Total no. of Pages: 04

Roll no. 2.1<2.1/EC/2

5th SEMESTER B.Tech. (SE)

END TERM EXAMINATION *Nov-2023*

SE207a Engineering Analysis & Design

Time: 03:00 Hours *Max. Marks: 40*

Note : Assume suitable missing data, if any.
All questions are compulsory.

Q.1 What do people mean by software crisis? Discuss the problem and causes for the software crisis with an example.

[4 M][CO4]

Q.2 a) Describe FAST (Facilitated Application Specification Technique and compare this with brainstorming sessions.

b) What is requirement engineering? State its process and explain requirements elicitation problem.

[4*2 M][CO2]

Q.3 Discuss the differences between the following:

a) Static Testing Tools Vs Dynamic Testing Tools with an example.

b) Object-oriented and Function-oriented system design approach with an example.

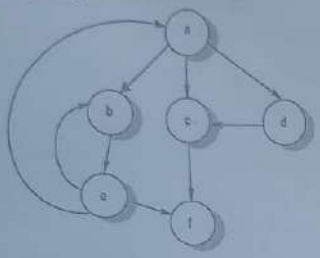
[3*2 M][CO3-5]

Q.4 What do you mean by boundary value analysis? Consider a simple program to classify a triangle. Its inputs are a triple of positive integers (say x, y, z) and the date type for input parameters ensures that these will be integers greater than 0 and less than or equal to 100. The program output may be one of the following words:
[Scalene; Isosceles; Equilateral; Not a triangle]
Design the boundary value test cases.

[4 M][CO4]

OR

Discuss cyclomatic complexity measures of software measurement and its metrics. Consider a flow graph given below and calculate the cyclomatic complexity.



[4 M][CQ3]

Q.4 Suppose a system for office automation is to be designed. It is clear from requirements that there will be five modules of size 0.5 KLOC, 1.5 KLOC, 2.0 KLOC, 1.0 KLOC, and 2.0 KLOC respectively. Complexity and reliability requirements are high. Programmer's capability and experience is low. All other factors are of nominal rating. Use COCOMO model to determine the overall cost and schedule estimated. Also calculate and schedule estimates for different phases.

Table 1: Coefficients for intermediate COCOMO

Project	a_i	b_i	c_i	d_i
Organic	3.2	1.05	2.5	0.38
Semidetached	3.0	1.12	2.5	0.35
Embedded	2.8	1.20	2.5	0.32

Multipliers of different cost drivers

Cost Drivers	Ratings					
	Very Low	Low	Nominal	High	Very High	Extra High
Product Attributes						
Software Reliability	0.75	0.88	1.00	1.15	1.40	--
Database Size	--	0.94	1.00	1.08	1.16	--
Product Complexity	0.70	0.85	1.00	1.15	1.30	1.65
Computer Attributes						
Executive Time Constraint	--	--	1.00	1.11	1.30	1.66
Main Storage Constraint	--	--	1.00	1.06	1.21	1.56
Virtual Machine Volatity	--	0.87	1.00	1.15	1.30	--
Turnaround Time	--	0.87	1.00	1.07	1.15	--

Cost Drivers	Ratings					
	Very Low	Low	Nominal	High	Very High	Extra High
Personnel Attributes						
Analyst Capability	1.46	1.19	1.00	0.86	0.71	--
Application Experience	1.29	1.13	1.00	0.91	0.82	--
Programmer Capability	1.42	1.17	1.00	0.86	0.70	1.65
Virtual Machine Experiences	1.21	1.10	1.00	0.90	--	--
Programming Language Experience	1.14	1.07	1.00	0.95	--	--
Project Attributes						
Modern Programming Practices	1.24	1.10	1.00	0.91	0.82	--
Use of Software Tools	1.24	1.10	1.00	0.91	0.83	--

Development Schedule	1.23	1.08	1.00	1.04	1.10	--

Lifecycle Phase Values of μ_p

Mode & Code Size	Plan & Requirements	System Design	Detailed Design	Module Code & Test	Integration & Test
Organic Small S≈2	0.06	0.16	0.26	0.42	0.16

Lifecycle Phase Values of τ_p

Mode & Code Size	Plan & Requirements	System Design	Detailed Design	Module Code & Test	Integration & Test
Organic Small S≈2	0.10	0.19	0.24	0.39	0.18

[6 M][CO2]

Q.6 Draw an ER-Diagram for an online railway reservation system, which allows the user to select route, book/cancel tickets using net banking/credit/debit cards. The site also maintains the history of the passengers. For the above system, also list its each component along with its dependencies. (Make necessary assumptions).

[4 M][CO1]

Q.7 Write a short note on the following:

a) Software maintenance and its type
b) CMM
c) Equivalence partitioning
d) Reverse Engineering

[2*4 M][CO1-3]