Registration No: - □□□□□□□□□□

Total Number of Pages: 2 **MCA**

MCA03001

3rd Semester Regular Examination: 2021-22

SOFTWARE ENGINEERING

Branch: MCA

Max Marks: 100

Time: 3 Hours

Q Code: OF290

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

Part- I

Q1 Only Short Answer Type Questions (Answer All-10) **(02×10)**

a) State different types of maintenance. **(2)**

b) Distinguish between a program and a software product. **(2)**

c) Why isthe SRS document also known as black box specification of a system. **(2)**

d) Differentiated between verification and validation. **(2)**

e) Define egoless programming? How can it be realized? **(2)**

f) How flow chart is different from structure chart. **(2)**

g) Why the spiral life cycle model is considered to be a meta model. **(2)**

h) Why phase containment errors are important? **(2)**

i) What problems are likely to occur if a module has low cohesion? **(2)**

j) When reengineering might be preferable? **(2)**

Part- II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) **(06×08)**

a) What do you mean by the “99% complete” syndrome in software development? Why does it occur? What is its implication for project management? What are its remedies? **(6)**

b) What do you mean by balancing a DFD? Illustrate your answer with a suitable example. **(6)**

c) Define SRS? Explain the characteristics of a good and bad SRS document. **(6)**

d) What are the important types of risks that a project might suffer from? How would identify the risks that a project is susceptible to during project planning stage? **(6)**

e) What is the significance of McCabe’s Cyclomatic Complexity Metric? What are the ways to compute it? **(6)**

f) Define debugging? Explain various approaches debugging techniques. **(6)**

g) Discuss types of code reviews. Explain when and how code review meetings are conducted. Why code review is considered to be a more efficient way to remove errors from code compared to testing? **(6)**

h) What are driver and stub modules in the context of integration and unit testing of a software product? Why are stub and driver modules required? **(6)**

i) List five silent requirements that a software development organization must comply with before it can be awarded ISO 9001 certification. **(6)**

j) What is statistically testing? In what way is it useful during software development? Explain in the different steps of statistical testing. **(6)**

k) Schematically draw the architecture of a CASE environment and explain how the different tools are integrated. **(6)**

l) What do you mean by the term software reverse engineering? Why is it required? Explain the different activities undertaken during reverse engineering. **(6)**

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four) **(02×16)**

Q3 Discuss different phases of Iterative waterfall model. Compare the relative advantages of using the iterative waterfall model and spiral modelof software development. Explain with the help of a few suitable examples, the type of problems for which you would adopt the waterfall model of software development, and the type of problems for which you would adopt the spiral model. **(16)**

Q4 What are the different categories of software development projects according to COCOMO estimation Model? Give examples of software product development projects belonging to each of these categories. A project size of 200 KLOC is to be developed software development team has average experience on similar types of project. The project schedule is not tight. Calculate effort, development, time, average staff size and productivity of project. **(16)**

Q5 State the advantages of function point over Lines of Code (LOC).List all the value adjustment factors. What are the metric for specification quality? **(16)**

Consider a project with

No. of user input=50
No. of output =40
No. of Enquiries = 35
No. of user files= 06
No. of external interface =04

All CAF and weighting factor are average. Compute function point.

Q6 What are the different models of a problem that can be constructed using UML. **(16)**

Explain the following in context to UML.

A) Use Case Diagram
B) Sequence Diagram
C) State Diagram
D) Classes and Objects

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MCA
MCA03002

3rd Semester Regular Examination: 2021-22
Compiler Design
BRANCH(S): MCA
Time : 3 Hour
Max Marks : 100
Q.Code : OF398
Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions :** **(2 x 10)**

a) Differentiate compiler vs. interpreter.
b) What are the secondary functions of a lexical analyzer?
c) What is YACC?
d) Differentiate lexeme vs. token.
e) Differentiate phase vs. pass of a compiler.
f) What is a symbol table?
g) What is handle pruning?
h) Give one example of S-Attributed definition.
i) Write a 3-address code for a<b.
j) Draw a block diagram indicating the attributes of an activation record.

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 × 8)**

a) How can we eliminate ambiguity from an ambiguous grammar? Eliminate ambiguity from the following grammar: E→E+E|E*E|E/E|(E)|id.
b) What is significance of left factoring in top down parsing? Left factor the following grammar: S→iEtSeS|iEtS|a, E→b.
c) Construct LL(1) parsing table for the following grammar: E→E+T|T, T→T*F|F, F→(E)|id.
d) Show that left factoring never eliminates ambiguity from an ambiguous grammar.
e) What is shift-reduce parsing? Given a grammar: E→E+E|E*E|(E)|id, parse the input string id+id*id using general shift-reduce parsing algorithm.
f) Discuss shift-reduce and reduce-reduce conflicts in LR(0) parsing. How can we resolve such conflicts?
g) Write an SDT to generate syntax tree for an arithmetic expression.
h) Represent x[i]=y and x=y[i] using triple representation of 3-address code.
i) Discuss different storage allocation strategies.
j) Differentiate loop jamming vs. loop unrolling with suitable examples.
k) What is machine dependent code optimization? Discuss different peephole optimizations?
l) Discuss different issues to design a code generator.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 Discuss the different phases of a 2-pass compiler with an example. **(16)**

Q4 Construct LR (1) and LALR parsing table for the grammar: S→AA, A→aA|b. From the above constructed parsing table, parse the input string “aaaabaaaaab” using LR(1) parsing algorithm. **(16)**

Q5 Differentiate syntax directed definition (SDD) vs. syntax directed translation (SDT)? Write an L-attributed definition to store type information into a symbol table. A sample input and output is given below: **(16)**

Input: int x,y,z

Output:

Lexeme	**Type**
z	int
y	int
x	int

Q6 Write translation schemes to generate 3-address code from Boolean expressions. Generate 3-address code (using value and flow of control representations) for the following Boolean expression: a<b or c>d and e<f. **(16)**

Discuss the different phases of a 2-pass compiler with an example.