END TERM EXAMINATION

SECOND SEMESTER [MCA] MAY 2017

Paper Code: MCA-110	Subject: Software Engineering
Time: 3 Hours	Maximum Marks: 75

Note: Attempt any five questions including Q.no.1 which is compulsory.
Select one question from each Unit.

Q1 Attempt all questions (Answer briefly):   (2.5x10=25)

(a) What is the significance of software crisis in reference to software engineering discipline? Was Y2K a software crisis?

(b) What are the disadvantages of LOC method for size estimation? Why Albrecht's function point analysis is becoming acceptable in industry?

(c) Differentiate Functional vs. Non Functional requirement with example. Consider an Online Railway Reservation System; identify five Functional and Five Non Functional requirement for the same.

(d) Write the Requirement Engineering Process Steps.

(e) Describe the difference between conceptual design and technical design. What are characteristics that make object-oriented design good?

(f) Compare hardware reliability with software reliability.

(g) Write the main objectives of Reserve Engineering and Re-engineering.

(h) What is Control Coupling? Can a system ever be completely "decoupled"? That is, can the degree of coupling be reduced so much that there is no coupling between modules?

(i) Differentiate Development Testing vs. Regression testing.

(j) Annual Change Traffic (ACT) for a software system is 15% per year. The development effort is 600 PMs. Compute estimate for Annual Maintenance Effort (AME). If life time of the project is 10 years, what is the total effort of the project?

Unit-I

Q2 (a) Explain the spiral model of software development. What are the limitations of such model? How does "project risk" factor affect the spiral model of software development?   (6.5)

(b) Discuss the various selection parameters to select software lifecycle model. What life cycle model you will use for the following system-
A flight control system with extremely high reliability. There are many potential hazards with such a system. Justify your answer with reason.   (6)

Q3 (a) What are the various requirement elicitation methods? Discuss FAST. State the reason why software requirements elicitation is difficult.(6.5)

(b) Consider an Online Airline Reservation. List four additional use cases at a comparable level of abstraction. Prepare a Usecase Diagram using full UML notation for an online airline reservation system. Write Usecase description for any two major usecase.   (6)

Unit-II

Q4 (a) Explain basic COCOMO model, under all three operating modes (Organic, Semi detached, Embedded). Why do we require three models (Basic, intermediate & detailed) for estimation.   (6.5)

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(b) Define Module Coupling and explain different types of coupling. Wh.
problems are likely to arise if a module has a high coupling? **(6)**

Q5 (a) What is software risk? Is it economical to do risk management? What
is the effect of this activity on the overall cost of the project? How staff
turnover problem affects software projects? **(6.5)**

(b) Consider a project with the following parameters. **(6)**

Number of user inputs = 40
Number of user outputs = 30
Number of user inquiries = 25
Number of files = 06
Number of external interfaces = 04

Assume weighting factors are average. In addition to above, system
requires.
(i) Significant data communication
(ii) Performance is very critical
(iii)Designed code may be moderately reusable
(iv)System is not designed for multiple installation in different
organizations.

Other complexity adjustment factors are treated as average. Compute
the function points for the project.

Software Components	Weighting Factors		
	Simple(Low)	Average	Complex(High)
user inputs	3	4	6
user outputs	4	5	7
user inquiries	3	4	6
Internal logical files	7	10	15
external interfaces	5	7	10

Unit-III

Q6 (a) What are software metrics? Why do we really need metrics in
software? Discuss Halstead software science metrics along with its
Limitations? **(6.5)**

(b) What is software quality? Discuss software quality attributes. **(6)**

Q7 (a) Discuss Five Levels of capability mature model (CMM) with all KPAs in
short. **(6.5)**

(b) Consider the following C program **(6)**

```
1. #include<stdio.h>
2. int main(){
3. int i, j, s,temp,a[20];
4. printf("Enter total elements: ");
5. scanf("%d", &s);
6. printf("Enter%d elements: ",s);
7. for (i=0; i<s; i++)
8. Scanf ("%d", &a[i]);
9. for(i=1;i<s;i++){
10. temp=a[i];
```
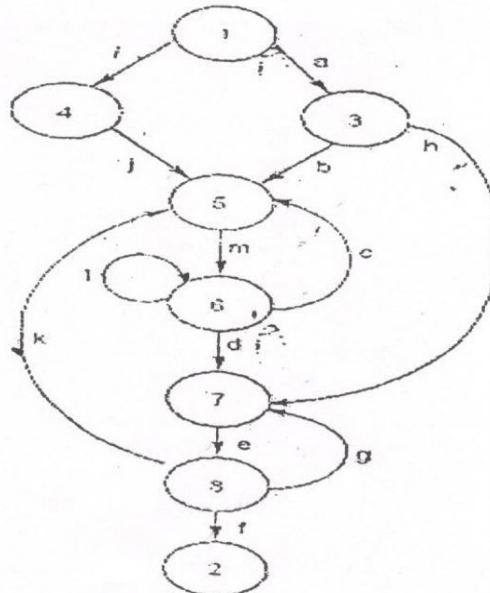
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```
11. j=i-1;
12. while ((temp<a[j])&&(j>=)){
13. a[j+1]=a[j];
14. j=j-1;
15. }
16. a[j+1]=temp;
17. }
18. printf("After sorting: ");
19. for(i=0;i<s;i++)
20. printf(" %d",a[i]);
21. return 0;
22. }
```

Define data structure metrics. Calculate Average No. of Live variables, Average Life of Variable and Module weakness of the program.

Unit-IV

Q8 (a) What is the difference between functional and structural testing? Explain Boundary Value Analysis and Worst Case Analysis with example. **(6.5)**

(b) Write short notes on: **(6)**
  (i) Configuration Management.
  (ii) Bottom up Integration Testing vs. Top down Integration Testing
  (iii) Debugging Approach
  (iv) Reuse Maintenance Model

Q9 (a) Describe various categories of maintenance. Which category consumes maximum effort & why? **(3)**

(b) Explain Taute Maintenance Model and Quick & Fix maintenance Model. **(3.5)**

(c) Explain cyclomatic complexity. Consider the following DD Path graph and calculate the cyclomatic complexity by all three methods. **(6)**

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