Assignment on
chapter 1] Software quality Assurance Fundamentals.

Q1) what is quality ? Differentiate between quality Assurance (QA) and Quality Control (QC)

→ quality is defined as a field of study and practice that describes the desirable attributes of characteristics. quality reflects how well it Compiles with or Conforms to a given design.

Difference between (QA) and (QC)

1) Quality Assurance - quality assurance is a method of making the software application with less defects and mistakes when it is finally released to the end users.

quality assurance is defined as an activity that ensures the approaches, techniques, methods and processes designed for the project are implemented correctly.

2) Quality Control -

Quality Control is a software engineering process that is used to ensure that the approaches, techniques, methods and processes are designed in the project

Quality Control activities operate and verify that the application meet the defined quality standards.

It is a Corrective technique.

It is a reactive measure.

Q2. Explain detail ISO 9000?

→ ISO 9000 is defined as a set of international standards on quality management and quality assurance developed to help companies effectively document the quality system elements needed to maintain an efficient quality system. They are not specify to an one industry and can be applied to organizations of any size

ISO 9000 was first published in 1987 by the international organization standardization.

A specialized international agency for standardization composed of the national standards bodies of more than 160 countries.

The standards underwent revisions in 2000 and 2008.

The most recent version of the standard ISO 9000:2015 and ISO 9001:2015 were published in sept 2015.

management principles of ISO 9000.

1) Customer focus
2) Leadership
3) Improvement
4) Process
5) Evidence based decision making

Q3. write a note on Six Sigma

→ Six Sigma is a set techniques and tools for process improvement. it was introduced by American engineer Bill Smith while working at Motorola in 1986. A Six Sigma process is a one in which 99.99966 % of all oppurtunities to produce some feature of a parts are statistically expected to be free of defeats Six Sigma strategies seek to improxe manufacturin quality by indentifying and removing the causes of defects and minimizing variability in manufacturing and business process.

The Term Sigma originates from statistical modeling of manufactering processes. The maturity of manufactering process can be described by a sigma rating indecating its yield or the percentage of defect free product its creates. - Specifically to within how many standard deviations of a normal distribution the fraction corresponds.

Motorola pioneered Six Sigma getting a "Six Sigma" goal for its manufactering business.

It registered Six Sigma as a Service mark on June 11, 1991

Q4. What are SQA activities and SQA Block.

→ 1) SQA activities - Software quality Assurance is a set of activities for ensuring quality in Software engineering processes. it ensures that produced developed Software meets and complies with the defined or standardized quality specifications SQA is an ongoing process within the Software Development Life cycle (SDLC) that routinely checks the developed Software to ensure it meets the desired quality measures.
SQA generally works on one or more industry standards that help in building Software quality guidelines and implementation.
It includes following activities
1) Process defination and implementation
2) Auditing
3) Training.

SQA Block -
The SQA organizational base includes managers, testing personnel, the SQA unit and the trustees,
SQA Committee members and SQA forum members.

* Product Metrics -

Product metrics are Software product measures at any stage of their developement, from requirement to established systems.

Product metrics fall into two classes -

1) Dynamic metrics that are Collected by measurements made from a program in execution

2) Static metrics that are Collected by measureme made from system representations such as desig programs or documentation.

product metrics are data that capture that ways customers or users interact with your digital app or product.

Q5. Explain in detail of quality factor.

→ The quality factor or Q factor is a dimensionless parameter that describes how underdamped an oscillator or resonator is. it is approximately defined as the ratio of the initial energy stored in the resonator to the energy lost in one radian of the cycle of oscillation.

Q factor is alternatively defined as the ratio of resonators center frequency to its bandwidth when subject to an oscillating driving force.

The quality factor of oscillators varies substantially from system to system depending on their construction.

Systems for which damping is important have Q near 1/2 clocks, lasers and other resonating systems that need either strong resonance or high frequency stability have high quality factors.

Tuning forks have quality factors around 1000

The quality factor of atomic clocks, super-conducting RF cavities used in accelerators and some high-Q lasers

The concept of Q originated with K.S. Johnson of Western electric Company's engineering department while evaluating the quality of coils.

The term was not intended as an abbrevation fo "quality" or "quality factor" although these terms have grown to be associated with i

Q6. what is Software quality Metrics. Explain Process Metrics and Product metrics in detail

→ Software quality Metrics - are a subset of Software metrics that focus on the quality aspects of the product, process and project These are more closely associated with process and product metrics.

Software quality metrics can be further divided into three categories -

1) Product quality metrics
2) In-process quality metrics
3) Maintenance quality metrics.

* Process Metrics :-

Process metrics are measurement used to track the performance of a business process. They are like key performance indicators in that they measure how a task performs and if it's meeting the defined goals. process quality for managers and supervisors to study.

process metrics can be useful in a variety of business sectors, such as human resources, manufacturing, Information Technology, finance and other disciplines.

example of process metrics :-

1) Efficiency -
2) productivity
3) Cycle Time - The duration of a process from start to end
4) Error Rate -
5) Cost Effectiveness

Q7. What are Software Reliability?

→ Reliability metrics are used to quantitatively expressed the reliability of the Software product.

The option of which metric is to be used depends upon the type of system to which it applies and the requirements of the application domain.

Reliability which can be used to quantify the reliability of the Software product Software reliability means operational reliability. it is described as the ability of a System or Component to perform its required functions under static Conditions for a Specific period.

Software reliability is also defined as the probability that a Software System fulfills its assigned task in a given environment For a predefined number of input Cases, assuming that the hardware and the input are free of error.

is an essential Connect of Software quality Composed with functionality, usability, performance, Serviceability, Capability, installability maintainability, and documentation. Software Reliability is hard to achieve because the Complexity of Software turn to be high. while any System with a degree of Complexity, Containing Software turn to be high.

Q8 write a note on following Reliability measurement factor.
a) ROCOF
b) MTTF, MTTR, MTBF
c) POFOD
d) Availability

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a) ROCOF :- ROCOF means the Rate of occurance of Failure. ROCOF measures the Frequency of occurance of unexpected behaviour of the software. it basically measures howmay times the software product fails.
ROCOF is basically the total number of failures occoring during the Specific time interval.

b) MTTF, MTTR, MTBF
MTTR - MTTR reflects the time it takes an organization to react to unplanned incidents and put their gear, equipment and devices back to work again. This metric Calculates the time passed from the beginning of an incident until the moment its' solved.

MTBF - means the Mean Time Between failure. Thats an intresting KPI because like the previous one it has to do with malfunctioning devices or assets.
MTBF is all about the devices themselves while MTTR represents how quickly an organization can react when unexpected problems occur.

MTTF - means mean time to failure.
we can say that MTTF represents an expecte
it sets the amount of time you can expect
a given asset to work reliably until it
fails

C) POFOD -
POFOD is described as the probability that the
system will fail when a service is
requested. it is the number of system
deficiency given several system inputs.
POFOD is the possibility that the system
will fail when a service request is made.
A POFOD of 0.1 means that one out of
ten service requests may fail

D) Availability -
availability is defined as the probability
that the system is operating properly when
it is requested for use.
in other words availability is the probabili
that a system is not failed or undergoing
a repair action when its needed to be used.