Q1.What is software scope?

Answer. Software scope is a well-defined boundary, which encompasses all the activities that are done to develop and deliver the software product.

- The software scope clearly defines all functionalities and artifacts to be delivered as a part of the software. The scope identifies what the product will do and what it will not do, what the end product will contain and what it will not contain.

Q2. Describe the components and quality which is necessary for the documents of software specification.

Answer: Software specification document may be defined as a set of those documents that have complete detail about the software just like functions of software, need of software, structure of design and its efficiency. A set of these valuable facts satisfied the software system. To reduce the gap between developer and user is the main objective of these documents. With the help of these document user and developer easily understand the need and expectation to this software system. Till time a client not gets the proper documentation regarding the software specification, he never thinks about that this software system is in favor or not. It satisfied the need of the user or not. Without a specified document it is not easy for any one that he can satisfy his customer that this software system complete their expectation.

A specified document regarding software have a lot of quality find which are defined below, with the help of these qualities a software system can achieve his goal.

1. **Completeness** - The base of specified software system documents is to cover all points which satisfied the customer. In case if complete information not find in those document then a number of question raised against this and it will not be good for the developer and client. Both parties lose their trust from this. In short, a software satisfied documents describe all the points related to its function and performance.
2. **Accurate** - 100% accuracy should be present when a software specification document present because it misguide the client if this report is not accurate.
3. **Understandable** - Software specification document should not be confusing that means the vision or objective should be clear and understandable so that user can easily understand it and become satisfied with this report.
4. **Regularity** - Regularity is also a main part of this document because every part or point covered step by step so that trust can be built in the favor of these documents.
5. **Alterable** - Alteration quality also should be present in software specification document because need of client and software can be any time change. So for this change a large scope should be present in this document report.
6. **Follow able** - If the software specified document covered all point step by step then any one can easily understand it and checked it again at every level. In short cross check is easily done with this report.
7. **Valid** - All document related to it should be valid by law, requirement and the client need.

Q3.What are the benefits of metrics in software engineering?

Answer: - Software metrics have a very large area and during the period of software development process it has much kind of applications regarding this. Software metrics plays a major role in software Engineering, The benefits are given below:

1. It makes the better control, planning and clear visibility.
2. It helps to increase the production and quality.
3. With the help of this we can measure the size of the software.
4. We can find out the cost of developed software.

5. With the help of software metrics we can find out the errors which creates problem on the first level of development life cycle.
6. We can find out the many kind of test techniques and method during this process.
7. With the help of this we can better control and examine this process of development life cycle.
8. We can take idea that how much cost and size would be this software.
9. With the help of better supervision on this we can find out the more important information about the capacity of productivity and quality.
10. With the help of software metrics we can analyze the problem which occurred in development process and helpful in better decision making.

Q4. Explain concept of data flow diagram.

Answer:

Data flow diagram has two major points.

1. Depict the data flow through the system.
2. It shows the needs of the system in a graphical form.

Here a system may be defined as a company, organization, process, a hardware and software system of computers etc.

Objectives of DFD

- It gives the detail of data flow.
- It gives the information about hierarchical breakdown of the system.
- DFD gives the detail of used file and result flow.
- Flow of document information in system.

For understanding a system, DFD is very helpful during the analysis process. The DFD has an advantage of simplicity and is easy to use. With the help of graph a good communication is built between user and analyst. There are some considerations which are helpful in developing a DFD.

Symbols used in making DFD

A limited number of symbols are used in a DFD to represent those functions which is done by a system and flow of data between these functions. Details of symbols are given below:

- **External entity symbol** - The external entity symbol represents sources of data to the system. A rectangle represents an external entity. An external entity have no responsibility for any action done by the system.
- **Data flow system** - For the presentation of data flow, arrow symbol is used. It shows the complete detail of data which data is used in processing. The flow of data can be use in two processes. Data flow system show the name and direction. Several types of element find in a data flow. For Example: - A data flow name is bank account it may consist of elements just like customer name, date of birth, nominee name, amount etc.
- **Functional system** - The circular shape is used to represent a function graphically represent. Some experts use oval or rectangle for the representation of functional symbol. The second name of the function is bubble or transformation to perform some task with the data it convert or transferred data from one computer to other. A name is very necessary for this which can define

what function does? Every process has a specific number which start from up to down and left to right.

- **Data store symbol** - A data store may be defined as an open rectangle. A data store is stored permanently data for performing transactions. Every data store connected with process. A data store may take place on a disk with a logical file or physical file to report it.

Q5. Write a short note on review process.

Answer: In the process of development of a project reviews plays a major role. Review can be treated as a task of pure verification. A review may be defined as a thought and feedback in concerned to a software project. These can be done by users, managers, customers and other person who are directly or indirectly related to this software.

Use and role in software development

Reviews are very important for the accuracy of the system. Reviews consist of the presentation of material to a review board. The role of reviews in software system is given below:

1. Review is helpful in getting the faults in analysis, design and coding testing.
2. Reviews by the experts give the surety that all actions which are done in the process are adjustable or not.
3. Reviews make the projects more understandable.
4. Reviews are the sources of knowledge for the junior engineers.
5. With the help of reviews we get the surety that the software have all the necessary quality.
6. With the help of reviews we can know that development process completed with according to given standard or not.

Implementation of reviews

Topics and goals of the meeting in advance. When the product became ready, then developer informs the project leader. This meeting deciding the following points which are given below:

1. The product needs alteration or not.
2. With the little changes can a product be accepted?
3. Reject the product.

After that a report is made which is called review reports and its cover following points.

1. What was reviewed?
2. Who gives the reviews?
3. What were the findings?
4. Conclusions.

Activities of reviews are following:

- **Walkthrough** - During the process of walkthrough material checked and valuate by the reviews. This process has deep supervision that the material used have the quality for the expert's opinion. Getting the problem area is the objective of walkthrough .With the help of expert's problems are

resolved and all of this discussed in a meeting. Important thoughts to get the benefits from walkthrough are following:

1. A specific reason must be required for the walkthrough session.
2. Every work step taken on the basis of schedule to check that all product are working.
3. Error should be noted down and resolution must be done in walkthrough session.

Benefits

4. Error easily caught at the first level which reduces the wastage of time.
5. It improves the communication and coordination of team which are working on project.
6. With the help of other we can learn much more.

- **Inspection** - In this step, a trained inspector required who can do better in inspection process. Inspection can be done on whole life cycle of software development and a better result can come out. According to Fagan

Three separate Inspections are to be performed. One following design but priority is given to implementation. One following implementation but priority is given to unit testing and one is following unit testing.

According to Fagan

An inspection team consist four persons who play the role of moderate, designer, implementer and tester.

During the process of design inspection some points might be covered.

- Design should be complete
- Regularity in definition
- Correctness of the interfaces between modules.

During the process of code inspection some points might be covered.

- Nature of subprograms
- Logic decision
- Computational expressions
- Statement of input and output
- Flow of data

Q6.Give the benefits of verification and validation in software development and tell about the techniques of verification and validation in the process of software development.

Answer: - Verification and validation has a great role in software development process so it is necessary that verification and validation is done at each step. It covers the following parts:

1. Surety that software functions as per user's need.
2. Improvement in Quality.
3. To increase the efficiency of the work during the process of development.
4. Alteration in the software.

Techniques for Verification & validations

1. **Quality surety** - With the help of proper planning and systematic performance and both control may be the surety of better quality. The main objective of quality assurance is that to check the

actions which are used in development process so that the margin of the error becomes zero and if in case error occurred during the process then solves the problem. To get the better output many actions taken by the developer.

2. **Walkthrough** - During the process of walkthrough material checked and valuate by the reviews. This process has deep supervision that the material used have the quality for the expert's opinion. Getting the problem area is the objective of walkthrough .With the help of expert's problems are resolved and all of this discussed in a meeting. Important thoughts to get the benefits from walkthrough:
    - A specific reason must be required for the walkthrough session.
    - Every work step taken on the basis of schedule to check that all products are working.
    - Error should be noted down and resolution must be done in walkthrough session.

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    - Error easily caught at the first level which reduces the wastage of time.
    - It improves the communication and coordination of team which are working on project.
    - With the help of other we can learn much more.
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    According to Fagan -

    An inspection team consist four persons who play the role of moderate, designer, implementer and tester.

4. **Statistical analysis** - With the help of software tool when a program text is analysis that is called statistical analysis techniques. It covers following points.
    - To get the error of structural and get the difference actual and expected measurement.
    - To produce the important information for easily understanding the programs and documentation process.
    - It is helpful for getting the problems.
    - It is helpful for reducing the cost of error.
5. **Symbolic Execution** - Execution of symbol is a method of validation in which we input the data in the form of symbol and numbers are not used for input in this process. If the program implemented normally then input which is variable of a program unit are assigned symbolic values rather than literal values. In case when we input the data then we get the output in the forms of symbols.

Q7.Define the meaning of software quality and detail the factors which affects the quality not productivity of a software product.

Answer: - Quality of software may be defined as the need of function and Efficiency. Standard of development also described explicitly and expected or proposed benefit from the software that became developed. Success may be defined as a measurement of productivity. A number of factors are given below which gives the effects on quality and production capacity.

1. **Management skill** - For the better management of any projects experts needed at every level. The person who care the whole projects should be capable that he can check that all function working properly during the process of software development.

2. **Competent program** - If the competition level is high of a program in that case it effects on the quality and the capacity of productions.
3. **Availability time** - This type of techniques takes a long time its effects the quality and production capacity in the process of development of software.
4. **Level of technology** - Manpower is very necessary in both activity production and maintenance. We can help the help the system to improve the quality and quantity of product with the use of efficient tool of system. Cost of maintenance will be reducing by the using of high level technology.
5. **Difficulty in production** - If the complexity is find in more quantity in any kind of software design in that situation production capacity and performance of quality will be reduce.
6. **Adequate training** - If a staff or member of an organization has the basic knowledge of customer behavior then they can perform high quality of production with high quantity of software. Efforts of staff play a major role in production.
7. **Availability of resources** - For the better performance of quality and quantity it is necessary that required technology and experienced staff should be available. All required resources and tools should be available in the area of budget.
8. **Numbers of programs** - Every software has a limit of performance but if after that extra programs also jointed with that software then the performance of that software will be negative.
9. **Understanding of problems** - The level of program understanding should be high level and friendly because if the system does not understand the problem of user then it will give the negative impact on user mind. Due to this reason the production will be low and quality suffered.

Q8.Give the details of quality parameters which are used in a software system.

Answer: - Following is the list of quality parameters:

1. **Correctness** - Correctness is that state of a system which has free from every kind of problems; errors and software fulfill the customer needs. In other word it is according to user and developer Expectations.
2. **Reliability** - Quality of Reliability is find on that stage where developer have fully confident about his software that software can satisfied the user and customer that the action performed by the software is according to desired time and desired situations.
3. **Efficiency** - The level of efficiency always calculated by the time period which software use for performing functions. Difference of time period used from actual to expect is show the level of efficiency positive or negative.
4. **Integrity** - This is that state of software where only that user can access the software who have the permission otherwise other person cannot access the software.
5. **Transformable** - The software must have the capacity of transformable because without this quality use of system on large basis is not possible. So software should be transferred from one computer to other computer and one site to other site. With the help of this facility a number of users can use it at the same time.
6. **Accuracy** - Accuracy is that state of software where software has zero percent errors and fulfills all the customer requirements.
7. **Robustness** - When a software performs with the given data and left automatically all such information which is either not accurate or not having the quality of performance, is called robustness.
8. **Testability** - Under this situation for checking the functionality efforts are most required.
9. **Maintainability** - To get the problems in a program some effort is needed. Capacity of maintenance is very necessary of every program.

Q9. Define the meaning of quality assurance.

Answer: Quality Assurance: With the help of proper planning and systematic performance and both control may be the surety of better quality. The main objective of quality assurance is that to check the actions which are used in development process so that the margin of the error becomes zero and if in case error occurred during the process then solves the problem. To get the better output many actions are

taken by the developer. In the process of analysis and design both the planes compared with each other. In this process Acceptance plan and Verification plan both checkout some points and compared which are:

Sr.No.	Verification Plan	Acceptance plan
1	It ensures that needs of the client are fulfilled/satisfied by software.	It ensures that outcome of the product is as per the need or not.
2	Sources used in the process should meet specified quality standards.	Each test can check the product performance.

A functional audit and physical audit are completed before the delivery of product to our customer. With the performance of function we check that it is fulfill the need of the customer. While physical audit performed to check that all the information are mentioned in document and documentation are done in systematic way and we can deliver the software at the next level.

Goal of quality assurance of software

1. To get the proper detail about the software and proper parameters are used in software development process.
2. To be helpful in quality maintenance.
3. Use of new technology in software technology.
4. To get the surety about the software development process to be of proper standard.

List of actions which used in quality assurance process

1. **Application of technical method** - To get the high level of performance from a software it is necessary that developer use various type of techniques and methods.
2. **Conduction of formal technical reviews** - After the process completed, a general meeting should be held for discussing the every point of the software development process. With the help of this discussion we can find the faults or errors if we miss any kind of errors in the process.
3. **Software testing process** - For the testing of software many kind of planning and techniques should be used. The department of Quality audits the software process for deciding that the software is according to expectations or not.
4. **Enforcement of standard** - We have a large choice of standard parameters and we find out the best one and apply this on software. ISO 9000, SEI and CMM are the best examples of standard of parameters.
5. **Assessment** - Software matrix can be used to get the quality and process changes.
6. **Record keeping** - A record keeping is must require at every level of a software life cycle. With the help of this we can get the proper information about the audit, thoughts and test report of a software at every level.

Q10.Explain software reliability and define how software and hardware reliability related to each other.

Answer: - Reliability of software may be defined with the following points.

- Accuracy of the software.
- Presence of zero percent failure in software.
- To fulfill the user need.
- Capacity of error avoidance.

- Capacity of recovery.
- Maturity of software.

Reliability of a software can be define as a software which have no failure and working in a special time period with special environment. Probability of failure may be defined with the probability that the software will be fail on the next input selected. IEEE gives the definition of software reliability management as:

The process of optimizing the reliability of software through a program that emphasizes software errors prevention, fault detection and removal and the use of measurements to maximize reliability in light of projects constraints such as resources, schedule and performance.

Reliability of a software can be defined as a software which have no failure and working in a special time period with special environment. Working of software depends on instructions while hardware is a part of mechanical. Hardware and software both have major role in functional area of software. Because as we operate the software with hardware parts then if we find any errors in that case it effects the whole operation. Reliability of software is maintained until any fault find in hardware which affects the path of the data. Reliability of a software refers to the probability of a failing hardware part and the calculation of time for the maintenance of hardware parts. Physically errors always find in software system.

Q11.Explain the term, software maintenance.

Answer: - Maintenance of a software system may be define which is used to concerned about the alteration or changes which are done in software system after the release. Maintenance of software is the part of software Engineering. Maintenance of software has a great value in the development of a system. Needs of Maintenance is required after

- When the user get the product at his own place.
- Installation
- When software is in operational stage.

When any alteration or modification is done in software during the operation time then it is called maintenance. Maintenance of software have a large area which has correcting coding, and design faults, documentation and updating of user support. IEEE gives the definition of maintenance as

Software maintenance is modification of a software product after delivery to correct faults to improve performance or other attribute or to adapt the product to a modified environment.

According to Stephan - Software maintenances is a detailed activity that include

- Error detections and corrections
- Enhancement of capabilities
- deletion of obsolete capabilities
- Optimization

Q 12. Write and explain the Parts of software specification document

Answer. Every project has specific need. So there is no any idea present which can be used every time or every situation. So for the software specification document report have a lot of views to build it. But every report needs some guide line, with the help of these report completed otherwise it is not possible.

1. **Introduction** - Introduction of any things contains some point which is necessary.
    - What is the objective of document?
    - Area of need
    - Covers the short point just like cost and schedule.
    - A short note about that product.
2. **General detail** - This section of report covers the following points:
    - It covers those points which can affect the customer need and software.
    - To define the relation with other product and compared many times.
    - Details of functions which can be performed by the software.
    - Basic quality or features for the users.
    - For the benefit of customer objectives and needs provided.
3. **Functional need** - During this step every function should be described clearly which is done by the software after input the data and getting the output. For performing any kind of action by this software we should define the things such as operation which is done by the software and what should be the required output from this.
4. **Nature of outside need** - Under this point of specification of software document should be detailed all the possible nature of software and which kind of structure use. A complete detail should be available about the user manual, format and feedback for the software.
5. **Needs for performance** - The detail of need related to the performance or action done by the software which plays a major role in the specification of document related to software. The action done by the software is in favor that's mean the quality of this software is good and according to standard which is decided by the client. Performance should be in that state which can be easily measurable. The area of performance are covered the points like time of response and expected time and etc.

Q13. Describe various Reason of Maintenance of software

Answer. In the life of a software maintenance activity have a great value. In the comparison of development cost, the maintenance cost is higher. Normally Maintenance of a software take 40 to 70 % cost of total costing of software life cycle. Cost and difficulty are the two drawbacks in maintenance of software. We have some reasons which increases the need of software maintenance.

- Where user needs change time to time.
- When technology of hardware change.
- When the environment of a system changed.
- To increase the ability or capacity of system.
- To keep the same quality of the product.
- To resolve the Errors.
- For getting the best output with the help of existing software.
- To reject the unusual effects.
- For making the software more compatible in the favor of user.

Q14. Explain various Types of software Maintenance

Answer. Types of software Maintenance are as follows

1. **Corrective Maintenance** - Corrective maintenance may be define with those alteration which is done for the solving those errors which was available in the software. With the help of corrective maintenance method software can change by removing all the faults. Thus the goal of this method is to correct the software from every type of errors. A software have many kind of faults just like specification errors, logical errors, coding error etc. . . and corrective maintenance solve all those types of faults. For the recovery of a system many types of actions performed in corrective Maintenance. According to K. Bennett, Maintenance personal sometimes resolve to emergency

fixes known as patching to reduce the pressure from the management. 20 % of total maintenance cost is the part of corrective method.

2. **Adaptive Maintenance** - Adaptive maintenance may be defined by that alteration in software system to survive in that area where this system operates. Environment refers those situations which affects the software from outside. According to R. Books, A change to the whole or part of this environment will require a corresponding alteration of the software. 20 % of the total maintenance cost is the part of adaptive maintenance
3. **Perfective maintenance** - To increase the efficiency, performance, maintainability, effectiveness of software that is called perfective maintenance. Most of the times enhancement also includes perfective maintenance as one of its part. After changes user operate this software for the purpose which it was developed by developer. For example: if GUI not attract the customer then some change are made for improving the looks and design of the software. Just to get the perfection the changes are made otherwise it is not necessary in normal cases. The demand of the perfective maintenance could be completed by software Engineering. All changes which improve the quality are including in perfective maintenance. The reason of alteration in a system could be a cause in improve the efficiency and functions and easy to understand. 50% of the total maintenance cost is the part of perfective maintenance.

Q15. Explain the role of testing in Quality assurance.

Answer. Importance of testing in Quality Assurance

1. We can easily get the errors without taking any time and efforts.
2. With the help of this we can get the information about that this software have the ability of trust and fulfill the client's needs.
3. We can get the software of a high level performer.
4. We can get the detail about the design of a software.

Relationship of testing and Quality surety

Every project needs the capacity of well performance and correctness and fulfillment of clients' needs for the success of projects. Testing of software provide the information about the requirement fulfilled on the opposite side quality of surety gives the information that testing method of software is used on a standard level.