Select the Best Choice(s):

1. Does an organization develop one life cycle model?
    a) for all the projects
    b) for each project
    c) for each domain

2. Pick up the odd one out of the following:
    a) Software Design
    b) Software Testing
    c) Software Quality Assurance

3. Software requirements should not be
    a) functional
    b) ambiguous
    c) consistent

4. Find the odd one out of the following:
    a) stepwise refinement
    b) structural design
    c) information hiding

5. What manifests in the patterns of choices made among alternatives ways of expressing an algorithm is
    a) a data flow diagram
    b) coding style
    c) a data dictionary

6. The decision logic is expressed by
    a) data flow diagram
    b) flow chart
    c) structure chart

7. Validation is to check
    a) whether we are building the product right
    b) whether we are building the right product
    c) the methodology of software development

8. Corrective maintenance is to
    a) improve the system in some way without changing its functionality
    b) correct the undiscovered errors
    c) make changes in the environment

9. Quality control
    a) focusses on inspections, testing and removal of defects before release.

b) is a set of planned and systematic actions to provide confidence that a product or service will satisfy given requirements for quality.
c) is to check the system for its interface errors.

10. Capability maturity model
    a) gives prescription for software process
    b) states what activities are necessary for success
    c) describes how activities are to be performed
11. Which software development model incorporates risk managaement ?
    a) waterfall model
    b) spiral model
    c) incremental model

12. Analysis phase is
    a) not to actually solve the problem
    b) not to determine exactly what must be done to solve the problem
    c) to move quickly to program design

13. A data flow diagram is not a
    a) logical model of a system
    b) good guide to a system
    c) representation of a physical system

14. Four important characteristics of a software product are
    a) dependability, usability, reliability, robustness
    b) maintainability, dependability, efficiency, usability
    c) Supportability, maintainability, visibility, rapididty

15. Object models
    a) should include details of the individual objects in the system
    b) are part of design
    c) are natural ways of reflecting the real world entities that are manipulated by the system.

16. Pick up the odd one out of the following:
    a) data flow design
    b) object identification
    c) structural decomposition

17. Pick up one of the testing methods given below that is part of white-box testing:
    a) Equivalence partitioning
    b) boundary value analysis
    c) basis path testing

18. The three classes of interface errors are:
    a) interface misuse, interface misunderstanding, timing errors

b) interface misunderstanding, interface coupling, data transfer errors
c) interface coupling, timing errors, interface parameter errors

19. Find the activity which is not part of version management
a) controlled change
b) storage management
c) coding standard

20. Which is the non-technical factor of maintenance cost?
a) program age
b) prgramming style
c) program validation

21. Pick up the odd one out of the following process models
a) Component assembly model
b) Incremental model
c) Spiral model

22. Software quality assurance is
a) a multitiered testing strategy
b) a measurement and reporting mechanism
c) an activity that is applied throughout the software process.

23. Verification is to check
a) whether we are building the right product
b) whether we are building the product right
c) neither of the above

24. Adaptive maintenance is
a) to improve the system in some way without changing its functionality.
b) the maintenance due to the changes in the environment.
c) the correction of undiscovered system errors.

25. Most common but least effective way of debugging is
a) brute force
b) backtracking
c) cause elimination

26. Equivalence paritioning is
a) a white-box testing method
b) a black-box testing method
c) neither white-box nor black-box testing method

27 Pick up the correct sequence of processes
a) Requirements, Analysis, Test case design, Design
b) Requirements, Test case design, Analysis, Design

c) Requirements, Analysis, Design, Test case design

28. Doing what is said one would do, is the definition for
    a) reliability
    b) quality
    c) software plan

29. The typical elements of the requirements engineering process are
    i) Problem analysis
    ii) software design
    iii) Analysis of staffing needs
    iv) External behavior specification

    A) i and iv
    B) ii and iii
    C) i, iii and iv
    D) i, ii and iii

30. In object models, information hiding conceals
    A) Operations
    B) Attributes
    C) methods
    D) state and behavior

31. The elements of the software architecture of a computing systems include
    i) software components
    ii) class diagrams
    iii) connectors expressing relationships between software components
    iv) entity relationship diagram

    A) i and ii
    B) i and iii
    C) i, iii and iv
    D) i,ii, iii and iv

32. Which of the following types of test plans is most likely to arise form the requirements specification process?
    A) system integration test plan
    B) acceptance test plan
    C) sub-system integration test plan
    D) module test plan

33. In object-orientation, polymorphism means
    A) There can be many objects in the design
    B) Methods can be changed in many ways
    C) Many objects can be instantiated of a class
    D) Objects can implement the same method in many ways.

Fill in the blanks :

1. _____is an iterative process through which the requirements are translated into a "blueprint" for constructing the software.
2. The sooner you begin_____, the longer it will take to get done.

Answers the followings in brief:

1. Explain the concept of black box.
2. What are the qualities of software?
3. Give the various steps in prototyping.
4. What are the various fact-finding Techniques?
5. What are the types of decision tables?
6. What are the structures of Structured English?
7. Give a brief note on acceptance testing.
8. Define coupling and cohesion.
9. What is maintenance? Explain about various types of maintenance.
10. Differentiate between Decision Tree and Decision Table.
11. Give the coding guidelines.
12. Give the debugging approaches.
13. Why Software doesn't wear out.
15. Explain about Dos and Don'ts of good coding style.
16. Give the contents of SRS document.
17. Explain briefly about SEI CMM.
18. What is feasibility study? Explain about various aspects of feasibility.
19. Define normalization and explain about first three normal forms.
20. What is changeover? What are the types of changeover
21. Differentiate between Black Box and White Box testing
22. Explain about Interview as a Fact Finding technique
23. What are the various factors that influence software cost-estimation.
24. Write a short note on Structured charts.
25. Explain about the various concepts of a system.
26. Give Salient features of CASE tools.
27. Explain about various stages of software Development according to classical life cycle.

Answers the followings in detail:

1. Compare and contrast the two life cycle models viz. Waterfall and Spiral models. (Mention at least three distinct aspects).
2. State the importance of requirements management in a software development
3. Discuss and compare the coupling and cohesion in software design
4. Discuss the trade-off between error checking execution time / memory space overhead. How can the overhead be reduced or eliminated?
5. Give some reasons for using global variables than parameters. What are the potential problems created by the use of global variables?

6. Develop test plan for the library management system (List at least three test cases).
7. Explain why it is very difficult to produce a complete and consistent set of requirements.
8. Discuss the differences between object-oriented and function-oriented design strategies
9. Explain why maximising cohesion and minimising coupling leads to more maintainable systems
10. Show using a small example, why it is practically impossible to exhaustively test a code.
11. List at least five distinct tests to exercise the various features of the Powerpoint software used for slide preperation and projection.
12. State the importance of requirements management in a software development
13. Develop a high level data flow diagram for an airline reservation system
14. Discuss the trade-off between error checking execution time / memory space overhead. How can the overhead be reduced or eliminated?
15. Give some reasons for using global variables than parameters. What are the potential problems created by the use of global variables?
16. Develop test plan for the library management system (List at least five test cases).
17. Rewrite the following requirements so that they may be objectively validated. You may make any reasonable assumptions about the requirements.
a) The software system should provide acceptable performance under maximum load conditions
b) Structured programming should be used for program development
c) The software must be developed in such a way that it can be used by inexperienced users.
18. Model the data processing which might take place in an electronic mail system that can send and receive messages from remote computers.
19. Discuss the advantages of incremental model as compared to water fall model.
20. Can a program be correct and still not be reliable ? Explain
21. Discuss how you would approach the top-down design of a software system.
22. Discuss the advantages and disadvantages of using the "antibugging" technique to provide built-in debugging assistance to uncover errors.
23. Discuss at least three reasons that would highlight the importance of software maintenance.
24. Compare and contrast the white-box and black-box testing methods.
25. Discuss the importance of documentation in software development.
26. Discuss the pros and cons of the COCOMO model for cost estimation

27. Make a structure chart for the following:
Given an array of integers, arrange them in ascending order using quick sort method.

28. Develop a software review checklist for use by the designer and the implementor. What issues are important to each of these roles?

29. Develop a high-level data flow diagram and a structure chart for an airline reservation system.

30. Develop an architecture and also flow diagrams (up to 2 levels) for the following:

"Consider the automation of the transaction at the registration counter of a post-office. A scanner is provided to capture the "from" and "to" addresses from the envelop. The clerk uses your software to issue receipts to the customers. This is expected to reduce the waiting time at the counter."

31. Suppose that a 50-KDSI (Thousands of delivered source instructions) application program can be purchased for Rs. 2,000,000/-. Assuming that your in-house programmers cost Rs.30,000/- per programmer month (including overheads), would it be more cost effective to buy the product or to build it ?

32. A Manager decides to use the reports of code inspections as an input to the staff appraisal process. These reports show who made and who discovered program errors. Is this ethical managerial behaviour? Would it be ethical if the staff were informed in advance that this would happen? What difference might it make to the inspection process?

33. Apply a "stepwise refinement process" to develop three different levels of procedural abstraction for developing a cheque writer that, given a numeric rupees amount, will print the amount in words that is normally required on a cheque.

34. Derive a set of test cases for a code which sorts arrays of integers. Draw a flow graph for an algorithm of your choice and derive its cyclomatic complexities

35. A university intends to procure an integrated student management system holding all details of registered students including personal information, courses taken, and examination marks achieved. The alternative approaches to be adopted are either

a) buy a database management system and develop an in-house system based on this database.

b) buy a system from another university and modify it to local requirements

c) join a consortium of other universities, establish a common set of requirements and contract a software home to develop a single system for all of the universities in the consortium. Identify two possible risks in each of these strategies.

36. Consider the error messages produced by MS-DOS or UNIX or WINDOWS operating system. Suggest how they might be improved.

37. Develop at least two levels of procedural abstraction for implementing the savings bank transactions in a banking system.

38. Draw a flow graph for the following and find its cyclomatic complexity : Given 1000 numbers, arrange them in ascending order using any one of the sorting methods.

39. Design test cases for the following problem : Given a quadratic equation, solve it to find the roots.

40. Oxford College of Commerce is an undergraduate college. The college receives sufficiently large number of application for admission to FY, SY and TY B. Com. classes.

The college has decided to computerize its admission procedure. The standard admission procedure requires adhering to the norms set by concerned government agencies, the university and the college administration. The procedure also involves disbursing admission forms at a cost, collecting duly completed forms, preparing merit lists and admitting the students as per norms, notifying student, collecting fees, preparing and submitting reports to concerned authorities.

By carefully studying the case you are required to solve the following:

i. Draw a context level and first level DFD
ii. Identify the various reports required

41. Draw the context level diagram for a payroll system

42. Prepare Context diagram for the saving bank deposit and withdrawal system in a nationalized bank. Also draw the first level DFD for the same.

43. Ratanlal College of Commerce is an undergraduate College. The college receives sufficiently large number of applications for admission to FY, SY and TY. Bcom classes. The college has decided to computerize its admission program. The standard admission procedure requires adhering to the norms set by concerned government agencies, the university and the college administration. The procedure also involves disbursing admission forms at a cost, collecting duly completed forms, preparing merit list and admitting students as per norms, notifying students, collecting fees, preparing and submitting reports to the concerned authorities

You are required to identify :

(i) Entities:
Processes
Data flows
Data Stores

(ii) Draw E-R Model of the System