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CSI:-321 (Softwoor Engineering)
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1-a

Ans to the Qus NO - 1 (a)

⊞ Define Softwar Engineering :- Software engineering defined as a process of analizing user requirments and the desining, bulding, and tasting Softwar application that will stisfy those requirment.

The various definition of software engineering.

IEEE, in its standard 610.12.1990, defines Softwar engineering as the application of a systematic, disciplined, which is Computable approach for the development, operation, and maintainence of Software.

Fritz Bawr defined it as - the establisment and used standard engineering prinucipile, It helps you to obtain, economically, Softwar - which is reliable and works efficiently on the real machines.

boehm defines Softwar engineering, - which involves, the practical appliation of scintific knowledge to the creative - design and bulding of computer program. It also included associated documentation needed

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Ans to the Qus NO-1 (b)

⊞. Describe waterfall model and validation process :-

*waterfall Model:- The waterfall Model was the first process model to be introduced. It is also referred to as a linear-Sequential life cycle model. It is very symple to understand and use. In a waterfall Model each phase must be Completed before the next phase can begine and ther is no overlapping in the phase.

The waterfall model is the earliest SDLC approach that was used for Software development.

The waterfall model illustorates the Software development process in linear-Sequential flow. this means that any phase in the development process begins only if the previous phase is Complete in this waterfall Model. The phase do not overlap

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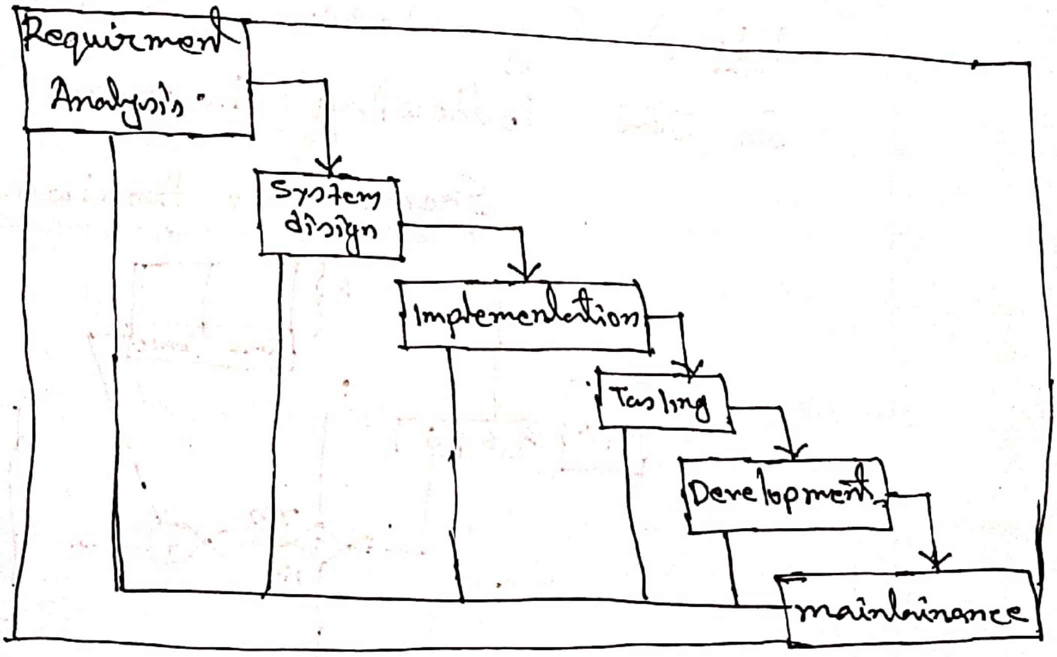
* waterfall Model — design :

The waterfall model approcch was the first SDLC Model to be used widely in software enginneering to ensure the Success of the project. In " the "waterfall" approach, the whole process of software development is devided into separate phase in this waterfall Model. Typically, the out come of one phase acts as the input for the next phase Sequentially.

The following illustration is a representa tion, of the defferent phase of the waterfall Model.



The Sequential process in the waterfall model are

* Requirment - Gathering and Analysis :- ALL possible requirment of the system to be developed are captured in this phase and documentation in a requirment specification document.

* System design :- The requirment Specification from the first phase are studied in this phase and the system design in a prepared this System design helps in specification hardware and system requirments and helps in defining the overall System architecture.

* Implemention :- with inputs from the System design, the System is the first developed in a small programs called units, which are integrated with the next phase, Each unit is developed and tested for its functionality, which is refered to as Unit Tasting.

* Integration and Tasting :- All the units developed in the implementation phase are integrated into a system after tasting of each unit post integration the entire System is tested any faults and failures.

*Deployment of System:- Once the functional and non-functional into the market.

*Maintenance:- There are some issues that Come up in the client environment. To Fix those issues, patches are releed, ALso to enhance the product some better version are relesed, maintainance is done to deliver these changes in the coustomer mvironment.

All these phase are cascaded to each other in which progress is seen as flowing Steadily downwards (like a waterfall) through the phases. The next phase is started only after the defined Set of goals are achived for the previous phase and it is signed of, So the Name "waterfall Model", In this model, phase do not overlap

*Validation process:- validation is the process of checking weather the Softwar product is up to the mark or

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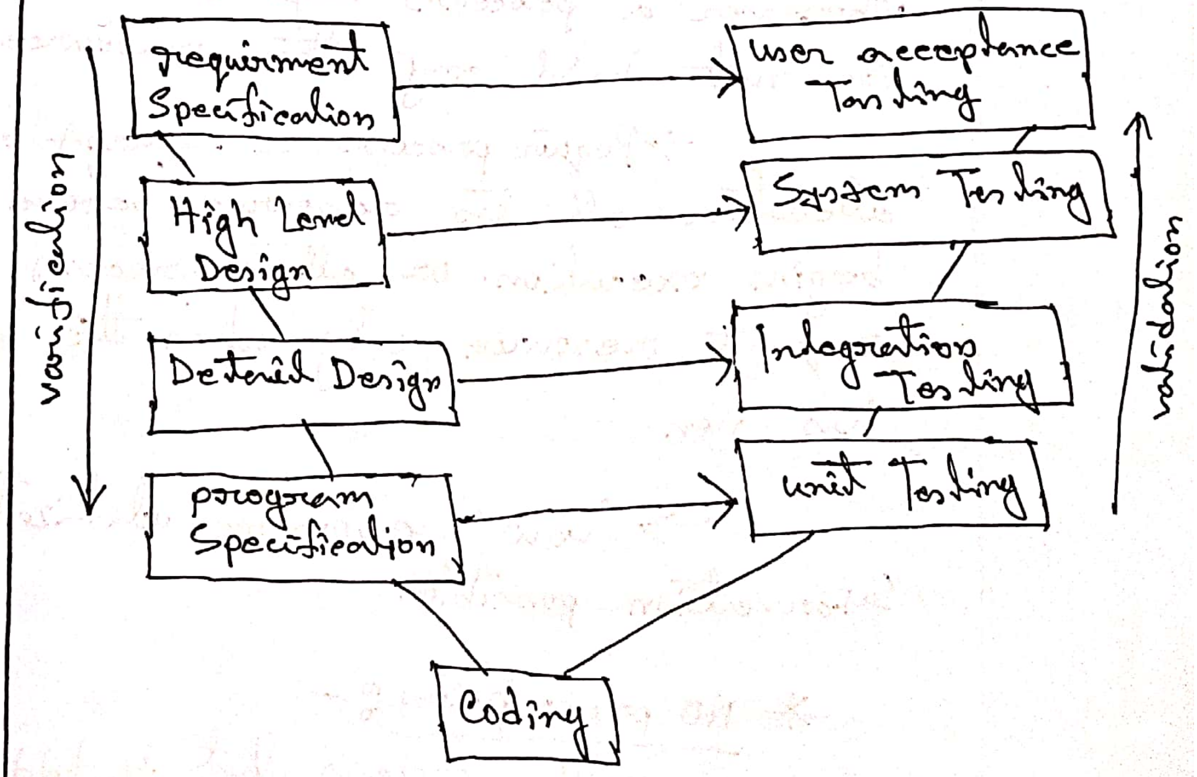
in other words product has high-level requirment. it is the process of checking the validity of the product

· validation is the Dynamic Testing:-

Activites involved in validation

* Black-box Testing
* White-box Testing
* Unit Testing
* Integration testing



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Ans to the Qus NO - 1 (c)

☐ Describe characterstics of SRS ?

Softwar Requirment Specification (SRS) is a document that Completely describes ~~that~~ what the proposed software should do without describing how the software will do it. The basic goal of the requirment phase is to produce the SRS, which describes the Complet behavior of the proposed Software. SRS is also helping the clients to understand their own needs.

* Characteristics of SRS :-

Correctness: User reviw is used to ensure the Correctness of requirments stated in the SRS. SRS is said to be correct if it Covers all the requirments that are actually expected from the System.

* Completeness :- Completeness of SRS indicates every sense of Completion including the numbering of all the page.

resolving the to be determined parts to as much extent as possible as well as Covering all the functional and non-functional requirment properly.

* **Consistancy**:- requirment in SRS are said to be consistance if there are no Conflicts between any Set of requirments example of Conflict include difference in terminologies used at sparate place, logical Conflict like the time period of report generation, etc.

* **Unambiguousness**:- SRS is said to be Unambiguousness if all the requirment stoted have only 1 interpretation. Some of the way to prevent Unambiguousness include the use of modeling Techniques lik ER diagrams, proper reviews and buddy checks, etc.

* **Modifiability**:- SRS should be made as modifiable as possible and should be capable of easily accepting chages

to the System to some extent, modification should be properly indexed and cross-referenced.

* Verifiable :- SRS should be made as modifiable as possible and should be Capable of easily accepting changes to the System to some extent. modification should be properly indexed and cross—referced.

* Traceability :- one should be able to Trace a requirment to the design Component and then to code segment in the program. Similarly. one should be able to Trace a requirment to the Corresponding Test cases.

* Design Independed :- There should be an option to choose from multiple design. alternatives for the Final System, more specifically. The SRS should be abl to

*

~~Tha~~ not mclud Any. implemention detail

* Testability :- SRS should be written in such a way that it is easy to generate test case and test plans from the document.

* Understandable by the Coustomar: An end-user may be an expert in his/her specific domain but might not be an expart in Computer science, Hence, the use of formet notation and symbols should be avoided too as much extent as possible, The language should be kept easy and clear

* Right level of abstraction :- if the SRS is written for the requirmen phase, the detail should be explained explicitlly. where as for a feasibility study, fewer detail can be used.

Hance, the level of abstraction varies according to the process of the SRS.

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Ans to the Que NO - 2 (a)

2-a Define Catagories of softwar maintainence?

* Software maintainance:- is the process of modifiying a soft war product after it has been delevered to the coustomar. The main purpose of softwar maintainance is to modify and update software application after delivery to correct faults and to improve performance.

* Catagories of Softwar maintainance:-

maintainane can be devided into the following.

Corrective Softwar maintenane:- Corrective Softwar maintenance is what one would typically associate with maintenance of any kind. Correct Softwar maintenane address the crors and faults within Softwar application that could impact various parts of your Softwar, including the ~~deg~~ design, logic and code. Those Correction usually come from bug reports that ware created by users or coustomer - but Corrective Software maintenane can help to spot them before your coustomer do. which can help your brand's repulation.

* Adaptive Software maintenanc :- Adaptive Software maintenance becomes important when the environment of your Software changes. this can be brought on by changes to the operating System, Hardware, Software dependencies, could storage, or even changes within the operating system, Sometime, adaptive Software maintenane reflect organization policies or rules as well. updating Services, making modification to vendors, or changing payment processors can all necessitate adaptive Software maintenance.

*perfective Software maintenanc :- perfective Software maintenance focuses on the evolution of requirments and fetures that exist as ~~us~~ your system, As user interact withe your application they may notice things that you did not or suggest new feature that they would like as part of the Software, which could become future project or enhancement, perfective Software maintennane takes over some of the work, both adding features that can enhane user exprience and removing feature that are not effective and functional, This can include feadurs that are not used or those that do not help you to meet your end goals.

* preventive Software maintenance:-

preventive Software maintenance helps to make changes and adaptation to your Software So that it can work for a longer priod time. The focus of the type of maintename is to prevent the deterioration of your Software as it continues to adapt and chang, thes services can include optimizing Code and updating documentation as needed.

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preventive Softwar maintenence helps to redus· the risk associated with operating Softwar for a longtime. helping it to become more stable, understandable. and maintainable for all business and organization, Softwar maintenance is an essential part of the Softwar development lifecycle, This isint something that one can skip or avoid. It is absolutly necessary for the success of your Softwar and any evolution into the feature,

Ans to the Que NO - 2.(b)

2-b

E what is the difference between black box Testing and white box Testing?

* Black-Box-Testing:- In black-box Testing, a ~~tester~~ tester doesnot have any information about the internal working on the Software System, Black-box testing is a high level of Testing that focuses on the behavior of the Softwar.

It involves Testing from an external or end-user perspective, Black-box Testing can be applied to virtually every level of Softwar Testing: unit integration. System and acceptance.

* white-Box Testing :- white-Box Testing is a testing technique that checks the internal founctioning of the System, in this method, Testing is based on the Coverage of Code statement, branches, paths, or Condition, white-Box Testing is considered low-level Testing. The white-Box Testing method assumes that the paths of the logic in a unit or program is know.

⊞ Defferances between Black-Box and white-Box Testing:

Blac-Box Testing	white-Box-Testing.
It is a way Software Testing in which the internal structure of the program or the Code is hidden. and nothing is Know about it.	It is a of Testing the Software in which the tester has knowledge about the internal Structure or the Code or the program of the Software.

Black-Box Testing	white-Box Testing
It is mostly done by Softwar Testers	It is mostly done by Softwar developers
No knowledge of implementation is needed	Knowledge of implementation requred
It can be referred to as outer or external Softwar testing	It is Inner or the internal Softwar Testing
This testing can be initiated on the basis of the requirment Specification document	This type of testing of Softwar is Stated after a detailed design document
No knowledge of programming is required	It is mandatory to have Knowldge of programming
It is the behavior Testing of the Software	It is the logic of the Softwar
It is applicable to the higher level testing of Softwar	It is generally applicable to the lower level of Softwar testing
It is also called Close Testing	It is also clea called box Testing
It is the least time consuming	It is most time Consuming

Ans to the Qus No - 2 (c)

⊞ Mention what are the types of documents in SQA :-

Softwar Quality Assurance (SQA):- is a process that assures that all Softwar engineering process, methood, activities and work items. are monitored and comply with the defined Standards. These defined standard culd be one or a Combination of any like ISO 9000, CMMI Model, ISO15504 - etc.

SQA incorporates all Softwar development process starting from defining requirment to Coding until relese. It's prime goal is to ensure quality. ⊞ The SQA plan document consists of the below Section :-

1. purpose Section
2. Referance Section
3. Softwar Configuration managment Section
4. problem. reporting and Corrective action Section
5. Tools, ~~Th~~ Technologies and methoodologies Section
6. Code Control Section
7. Records: collection maintenance, and retention Section
8. Testing methodology

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Ans to the Qwe NO -: 3 (a)

⊞ what is Software project mangement :-

* project :- A project is a group of tasks that need to complete to reach a clear result. A project also defines as a set of inputs and output which are required to achieve a goal. project can very from simple to difficully and can be operated by one person or a hunderd.

project usually described approved by a project manager or team exective. They go beyond their expectation and object, and its up to the team to hundle logistic and comple the project, on time. for good project Development. Some teams split the project into specific tasks so they can manage responsibility and utilize team strengths.

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* Softwar project management:- Softwar project menagement is an art and discipline of planing and supervising Softwar project. It its a sub-discipline of Softwar project management in which Softwar project planned, implemented monitored and Controlled,

It is procedure of menaging, allocating and timeing resource to develop Computer Softwar that fullfills requirment

In Softwar project management. The client and the developers need to know the Length, ~~pro~~ period and cost of the project.

Ans to the Qus NO - 3.(b)

⊞ Define project menager roles and responsibility :→

* Softwar project manager:- A Softwar

project manager defines the requirment of the project, bulds the project team leys out a blupoint for the whole project meluding. The project scope and perameters, clearly Communicate the goals of the project to the team. The target to be Achieve, allots bulget to the various Task to be Completed, and ensures that the expectation of the Board of Directors and Stakeholders are met through timely Completion of the project. This article discusses the roals and respon sibilityes of a project manager in a Softwar Company.

*Roals of Softwar project manager:

Leader: A project manager must lead his team toward success. He should provide the direction and make them what is expected of them. clearly explain The roles of each member of the Team

* **Liaison :-** The project manager is a link beetween his clients, his team, and his own supervisors. He must cordinate and transfer all the relevent forom the client to his teams and report to the upper management.

* **Mentor :-** He must be their to guide his team evry step and ensure that the teams has choesion. He provides advise to his teams wherever they need it and point them in the right Direction

⊞ Responsibities of a Softwar project manager

* **planing :-** In order for a project to be successfull and Completed within a specified time, The project manager for a Softwar Company must plan effectively. This also includinors.

Scope: The project must clearly define the scope of the project and answer questions like. who is the Coustomer ? what need will the Software Satisfy ? How will it be beneficial to others what are the operational requirments for the project ?

- Design variations
- variations by the client.
- Occurrence of dispute and fixing any discrepancies arising due to personal conflicts between the team members.
- Incomplete or inaccurate Cost estimate
- if the project has been delayed then ~~b~~ he must try to fix the gap brought about by the delay
- Time managements – Time estimation for the various activities is a major significance as it help Set the daily priorities of each team member

* Implemetation of Monitooring :- Implementation of the projects. activities. include delegating defferent activities and ensuring their Completion on time, Excuting the plan of action and ensuring that it is Monitored along the way is a key responsibility if his. A project manger must Set out the project boundaries and scope for the project which formul,

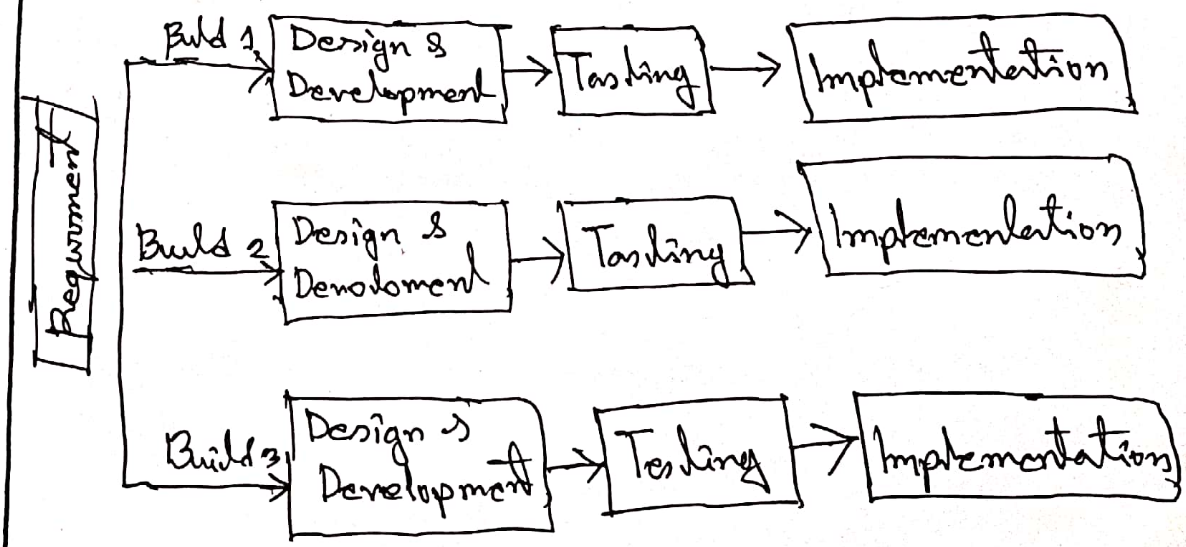
Ans to the Qus No - 3 (e)

Define Iterative Model advantage and disadvantages :-

* Iterative Model :- The Iterative process Starts with a simple implementation of a small Set of the Software requrment and iteratively enhance the evoloving versions until the complete System is implementation and ready to be deployed.

* **Iterative Model design :-** The iterative process starts with a symple implementation of a subset of the Software requrment. and iterative enhance the evolving version until the full system is implemented. at each iteration, design modification are made and new functional capabilities are added. The basic idea behind this method is to develop a System through repeated cycle (itrative) and in smaller portion at a time (incremental).

* The Following illustration is a representation of the Iterative and incremental model:



⊞ Advantage and disadvantag of iterative model.

The advantage of the iterative and Incremental SDLC Model are as Follows –

* Some working funclinality can be developed quickly and early in the cyche.
* Result are obtained early and periodlycally
* parallel development can be planned
* progress can be measured
* less costly to change the scope/requrment
* Easier to manage risk – high-risk part is done first.
* Risk analysis is better
* It support changing requrment.
* initial operating time is less

⊞ The disadvantage of the iterative

* more resources may be requireد
* Al though the cost of change is lesser, It is not very suidable for changing requirment.
* More mangement attention is required
* Systems artecture or desing issues may arise because not all requirments are gathered at the begining of the entire SDLC.

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* Defining incremont may requir a definitaion of the complete System.
* Not suitable for smaller project.
* managment complexcity is more
* The end of the project may not be known which is a risk
* Highly skilled resource are required for risk analiysis.

Ans to the Qus NO - 4. (a)

what is Quality :- Software quality :- Software Quality product is defined in terms of its fitness of purpose, That is Qualidy product does precisely what the users want it to do. for Software products. The fitness of use is generally explaned in terms of satisfaction with the requir ments laid down in the SRS document, Although " Fitnee of purpose" is a satisfac tory interpretation of quality for many device such as a car, a table fan, a a grinding machine etc for Software products. " fitness of purpose is not a wholly Satisfectory defination of Quality.

⊞ Importanc of Quality :-

Savs time and Money:- The advantag of having System and process in place during development is that they anticipate and prevent most bugs and flaws from developing in the first place. as a result, The error that the surface are relatively minor and can be fixed easily.

On the other hand. without QA most bugs would potentially be bigger and may only be caught in the testing phase, or after the program was relesed. fixing these bugs after the fact would require more time. which in turn could cost more

⊞ maintains product Quality :-

QA process are designed to ensure that the Software product works reliable and is stable, in addition. There are Quality Control (QC) Tests designed to test the functionality, performance, security, usability. and more. as a result, the Final product has minimal defects and is guaranteed to work is intended,

*Ensur Security:- whilst a Softwar program might perfrom all function as intended, It may not nessarily be Completely Secure. if ther is any weakness in its defenses, The product and users. data could be Compromised.

* protects your repulation:-

The Quality of your Softwar can reflect on your Company and brand. by releasing a high-Quality product that offers. excellent features withe Comprehensive Security you can build a positive reputation for your business.

* Costomers Satisfaction:-

In order to ensure satisfied customers, your product needs. to fullfill their needs. It should have the feature required and work properly. The role of QA is exactly that to make sure that the Software gives your Coustomer

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Ans to the Qus No - 4 (b)

□ **Softwar Quality assurance Activities:-**

SQA is the process of evaluating the quality of a product and enforcing adherence to Softwer product Standard and procedures. It is an umbrella activity that ensure Conformance to Standard and procedures throughout the SDLC of Soft war products.

There are a large number of tasks involved in SQA activities.

* Formulating A Quality mangement plan.
* Applying Software Engineering Techniques
* Conducting formal Technical Reviews.
* Applying A multi-tiered Testing Strategy.
* Enforcing process Adherene
* Controlling change
* Measuring the impact of change
* performing SQA Audits
* keeping Record and reporting

* Enforcing process Adherence:- The task of SQA emphasizes the need for process adherence during product development. In addition, The development process should also adhere to procedures deffined for product Development. Therefore, this is a combination of two Task product evaluation

* process Monitoring:- process Monitoring ensures that appropriate Step to follow the product development procedures are carried out, SQA monitors processes by Comparing The actual step carried out the step in the documented procedures, product evaluation and process monitoring ensure that the development and Control process.

* Controling change: The task combine human procedures and automated tools to provided a machanism for chang Control. The Change Control mechanism ensure Software Quality by formulizing requests for chane evaluting

* Formulating Quality mangement plan!- One of the task of SQA is the formulation of a Quality managment plan. The Quality managment plan identifies the quality aspects of the Software product to be developed. It helps in planing cheapoint for work product and the development process. It also tracks changes made to the development process based onthe result of the checks.

* Applying Software Engineering:- The applicatio of Softwar engineering Techiques helps the Software designer to achieve high-Quality Specification. The designer gathers information using Techniques such as interviews and Fast

* Conducting formal Technical Reviews!

Formal Technical review (FTR) is Conducted to access the Quality and design of the phototype. It is a meeting with the technical staff to discuss the quality requirment of a Softwar product and its design Quality