each.	1	2	3	2	8
2	Define Functional and Non functional Requirements. Distinguish between them.	2	2	3	2	8
3	Consider Mentcare system. Derive 5 functional requirements and 5 non functional requirements	4	2	3	2	8
4	Illustrate types of non functional requirements with a neat diagram	2	2	3	2	8
5	Outline metrics for specifying non functional requirements	2	2	3	2	6
6	Identify functional requirements for Insulin pump system	3	2	3	2	6
7	Give the spiral view of the requirement engineering process	2	2	3	2	6
8	Analyze how requirement elicitation or requirement discovery are done. Explain the process activities involved with a neat diagram	4	2	3	2	8
9	How to write requirement specification document. Mention the key fields and elobarate	1	2	3	2	8
10	In practice, requirements and design are separable. Justify this statement	4	2	3	2	6
11	Give the guidelines for writing requirements	2	2	3	2	6
12	Consider Insulin pump example. Generate structured specification of requirements	4	2	3	2	8
13	Consider Insulin pump example. Generate Tabular specification of requirements	4	2	3	2	8
14	Design use case for ment care system	3	2	3	2	6
15	Elaborate structure of requirement specification document as per IEEE standard	2	2	3	2	8
16	Explain the following: i) Requirement validation ii) Requirements checking	2	2	3	2	8
17	Synthesize how different levels of requirement management are established	1	2	3	2	8
18	Analyze how to decide if the requirement change should be accepted or not	4	2	3	2	6
19	Define System Modeling. Differentiate between existing models and planned system models	2	2	3	2	8
20	Outline the system perspectives of model	2	2	3	2	6
21	Mention different UML diagram types. With an example explain each	2	2	3	2	8
22	Illustrate the usage of context model and explain in detail with an example	2	2	3	2	8
23	Derive the process model for involuntary detention at mentcare system example	3	2	3	2	6
24	Illustrate the usage of Interaction model. Mention its approaches and explain in detail with an example	2	2	3	2	8
25	Derive the Sequence diagram for patient view information at mentcare system example	4	2	3	2	8
26	Derive the state diagram for microware owen. Elaborate the state and stimuli for the owen	4	2	3	2	8

27	Analyze the pros and cons of model driven engineering	4	2	3	2	6
28	From a high-level, platform independent model, it is possible, in principle, to generate a working program without manual intervention. How many types of models are derived and elaborate each	3	2	3	2	8
29	With suitable diagram, illustrate multiple platform specific models	2	2	3	2	6
30	Why architectural design is important? Derive architecture diagram for packing robot control system	2	2	3	2	8
31	Outline architecture and system characteristics	2	2	3	2	6
32	Describe the views of software architecture	2	2	3	2	6
33	With a neat diagram, explain MVC controller pattern	2	2	3	2	8
34	Explain web application of MVC architecture	2	2	3	2	6
35	When to use layered architecture. Demonstrate with an example.	2	2	3	2	6
36	Analyze repository pattern with an example	2	2	3	2	6
37	Analyze client server pattern with an example	2	2	3	2	6
38	Design pipe and filter architecture for a payments system	2	2	3	2	6
39	Mention use of application architecture. Outline examples of application types	2	2	3	2	6
40	Derive the software architecture of an ATM system	4	2	3	2	6
41	Consider ment care system example. Design class diagrams showing generalization and aggregation	4	2	3	2	8
42	What is unit testing? What type of testing process is Unit Testing? Explain each in detail	2	2	3	2	8
43	Draw a State Diagram for an Order Processing System of a Grocery shop	4	2	3	2	8
44	Derive the software architecture for men care system	3	2	3	2	6
45	Derive the software architecture for language processing system	3	2	3	2	6
	UNIT 3					
1	Identify use cases and build model for weather station	3	3	3	2	6
2	Derive object classes for weather station	3	3	3	2	6
3	To show sequence of object interactions, which design model is better? Justify with a suitable example	4	3	3	2	8
4	To show how objects respond different service requests and transitions which model is suitable. Demonstrate the model with an example	4	3	3	2	8
5	When to use <<interface>> and <<implement>> interfaces? For the weather station example, derive the design using both interfaces	4	3	3	2	6
6	Describe observer pattern with a neat UML diagram. Explain Pattern name and mention corresponding observer	4	3	3	2	8
7	Mention common implementation issues and elaborate any two issues with suitable diagram	2	3	3	2	8
8	Define validation testing and defect testing. Analyze each with appropriate example	4	3	3	2	6
9	Distinguish between i) Validation and verification ii) Inspection and testing	1	3	3	2	6
10	Mention the advantages of inspections	1	3	3	2	6
11	Explain a model of the software testing process with a neat diagram	2	3	3	2	8
12	Discuss development testing and types of development testing with example	2	3	3	2	6

13	Mention automated test components. Analyze how to choose test cases? Mention testing strategies in brief	4	3	3	2	6
14	Demonstrate Equivalence Partitioning with a suitable diagram	2	3	3	2	6
15	say a program specification states that the program accepts four to eight inputs which are five-digit integers greater than 10,000 Derive test cases using boundary value analysis method	4	3	3	2	6
16	For Password length between 8 to 16 requirement, Derive test cases using equivalence partitioning method	4	3	3	2	6
17	Mention testing guidelines	2	3	3	2	6
18	What is component testing? Explain each interface testing types in brief	2	3	3	2	6
19	Differentiate between i) System testing and component testing ii) Release testing and system testing	2	3	3	2	6
20	When one can use test driven development(TDD) approach? With a neat diagram illustrate TDD. Mention the benefits of TDD.	2	3	3	2	6
21	When one can use Requirement Based Testing(RBT) approach? With an example illustrate RBT.	2	3	3	2	6
22	Explain performance testing in brief	5	3	3	2	6
23	Which testing is used by users and customers. What are its types. Explain any one in detail with a neat diagram if applicable	3	3	3	2	8
24	Explain acceptance testing with a neat diagram. Mention its stages	2	3	3	2	8
25	With an example, explain a software legacy system. Why is it hard to change legacy systems?	2	3	3	2	6
UNIT 4						
1	Outline any 5 PMBOK knowledge areas	1	4	2	2	6
2	Why software risk management is important? Give examples of risks and identify risk classes for each.	2	4	2	2	8
3	Explain risk management process with a neat diagram.	2	4	2	2	8
4	Mention risk types and identify possible risks against each	2	4	2	2	8
5	Analyze risk with any 4 examples. Mention probability and affects for each	2	4	2	2	6
6	Elaborate risk planning and derive strategies for different types of risks	2	4	2	2	6
7	Mention people management factors	2	4	2	2	6
8	Synthesize Maslow's Pyramid with a neat diagram	2	4	2	2	6
9	Motivation should also take into account different personality types. What are those types? Explain each in brief.	2	4	2	2	6
10	Mention advantages of group coherence and effectiveness of a team	2	4	2	2	6
11	List the importance of effective communication. Explain factors influencing effective communications	2	4	2	2	6
12	Explain project planning process with a neat diagram	2	4	2	2	8
13	What is project scheduling? Mention its activities. Explain project scheduling process	2	4	2	2	8
14	Consider a suitable example. Derive Tasks, durations and dependencies. Design Gantt Chart	3	4	2	2	8
15	List the factors to be considered for estimation in software. Elaborate each in brief	2	4	2	2	6

<table>
<tr><td>16</td><td>What are the 2 types of estimation techniques? Explain in brief</td><td>2</td><td>4</td><td>2</td><td>2</td><td>8</td></tr>
<tr><td>17</td><td>Describe COCOMO cost modeling with a neat diagram</td><td>2</td><td>4</td><td>2</td><td>2</td><td>8</td></tr>
<tr><td>18</td><td>"For the given activities, draw the network diagram, identify the critical path and its duration.
A-->B = 5 Days
B-->C = 3 Days
B-->D = 4 Days
B-->F = 6 Days
C-->E = 8 Days
D-->F = 7 Days
E-->F = 4 Days
F-->G = 5 Days"</td><td>4</td><td>4</td><td>2</td><td>2</td><td>8</td></tr>
<tr><td>19</td><td>"Compute Estimate At Completion (EAC) and Variance At Completion (VAC) if both SPI and CPI influence the project work when given variables are
• Budget At Completion (BAC) = 50 Lakh Rupees
• Earned Value (EV) = 20 Lakh Rupees
• Planned Value (PV) = 30 Lakh Rupees
• Actual Cost (AC) = 35 Lakh Rupees
Also, identify whether the project is behind schedule and whether the project is within the budget."</td><td>4</td><td>4</td><td>2</td><td>2</td><td>8</td></tr>
<tr><td>20</td><td>In a software project, three risks were identified.
(1) 75% chance of losing 50 thousand Rupees due to delayed delivery of reports module.
(2) 5% chance of spending of 30 Lakh Rupees due to customer changing product specifications.
(3) 20% chance of wasting 2 Lakhs due to delay in loading of customer supplied data.
Calculate the combined risk exposure of the project.</td><td>3</td><td>4</td><td>2</td><td>2</td><td>8</td></tr>
<tr><td>21</td><td>Compute Estimate At Completion (EAC) and Variance At Completion (VAC) if both SPI and CPI influence the project work when given variables are
• Budget At Completion (BAC) = 22 Lakh Rupees
• Earned Value (EV) = 13 Lakh Rupees
• Planned Value (PV) = 14 Lakh Rupees
• Actual Cost (AC) = 15 Lakh Rupees
Also, identify whether the project is behind schedule and whether the project is within the budget.</td><td>4</td><td>4</td><td>2</td><td>2</td><td>8</td></tr>
<tr><td>22</td><td>For the given activities, draw the network diagram, identify the critical path and its duration.
<table>
<tr><th>Activity</th><th>Optimistic</th><th>Most Likely</th><th>Pessimistic</th></tr>
<tr><td>1 – 2</td><td>4</td><td>6</td><td>8</td></tr>
<tr><td>1 – 3</td><td>2</td><td>3</td><td>10</td></tr>
<tr><td>1 – 4</td><td>6</td><td>8</td><td>16</td></tr>
<tr><td>2 – 4</td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>3 – 4</td><td>6</td><td>7</td><td>8</td></tr>
<tr><td>3 – 5</td><td>6</td><td>7</td><td>14</td></tr>
<tr><td>4 – 6</td><td>3</td><td>5</td><td>7</td></tr>
<tr><td>4 – 7</td><td>4</td><td>11</td><td>12</td></tr>
<tr><td>5 – 7</td><td>2</td><td>4</td><td>6</td></tr>
</table></td><td>4</td><td>4</td><td>2</td><td>2</td><td>8</td></tr>
</table>

	6 – 7 | 2 | 9 | 10						
23	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. (Hint: Use semi-detached model where $a_1 = 3$, $a_2 = 1.12$, $b_1 = 2.5$ and $b_2 = 0.35$	3	4	2	2	8
24	You are managing a project which is into six months of its execution. You are now reviewing the project status and you have ascertained that project is behind schedule. The actual cost of Activity A is ₹ 2,00,000 and that of Activity B is ₹ 1,00,000. The planned value of these activities are ₹ 1,80,000 and ₹ 80,000 respectively. The Activity A is 100% complete. However, Activity B is only 75% complete. Calculate the schedule performance index and cost performance index of the project on the review date.	3	4	2	2	8
25	For the given activities, draw the network diagram, identify the critical path and its duration. **Activity** | **Optimistic** | **Most Likely** | **Pessimistic** 1 -- 2 | 6 | 9 | 12 1 -- 3 | 3 | 4 | 11 2 -- 4 | 2 | 5 | 14 3 -- 4 | 4 | 6 | 8 3 -- 5 | 1 | 1.5 | 5 2 -- 6 | 5 | 6 | 7 4 -- 6 | 7 | 8 | 15 5 -- 6 | 1 | 2 | 3	4	4	2	2	8
UNIT 5						
1	Illustrate MLOps pipeline with a neat diagram	2	5	3	2	8
2	Outline Iterative-Incremental Process in MLOps with a neat diagram	2	5	3	2	8
3	Demonstrate automated ML pipeline with CI/CD routines	2	5	3	2	8
4	Mention and explain in brief MLOps stages that reflect the process of ML pipeline automation	2	5	3	2	6
5	MLOps setup requires several components to be installed or prepared. List them and describe each in brief	**2**	5	3	2	**6**
6	MLOps is an ML engineering culture that includes few practices. List them and explain each in brief	**2**	5	3	2	**6**
7	What is the importance of versioning in MLOps? List the common reasons when ML model and data changes	**2**	5	3	2	**6**
8	ML Systems require extensive testing and monitoring. Justify this statement with suitable diagram and explain	**2**	5	3	2	**8**
9	Analyze how to extract features and how to perform data tests in MLOps	**4**	5	3	2	**6**
10	Analyze how to detect ML specific errors	**4**	5	3	2	**6**
11	Training the ML models should be reproducible. Justify how?	**3**	5	3	2	**6**
12	Once the ML model has been deployed, it need to be monitored to assure that the ML model performs as expected. Mention the checklist for model monitoring activities	**3**	5	3	2	**6**
13	Analyze how to produce reproducibility with respect to Phase and challenges	**4**	5	3	2	**6**

14	Differentiate between DevOps and MLOps	**4**	**5**	3	2	**8**
15	Bring out the best practices of MLOps	**2**	**5**	3	2	**6**
16	Design an end-to-end MLOps pipeline for a predictive analytics use case.	**2**	**5**	3	2	**6**
17	Explain the importance of explainability in MLOps	**2**	**5**	3	2	**6**
18	Discuss the challenges of implementing MLOps in resource-constrained environments	**2**	**5**	3	2	**6**
19	How does MLOps facilitate multi-model management? How does MLOps support real-time inference?	**2**	**5**	3	2	**6**

References:

i) https://ml-ops.org/content/mlops-principles

ii) Mastering MLOps: A Comprehensive Guide to Questions and Answers for AI Enthusiasts | Mahesha Pandit