University of Engineering and Management, Kolkata
1st Term Examination, September, 2023
Programme Name: B.Tech in CSE / CSE (AIML) / CSE (IOT, CYS, BCT)
Semester: 5th
Course Name: Software Engineering
Course Code: PCCCSE503

Full Marks: 30 | Date: 13th September, 2023 | Time: 1.30 PM – 2.30 PM

Part - A
Attempt 5 questions
Each question carries 2 Marks (2 X 5)

1.A. Distinguish between content coupling & stamp coupling.

Or

1.B. Discuss the utility of a container widget in GUI Design.

2.A. Analyse why the spiral model is called as meta model.

Or

2.B. Analyse the 99% completion syndrome in software engineering.

3.A. Discuss the principle used in prototyping model of software development.

Or

3.B. Discuss the difference between prototyping model and evolutionary model of SDLC.

4.A. What do you mean by balancing of a DFD?

Or

4.B. Compare synchronous versus asynchronous DFD modelling.

5.A. Why the black-box testing is named as functional testing?

Or

5.B. Define test-suite for a function or a program.

Part - B
Attempt 2 questions
Each question carries 5 Marks (5 X 2)

6.A. i) Draw the sequence diagram for the following function: [2+(2+1)]
Withdrawing money from Bank ATM
ii) Demonstrate the V-shaped model of SDLC with a proper schematic representation and indicate why is it named as the verification and validation model.

Or

6.B. Draw the context diagram for a restaurant management system.
Deduce the level-1 DFD with some of its relevant functions as applicable and finally derive the level-2 DFD for the "Order cancellation" function that must be present in the said system.

7.A. Draw the control flow graph (CFG) for the following function named find-maximum. From the control flow graph, determine its cyclomatic complexity. [2+3]

```
int find-maximum (int i, int j, int k)
{
  int max;
  if(i>j) then
    if(i>k) then max=i;
        else max=k;
   else if(j>k)
    max=j;
  else max=k;
 return(max);
}
```

Or

7.B. Consider the following C function named as "sort" .

```
/* sort takes an integer array and sorts it in ascending order */
void sort(int a[], int n)
{
  int i, j;
  for(i=0; i<n-1; i++)
    for(j=i+1; j<n; j++)
      if(a[i]>a[j])
      {
        temp=a[i];
        a[i]=a[j];
        a[j]=temp;
      }
}
```

Design a test suite for the function "sort" that satisfies the branch coverage testing strategy.

Part - C
Attempt 1 question
Each question carries 10 Marks (10 X 1)

8.A. i) With a proper schematic diagram, explain the working principle of the spiral model of SDLC. [4+3+3]
ii) Explain the working principle of RAD model.
iii) Explain agile methodology of software development with proper example.

Or

8.B. Draw a decision tree to represent the processing logic of the chemical plant controller described as follows: [5+5]
Consider the following requirement for a software to be developed for controlling a chemical plant. The chemical plant has a number of emergency conditions. When any of the emergency conditions occur(s), some pre-specified actions should be taken. The different emergency conditions and the corresponding actions that need to be taken are as follows:
(a) If the temperature of the chemical plant exceeds T1 ^{0}C, then the water shower should be turned ON and the heater should be turned OFF.
(b) If the temperature of the chemical tank falls below T2 ^{0}C, then the heater should be turned ON and the water shower should be turned OFF.
(c) If the pressure of the chemical plant is above P1, then the valve v1 should be OPENED.
(d) If the chemical concentration of the tank rises above M, and the temperature of the tank is more than T3 ^{0}C, then the water shower should be turned ON.
(e) If the pressure rises above P3 and the temperature rises above T1 ^{0}C, then the water shower should be turned ON, valves v1 and v2 to be OPENED and the alarm bell to be sounded.
Consecutively draw the respective decision table as per your understanding.

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