Ex./CSE/Math/T/124/81/2013

BCSE EXAMINATION, 2013

(2nd Year, 2nd Semester)

SOFTWARE ENGINEERING

Full Marks : 100 Time : Three Hours

The figures in the margin indicate full marks.

Group - A

Match the correct pairs : 2×15=30

Set-I	Set-II
1. Backward Pass	(i) 2
2. Big Bang testing	(ii) 3
3. Defensive design	(iii) 60 days
4. Environmental factor having an average effect	(iv) avoiding risk
5. Environmental factor having a moderate effect	(v) earliest start date
6. Estimation	(vi) historical data
7. Forward Pass	(vii) integration
8. Inquiry	(viii) latest start date
9. Proactive strategy	(ix) many keys

[*Turn over*]

10. Project manager	(x) preconditions
11. Query	(xi) schedule
12. RAD	(xii) sequential
13. Software scope	(xiii) simple keys
14. Task interdependencies	(xiv) stakeholder
15. Waterfall	(xv) use-cases

Group - B

Answer any *fifteen* questions. 2×15=30

Fill in the blanks.

16. Software Engineering is the application of a systematic, disciplined, _____ approach to the development, operation, and _____ of software.

17. The waterfall model has difficultly accommodating the natural _____ that exists at the _____ of many projects.

18. Software project planning encompasses estimation, scheduling, risk analysis, _____ management planning, and _____ management planning.

19. Software feasibility has four dimensions : _____, finance, time, and _____.

20. The major
software co

21. When fire-
takes over a

22. Risk invo
_____

23. To find wh
the software
_____

24. Risk expos
of risk and

25. In an activi
joining all

26. PERT prov
meeting or

27. In PERT, t
measure of
duration est

28. McCall's "
software
conciseness

20. The major categories of resources are people, _____ software components, and _____ environment.

21. When fire-fighting mode fails, _____ _____ takes over and the project is in real jeopardy.

22. Risk involves two characteristics : _____ and _____.

23. To find whether a project is "at risk" one might ask : "Does the software engineering team have the right _____ of _____ ?"

24. Risk exposure is the product of _____ of occurrence of risk and _____ to the project if the risk occurs.

25. In an activity-on-arrow network, the critical path is the path joining all nodes with a zero slack.

26. PERT provides a method for estimating the _____ of meeting or missing _____ dates.

27. In PERT, the standard deviation of an activity time is a measure of the _____ of _____ of an activity duration estimate.

28. McCall's "Maintainability" quality factor translates to the software quality criteria of _____, simplicity, conciseness, modularity, and _____.

[*Turn over*]

29. A use case model captures services offered by a system and users of the system in terms of _____, use cases, and the _____ relationship.

30. Hexibility can be built into a design by creating abstractions. In particular, we should try to create interfaces or superclasses with _____ _____.

31. The criteria used in determining equivalence classes are _____, disjointedness, and _____.

32. A disadvantage of equivalence class and boundary testing is that these techniques do not explore _____ of test _____ data.

33. The advantage of bottom-up testing is that _____ _____ can be more easily found.

34. In top-down testing, test _____ are used to simulate the components of subsequent layers that have not yet been integrated.

35. In acceptance testing, _____, functional, and performance tests are performed by the customer in the _____ environment against acceptance criteria.

Choose the

36. In Rap involve

(a) req

(b) dev

(c) fina

(d) all

37. If resou appropri

(a) Wate

(b) Incre

(c) Proto

(d) RAD

Group C

Answer any *ten* questions. : 2×10=20

Choose the unique correct answer.

36. In Rapid Application Development (RAD), the user is involved in

    (a) requirements definition

    (b) development and test

    (c) final delivery

    (d) all of the above.

37. If resources (time, money, tools, people) are scarce, the appropriate process model is

    (a) Waterfall

    (b) Incremental

    (c) Prototype

    (d) RAD

38. If high reliability is desired, the appropriate process model is

(a) Spiral

(b) Waterfall

(c) Prototype

(d) RAD

39. Data structures shared between systems are counted as

(a) external inputs

(b) interfaces

(c) data structures

(d) both interfaces and data structures

40. In the Software Equation $L = P \times E^{\frac{1}{3}} \times t^{\frac{4}{3}}$, E is

(a) earned value

(b) effort in person-months

(c) expenditure in dollars

(d) energy in kilowatts

41. In the critical path method, if activities are represented as nodes, the links between nodes represent

(a) precedence requirements

(b) path of information flow

(c) concurrent development

(d) wired link between the offices of the company

42. A critical activity has

(a) positive float

(b) zero float

(c) negative float

(d) undefined float

[*Turn over*]

43. In McCall's methodology, Integrity is a

(a) product operation quality factor

(b) product revision quality factor

(c) product transition quality factor

(d) none of the above

44. In McCall's methodology, Portability is a

(a) product operation quality factor

(b) product revision quality factor

(c) product transition quality factor

(d) none of the above

45. UML is a

(a) visual programming language

(b) visual modelling language

(c) tool or repo

(d) all of the al

46. A subsystem ca

(a) packages

(b) classes

(c) methods

(d) none of the

47. The maxim "Tl
will test" is rela

(a) decomposab

(b) controllabilit

(c) operability

(d) understanda

(c) tool or repository specification

(d) all of the above

46. A subsystem can be divided into one or more

(a) packages

(b) classes

(c) methods

(d) none of the above

47. The maxim "The more information we have, the smarter we will test" is related to

(a) decomposability

(b) controllability

(c) operability

(d) understandability

48. The test which checks if the system can respond to many simultaneous requests is

(a) Security testing

(b) Stress testing

(c) Volume testing

(d) none of the above

Group D

Answer *all* questions : 10×2=20

49. A flowchart is represented by a directed graph with the following set of arcs :

$\{(1,2), (2,3), (2,4), (3,2) (4,5) (4,6), (5,6), (6,7), (6,8)\}$,

where (a, b) represents an arc directed from vertex "a" to vertex "b". A vertex with out-degree = 2 represents a decision-box.

(a) Identify, for every vertex "k", all the paths from vertex "1" to vertex "k". 8

(b) Find the cyclomatic complexity of the flowchart. 2

50. Consider the

Class lln {

box * c

lln * ptr

Public :

lln (box

{cell

lln * ge

box * g

void set

{pt

}

Let I_j be t

(a) Find P

and Q

50. Consider the following nested class in a C++ program :

```
Class lln {
    box * cell;
    lln * ptr;
Public :
    lln (box* newbox)
        {cell = newbox; ptr = 0;}
    lln * getptr ( ) {return ptr;}
    box * getbox ( ) {return cell;}
    void setptr (lln * newptr)
        {ptr = newptr;}
}
```

Let I_j be the set of instance variables used by method m_j.

(a) Find $P = \{(I_i, I_j) / I_i \cap I_j = \phi\}$

and $Q = \{(I_i, I_j) / I_i \cap I_j \neq \phi\}$ 8

(b) Compute LCOM (Lack of Cohesion in Methods)

$$= \begin{cases} \text{Card}(P) - \text{Card}(Q), & \text{if card}(P) > \text{card}(Q) \\ 0, & \text{otherwise} \end{cases}$$

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