Paper / Subject Code: 88701 / Quality Assurance

[Total Marks: 75]

(2½ Hours)

Answer Sheet

1. **Attempt any three of the following:**

   a. **What is quality? Explain its core component.**

   Ans:- .

   Definitions of Quality

   For achieving the quality of the product, one must define it in some measureable terms which can be used as a reference to find whether quality is really met or not. The definitions of quality from different perceptions are as follow: -

   1) **Customer- Based definition of Quality**- Quality product must have "Fitness for use".

   2) **Manufacturing- Based definition of Quality**- This approach gives the definition of "Conformance to requirements".

   3**) Product- Based definition of Quality-** The product must have something that other similar products do not have.

   4) **Value- Based definition of Quality**- Many times it is claimed that "People do not buy products, they buy benefits".

   5) **Transcendent Quality**- To many users/customers, it is not clear what is meant by a "quality product", but as per their perception it is something good and they want to purchase it because of some quality present/absent in the product.

   b. **Core Components of Quality**

   Quality of a product must be motivated by customer requirements and expectations from the product. Some postulates of quality are: -

   1) Quality is based on Customer satisfaction by acquiring a product: - Customer's satisfaction and delight is the most important factor in determining whether the quality of the product has been achieved or not.

   2) The organization must define Quality parameters before it can be achieved. In order to satisfy a customer, one must follow a cycle of 'Define', 'Measure', 'Monitor',' Control' and 'Improve'.

   The cycle of improvements through measurements is as follow:

DEFINE: - There must be some definition of what is required in the product, in terms of attributes or characteristics of a product and in how much quantity it is required to derive customer satisfaction

MEASURE: - Measurement gives a gap between what is expected by a customer and what is delivered to them when the product is sold.

MONITOR: There must be some mechanism available with the manufacturer to monitor the processes used in development, testing and delivering a product to a customer.

CONTROL: - Control gives the ability to provide desired results and avoid the undesired things going to a customer.

IMPROVE: - Continuous/Continual improvements are necessary to maintain on going customer satisfaction and overcome possible competition, customer complaints.

3) Management must lead the organization through improvement effort. Management is the single strongest force existing in an organization to make the changes as expected by a customer.

4) Continuous process(Continual) improvement is necessary. The cycle of continuous or continual improvement (Plan-Do-Check-Act or Define Measure-Monitor-Control-Improve) must be used.

b. Differentiate between tools and techniques.

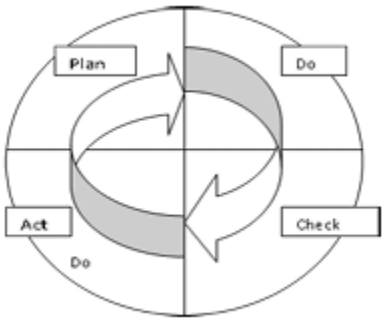
Ans :-

Tools	Technique
Usage of tool is guided by the technique. Tool is of no use unless technique to use it is available.	Technique is independent of any tool
Different techniques may use sametool to achieve different results	Same technique may use different tools to achieve same result
Tool improvement needs technological Change	Technique change can be effected through procedural change
Contribution of tools in improvement is limited	Contribution of technique in improvement is more important

c. Explain continual (continuous) improvement cycle.

Ans :-

Continual (continuous) improvement cycle is based on systematic sequence of Plan-Do- Check-Act activities representing a never ending cycle of improvements. PDCA improvement cycle can be thought of as a wheel of improvement continually (continuously) rolling up the problem-solving hill and achieving better and better results for the organization in each iteration.



Stages of Continual (Continuous) improvement through PDCA are:-

1) Plan:- An organization must plan for improvements on the basis of its vision and mission definition. Planning includes answering all questions like who, when, where, why, what, how etc.

2) Do:- Plan is not everything but a roadmap. Actual execution of a plan can determine whether the results as expected are achieved or not. Do process need inputs like resources, hardware, software, training, etc. for execution of a plan.

3) Check:- An organisation must compare actual outcome of Do stage with reference or expected results which are planned outcomes. It must be done periodically to assess whether the progress is in proper direction or not and whether the plan is right or not.

4) Act:- If any deviations (positive or negative) are observed in actual outcome with respect to planned results, the organization may need to decide actions to correct the situations.

d. List and explain any five requirements of a product.

Ans :- There are basic requirements for building software, which will help customers conduct their business in a better way. Following are the different categories of requirements:

1)**Stated/implied Requirements: -** Some requirements are specifically documented in software requirements specifications while few others are implied ones.

2) **General/ Specific requirements: -** Some requirements are generic in nature, which are generally accepted for a type of product and for a group of users while some others are very specific for the product under development.

3) **Present/Future requirements: -** Present requirements are essential when an application is used in present circumstances while future requirements are for future needs which may be required after some time span.

4) **'Must' and 'Must not' requirements or primary requirements: -** Must requirements are primary requirements for which the customer is going to pay for while acquiring the product. Must not requirements which must be absent in the product.

5) **'Should be' and 'should not be' requirements or secondary requirements: -** Should be requirements are the requirements which may be appreciated by the customer if they are present/absent and may add some value to the product.

e. Explain types of products based on criticality to the users.

Ans:-

There are various schemes of grouping the products on the basis of criticality to the users which are as follow.

1) Life Affecting Products: - Products which directly/indirectly affect human life are considered as the most critical products in the world from user's perspective. This type of product may be further grouped into 5 different categories: -
   - Any product failure resulting into death of a person.
   - Any product failure which may cause temporary disablement to a patient.
   - Other products which do not affect health or safety directly.

2) Product Affecting huge sum of money: -
   A product which has direct relationship with loss of huge sum of money is second in the list of criticality of the product.e-commerce and e-business software may be put in this category. Security, confidentiality and accuracy are some of the important quality factors for such products.
3) Products which can be tested only by simulators: -
   Products which cannot be tested in real-life scenario but need simulated environment for testing are third in the ranking of criticality. In this case, real life scenario is either impossible to create or may not be economically viable.
4) Other products: -
   All other products which cannot be categorized in any of the above scheme may be put in this category.

f. List and explain any five quality principles of Total Quality Management.

Ans:-

Total Quality management works on some basic principles of quality management definition and implementation.

Some quality principles of TQM are:-

1) Develop Constancy of purpose of definition and deployment of various initiatives
2) Adapting to new philosophy of managing people/stakeholders by building confidence and relationships
3) Declare freedom from mass inspection of incoming/produced output
4)) Stop awarding of lowest price tag contracts to suppliers
5) Improve every process used for development and testing of products
6) Institutionalize training across the organization for all people
7) Institutionalize leadership throughout organization at each level

8) Drive out fear of failure from employees
9) Break down barriers between functions/departments
10) Eliminate exhortations by numbers, goals, targets

2) Attempt <u>any three</u> of the following:

a.Explain salient features of good testing.

<u>Ans :-</u>

• Defects indicate the quality of s/w under testing, development and test processes used for making it.
• Testing is a life-cycle activity where testers take part in testing right from proposal stage till the application is finally accepted

• Good ST involves testing of following

1) Capturing user requirements

2) Capturing user needs

3) Design objectives

4) User interfaces

5) Internal structures

b.Differentiate between verification and validation.

Ans :-

The verification and validation are the main aims of the workbench concept, but it is important to know the difference between them to outline all the specific elements of each process clearly:

Verification

1. Checks program, documents, and design.

2. Reviews, desk-checking, walkthroughs, and inspection methods.

3. Check of accordance with the specified requirements.

4. Bug detection is performed on the cycle of early development.

5. It precedes the validation.

Validation

1. It is a process of testing and validating the real product.

2. It uses non-functional testing, Black Box Testing, and White Box Testing.

3. Checks whether the software is in compliance with customers' expectations.

4. It can detect bugs, which are missed by verification.

5. It is performed when the verification is done.

c. List and explain any two approaches of software testing team with its advantages and disadvantages.

Ans:-

1.Location of test teams in an organization: having its advantages & disadvantages

2. Developers becoming testers: having its advantages & disadvantages

3. Independent testing team: having its advantages & disadvantages

4. Domain experts doing software testing: having its advantages & disadvantages

d.What is test strategy? Explain different stages involve in process of developing test strategy.

Ans:-

• Test strategy defines the action part of test policy.

• It defines the ways and means to achieve the test policy.

• There is a single test policy at organization level for product organization while test strategy may differ from product to product, customer to customer and time to time

Following are some examples of test strategy

1. Definition of coverage like requirement or function coverage

2. Level of testing, starting from requirements and going upto acceptance phase

3. How much testing would be done manually and what can be automated?

4. Number of developers to test.

e. Explain gray box testing with its advantages and disadvantages.

Ans:-

Gray Box Testing is a software testing technique that is a combination of the Black Box Testing technique and the White Box Testing technique.

1) In the Black Box Testing technique, the tester is unaware of the internal structure of the item being tested and in White Box Testing the internal structure is known to the tester.

2) The internal structure is partially known in Gray Box Testing.
3) This includes access to internal data structures and algorithms to design the test cases.

Gray Box Testing is named so because the software program is like a semitransparent or gray box inside which the tester can partially see.

4) It commonly focuses on context-specific errors related to web systems.

It is based on requirement test case generation because it has all the conditions presented before the program is tested.

f. List and explain different testing skills required by tester.

Ans:-

Challenge: Insufficient skills and knowledge among team members regarding testing methodologies, tools, and techniques.

Communication Gaps:

Challenge: Poor communication between development, testing, and other stakeholders leading to misunderstandings and delays.

Resource Constraints: Challenge: Limited availability of skilled testing resources, impacting the thoroughness and effectiveness of testing.

Resistance to Change: Challenge: Resistance from team members to adopt new testing methodologies or tools due to comfort with existing processes.

Inadequate Training and Development: Challenge: Limited opportunities for ongoing training and skill development, hindering the ability to keep up with evolving testing practices.

Testing in Silos: Challenge: Isolation of testing teams from the development process, leading to delayed defect identification and resolution.

Pressure to Deliver Quickly: Challenge: Pressure to release software quickly may compromise thorough testing, leading to increased post-release issues.

Ambiguous Requirements: Challenge: Unclear or changing requirements can make it difficult for testers to create comprehensive test cases and scenarios.

c. Attempt <u>any three</u> of the following:

What are cause-effect graphs? Explain with the help of an example.