MANIPAL UNIVERSITY JAIPUR
SCHOOL OF COMPUTING AND IT
V Semester B.Tech – End Semester Examination: 2017-18
Branch: CSE
CS1502-Software Engineering
(CLOSED BOOK)

Duration: 3 Hours **Max. Marks: –80**

Instructions:

- Answer any five full questions
- Missing data if any may be assumed suitably.

1. a) Apply waterfall model and prototype model for development of e-commerce software. State how the prototype model is better suitable for e-commerce software system. Indicate in detail, each of the steps with diagram [4]

   b) Assume that you are a project manager of three projects with the following characteristics: [3*4]
   Project 1. A complex real-time system whose requirements can be relatively easily identified and are stable.
   Project 2. A web-site for a local library. Requirements are vague and are likely to change in the future.
   Project 3. An order processing system with a web-site for a local business. Requirements are vague but stable (i.e. unlikely to change in the near future).
   Consider also the following software development approaches/models: waterfall, incremental, prototyping, RAD, Agile development. Which of the above models would you choose for each of your projects? Your choices should be properly justified.

2. a) Suppose that a project was estimated to be 400000 lines of code. Calculate the effort and development time for each of the three modes i.e organic, semidetached and embedded. [4]

   b) A project consists of a series of tasks labeled A, B, ….., H, I with the following relationships (W<X, Y) means X and Y cannot start until W is completed; X, Y<W means W cannot start until both X and Y are completed). With this notation construct the network diagram having the following constraints: Tasks A, B, C, ….., H, I constitute a project. The precedence relationships are A<D; A<E; B<F; D<F; C<G; C<H; F<I; G<I [3*4]
   Minimum time of completion of the project when time, in days, of each task is as follows:

A	B	C	D	E	F	G	H	I
8	10	8	10	16	17	18	14	9

   (i) Draw a network graph to represent the project
   (ii) Calculate ES,EF,LS,LF and find out the critical path
   (iii) Calculate the length of critical path

3. a) Identify the cohesion in the c program below: [2*2]

```
a)
public void sample( int flag )
 {
 switch ( flag )
  {
  case ON:
   // bunch of on stuff
   break;
  case OFF:
   // bunch of off stuff
   break;
  case CLOSE:
   // bunch of close stuff
   break;
  case COLOR:
   // bunch of color stuff
   break;
  }
 }
```

```
b)
int Function1 (int a) {
 if (a > 0)
 {
  myGlobalVar++;
  a = 0;
 }

 return a;
}
void Function2 (void)
{
 if(myGlobalVar > 0)
 {
  myGlobalVar = 42;
 }
 else
 {
  myGlobalVar = -1;
 }}
```

b) The ATM will service one customer at a time. A customer will be required to insert an ATM card and enter a personal identification number (PIN) - both of which will be sent to the bank for validation as part of each transaction. If the customer is not an authorized user or session ended an error message will be displayed on the screen. An authorized user will then be able to perform one or more transactions. Each transaction is validated from a network directory. After completion of the transaction a receipt will be generated.
(i)Draw context level and Level-1 diagram for the above case study.
(ii) What do you mean by balancing a DFD?
(iii) Illustrate your answer with the help of above case study

4. a) A wholesaler sells printer cartridges. The minimum order quantity is 5. There is a 20% discount for orders of 100 or more printer cartridges. You have been asked to prepare test cases using various values for the number of printer cartridges ordered. Which of the following groups contain three test inputs that would be generated using Boundary Value Analysis? [4]

b) Consider the code given : [4*3]

```
i=0; //
n=4; // N-Number of
nodes present in the
graph
while (i<n-1) do
i = i + 1;
while (j<n) do
if A[i]<A[j] then
swap(A[i], A[j]);
end do;
i=i+1;
end do;
```

(i)Draw the control flow graph for the code.
(ii)Determine the cyclomatic complexity.
(iii)Determine all the independent paths in the program.

5. a) Draw a Class Diagram for online shopping domain model. [4]

b) Consider the following software attributes: Maintainability, Cyclomatic complexity, Lines of Code count (LOC), Reliability, Number of errors. Which of these attributes can be measured directly and which indirectly? Justify your answers. [4*3]

6. a) What is meant by the term cohesion in the context of software design? Is it true that in a good design the modules should have low coupling? Why? What are the type of cohesion explain with example [4]

b) i) The following program is to be tested for statement coverage: [8]

```
begin
 if (a== b) {S1; exit;}
 else if (c== d) {S2;}
    else {S3; exit;}
 S4;
end
```

The test cases T1, T2, T3 and T4 given below are expressed in terms of the properties satisfied by the values of variables a, b, c and d. The exact values are not given. T1 : a, b, c and d are all equal T2 : a, b, c and d are all distinct T3 : a = b and c != d T4 : a != b and c = d. Identify the test suites which ensures coverage of statements S1, S2, S3 and S4? Justify the answer

c) State at least five risks in Software Engineering. How will you manage them? [4]