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Paper Code : EE-604A

SOFTWARE ENGINEERING

Time Allotted : 3 Hours *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $10 \times 1 = 10$

i) To achieve good design quality, a module should have
   a) high cohesion low coupling
   b) high cohesion high coupling
   c) low cohesion low coupling
   d) low cohesion high coupling.

ii) According to Intermediate COCOMO, number of cost drivers is
   a) 14 b) 15
   c) 20 d) 10.

iii) Which of the following life cycle models deals with risk associated with software products ?
   a) Prototype model b) Incremental model
   c) Spiral model d) Waterfall model.

iv) System testing performed by a set of friendly customers is called
   a) alpha testing b) beta testing
   c) performance testing d) usability testing.

v) If the project size is same, then the development time is maximum in case of
   a) embedded b) semi-detached
   c) organic d) none of these.

vi) The best type of coupling is
   a) logical b) informational
   c) coincidental d) functional.

vii) Who writes the Software Requirement Specification Document (SRS) ?
   a) System Developer b) System Tester
   c) System Analyst d) None of these.

viii) Data Flow Diagrams are used for
   a) Process modeling
   b) Data modeling
   c) Modeling interactions in a real-time environment
   d) None of these.

ix) The cost of software engineering includes approximately ..... of development costs and ..... of testing costs.

a) 50%, 50% b) 40%, 60%

c) 80%, 20% d) 60%, 40%.

x) Which type of DFD concentrates on the system process and flow of data in the system ?

a) Logical DFD b) Physical DFD

c) Both (a) and (b) d) None of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following 3 × 5 = 15

2. Discuss the different stages of SDLC in brief.

3. a) Describe the role of a 'System analyst'.

b) What are the advantages of the SRS document ? 3 + 2

4. a) Why is COCOMO called Heuristic Estimation Technique ?

b) The size of an organic type software product has been estimated to be 48000 lines of source codes. Assume that the average salary of software engineers is Rs. 18,000 per month. Determine the effort required to develop the software product, total cost and the nominal development time. 1 + 4

5. Draw an ER Diagram for Hospital Management System showing cardinalities, strong and weak entities, derived attributes, primary key etc.

6. a) What is the Integration testing ?

b) What are the roles of stubs and drivers in Integration testing ? 2 + 3

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Is the spiral model of software development a risk management model ? Discuss in brief.

b) Explain why Spiral model is also called the 'meta' model.

c) Draw the Control Flow Graph for the following program segment :

```
int compute_gcd (x, y)
int x, y :
{
while (x! = y)
if (x > y) then x = x-y;
else y = y - x;
}
return x;
```

d) Explain why Intermediate COCOMO is expected to give better results than the basic COCOMO.

4 + 3 + 5 + 3

8. A college runs an admission system for a batch of 30 for M. Tech in Electrical Technology. The procedure involves announcement of the admission in the newspaper. Admission applications are invited from the candidates. After the written test, a list of 30 students are displayed on the notice board. The selected students are instructed to pay an amount of Rs. 20,000 for the admission within one week from the date of publication of the merit list. In this domain, perform the following actions :

I. Identify actors.

II. Develop three use cases.

III. Complete the class diagram with properties.

IV. Draw interaction diagram.

V. Draw activity diagram.

VI. Draw the total system diagram with packages.

2 + 2 + 2 + 3 + 3 + 3

9. a) What is the difference between verification and validation ?

b) What is the difference between Black-Box Testing and White-Box Testing ?

c) Draw the context diagram and Level-1 DFD for Library Management System.

d) What are the disadvantages of classical waterfall model ?

3 + 3 + 5 + 4

10. a) Explain Critical Path Method with example.

b) The following table indicates the various tasks involved in completing a Software Project and the corresponding activities and the estimated effort for each task in person-month :

Notation	Activity	Effort in Person-Months
T_1	Requirements Specification	1
T_2	Design	2
T_3	Code actuatory interface module	2
T_4	Code sensor interface module	5
T_5	Code user interface part	3
T_6	Code control processing part	1
T_7	Integrate and test	6
T_8	Write user manual	3

The precedence relation $T_i <= \{T_j, T_k\}$, indicates that the task T_1 must be completed before either task T_j or T_k can start. The following precedence relation is known to hold among different tasks $T_1 <= T_2 <= \{T_3 <= T_4 <= T_5 <= T_6\} <= T_7$.

Draw the Activity Network and the Gantt Chart representations for this project.

c) Define coupling and cohesion. What are the different types of coupling and cohesion ?

4 + 6 + (2 + 3)

11. Write short notes on any *three* of the following : 3 × 5

a) Software Quality Assurance

b) Cyclomatic Complexity

c) Feasibility study

d) Decision Tree and Decision Table

e) Prototype Model.