BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: MCA **SEMESTER : III**
BRANCH: MCA **SESSION : MO/18**

SUBJECT: MCA3003 SOFTWARE ENGINEERING

TIME: 3 HRS. **FULL MARKS: 60**

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) (i) Distinguish between program and professionally developed software. Draw a bath tub curve for Hardware. [3]
(ii) Draw the neat diagrams of the process models: Prototyping model, RAD [3]

Q.1(b) Explain the importance of Agile models. List some agile models and explain briefly any one agile model. [6]

Q.2(a) Determine the effort required to develop the software product, the nominal development time, and the staffing level for the product with the following requirements: [6]
Estimated size:10,000LOC, small project and familiar environment, ACAP (low-1.19), AEXP (low-1.13), PCAP (low-1.17), PEXP (high-0.95).

Q.2(b) (i)For a particular software application the following information is given External Inputs=25, External Output=29, Logical Internal Files=05, External Interface Files=19, External Inquiries=09, Assuming that all the function types are complex and the general application characteristics has average influence. Calculate UFP and Find FP. [3+3]
(ii) A programming language has total occurrences of operators and operands are 53 and 38. The number of unique operators and operands are 14 and 10 respectively. Calculate the estimate program length and volume.

Q.3(a) (i) Explain briefly the characteristics of a good SRS document. [3+3]
(ii) It is impossible to separate specification with implementation, but in several cases they can be intermixed. Give a case to justify the statement.

Q.3(b) (i)Give one example each of the following content of requirement specifications: Functional, Data, Performance, constraints and guidelines. [3+3]
(ii) Draw any two architectural styles.

Q.4(a) (i) What do you mean by coupling? How is it different from cohesion? List best and worst type of coupling and cohesion. [3+3]
(ii) Write a java code to demonstrate tight coupling and low cohesion.

Q.4(b) (i) Draw the class diagram for the following: A teacher teaches 1 to 3 courses (subjects), Each course is taught by only one teacher, A student can take between 1 to 5 courses, A course can have 10 to 300 students. [3+3]
(ii) Design test cases for a triangle problem using Decision Table based testing.

Q.5(a) (i) Draw the hierarchy of levels of software testing. [2+4]
(ii) Explain McCall Software Quality Model. List two important SQA activities.

Q.5(b) (i) Design Minimum number of MC/DC test cases for the segment (((a || b) && c) || d) && e. [3]
(ii)A program reads three numbers, A, B and C with a range [1,50] and prints the largest number. Design the test cases for this program using equivalence class partitioning technique. [3]

Q.6(a) (i)The availability of complex software is 90%. Its MTBF is 200 days. Because of the critical nature of the usage, the organization deploying the software further enhanced it to obtain an availability of 95%. In the process, the MTTR increased by 7 days. Calculate the MTBF of the enhanced software. [3+3]
(ii) Assume that a C program will experience 200 failures in infinite time. It has now experienced 100.The initial failure intensity was 20 failures/CPU hr. Determine the value of the current failure intensity. Calculate the decrement of failure intensity/failure.

Q.6(b) For the given code draw the CFG and calculate the Cyclomatic Complexity using all the three methods. List Linear Independent Paths and any corresponding test cases. [6]

```
main()
{
char string[80];
int index;
printf("Enter the string for checking its character");
scanf("%s",string);
for(index=0;string[index]!='\0';++index)
{
 if(string[index]>='0'&&string[index]<='9')
printf("%c is a digit",string[index]);
elseif(string[index]>='A'&& string[index]<'Z'||
(string[index]>='a' && string[index]<'z')
printf("%c is an alphabet",string[index]);
else
printf("%c is a special character ",string[index]);
}
```

Q.7(a) Explain the objective of Software Configuration Management (SCM)? Explain one important mechanism of SCM. [6]

Q.7(b) Explain briefly three SCM tools. [6]

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