

Unique Paper Code : 32341402_OC
Name of Paper : Software Engineering
Name of Course : BSc. (H) Computer Science (CBCS)
Semester : IV (Admissions of 2015, 2016, 2017 & 2018)

Duration: 3 hours

Maximum marks: 75

Note: Attempt any four questions. All questions carry equal marks.

- Q.1 Suppose that you need to develop a Software. The members in the team have an average experience on similar projects and the technology is relatively new. The requirements may change anytime and are complex and unclear. Also, the software releases are frequent. Which SDLC model will you prefer in this case? Support your answer with appropriate reasons. Explain all phases of the model chosen with suitable diagram.
What are the factors to be considered while selecting an appropriate Process Model?
- Q.2 Create a data flow diagram (level 0 and level 1) of the problem statement given below:
A COVID vaccination registration process is to be created. The eligible individuals (age greater than 45) can register online for the vaccination by providing the required details (name, age, gender, region, AADHAR number as well as the preferred date). The process validates the details provided by the individual. If the date chosen is available and the stock of vaccine is not depleted, it confirms the date, time and the Centre for vaccination to the individual.
Also create and explain the data dictionary for the above problem statement.
- Q.3 Which of the following requirements in Software Requirement Specification (SRS) document are ambiguous? Justify your answer.
(a) The system shall be user friendly.
(b) The system shall have 256KB of RAM.
(c) The system shall be menu driven.
(d) The system shall be manageable.
(e) The system shall be reliable and of high quality.

Explain various stages of COCOMO-II Model. Consider a database application project with the following characteristics:

- (a) The application has 10 screens with 5 views each and 8 data tables for 2 servers and 8 clients.
(b) The application may generate two reports of 6 sections each from 07 data tables for two server and 3 clients. There is 10% reuse of object points.

The developer's experience and capability in the similar environment is low. The maturity of organization in terms of capability is also low. Calculate the object point count, new object points and effort to develop such a project.

Q.4 Investor A, Investor B and Investor C are offering different investment plans.

A is subject to a disrupting event with probability 0.01 with related loss of Rs 800.

B is subject to a disrupting event with probability 0.02 with related loss of Rs 700.

C is subject to a disrupting event with probability 0.03 with related loss of Rs 400.

Considering the risk involved, which one of the three investors will you prefer and why?

What are the ways to deal with risks? Explain in detail.

Q.5 Consider the program given below for calculating the factorial of a number. It consists of main() program and the module fact(). Draw the control flow graph of the program. Compute the Cyclomatic Complexity for both main() and fact() independently. Also compute the Cyclomatic complexity of the complete program and find all independent paths.

```
main(){
    int n;
    int fact(int);
    1. clrscr();
    2. cout<< "Enter the number-";
    3. cin>>n;
    4. if (n<0)
    5.     cout<<"NA";
    6. else
    7.     cout<<"Factorial is -"<<fact(n);
    8. }

int fact(int n)
{
    int i;
    1. int p=1;
    2. for(i=1;i<=n;i++)
    3.     i=p*i;
    4. return(p);
    5. }
```

Q.6 Why cohesion should be high and coupling should be low in a software design? Justify and explain with appropriate examples?

Identify the type of cohesion involved in each of the following cases with suitable justifications.

1. X outputs some data that becomes an input for Y.
2. Instructions in a module accomplish different tasks yet they are combined in a module because there is a specific order in which the tasks should be completed.
3. There is no relationship between the tasks that are put in a module yet they are all put in a single module.
4. The instructions that are combined in a module fall in the same logical class of functions.
5. The instructions are put in one module because they all are executed in the same time span.

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