Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

I SEMESTER MCA

END SEMESTER EXAMINATIONS, NOV/DEC 2018

SUBJECT: SOFTWARE ENGINEERING AND PROJECT MANAGEMENT [MCA 4103]

REVISED CREDIT SYSTEM

(26/11/2018)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data may be suitably assumed.

1A.	Consider the cost of developing an Organic application consisting of four modules with sizes **2K, 2K, 2K and 1K** respectively. Use the COCOMO model to determine the cost and schedule estimates for different phases with cost driver attributes namely **CPLX=1.30, ACAP=1.19, TOOL=0.83, DATA=1.16.** Also determine the staff requirements for different phases with average, minimum and maximum staff requirements. Calculate the nominal productivity for the project and effort estimates of each module separately.	**5**
1B.	With a suitable example case study, differentiate between black box and white box testing.	**3**
1C.	If a module has sequential cohesion, what kind of coupling is this module likely to have with other modules? Justify your answer.	**2**
2A.	With suitable examples, explain different methods of monitoring a project.	**5**
2B.	If an expert decision support system were to be developed which would help automate all the activities of blind and deaf people and prove to be a worthy assist to them, eliminating the need of a home nurse, which process model should be ideally preferred? Which development approach should be opted top-down or bottom-up? Also highlight the suitable team structure that should be made operational along with the type of testing strategy and the actual type of testing to be followed.	**3**
2C.	Differentiate between data abstraction and functional abstraction.	**2**

3A.	What is cause effect graphing. Draw the cause-effect graph and decision table for the following. **Causes:** c1. Command is debit c2. Command is credit c3. Transaction_amt is valid c4. Account number is valid **Effects:** e1. Print "invalid command" e2. Print "invalid account_number" e3. Print "Debit amount not valid" e4. Debit account e5. Credit account	**5**
3B.	Suppose that a **45-KDSI** utility program can be purchased for **$6,50,000** assuming that your in-house programmers cost **$3500** per programmer months (including overheads), would it be more cost-effective to buy the product or build it in-house? If the external company which is to provide the product charges an annual maintenance of **$500** per year for a useful product span of **4** years, whereas the in-house maintenance works out to just **$65** per month, would you then be forced to change your decision?	**3**
3C.	What is the cohesion of the following module? How would you change the module to increase the cohesion? Also comment on the coupling achieved in the process. Module Name : Print bill in a multifloor textile showroom Uses : bill-no as the primary attribute. Pseudocode statements of tasks to be done in the module i) Call Validation using bill-no returning valid or invalid. ii) Get bill details using bill-no. iii) Call bill using bill details returning final bill. iv) Call bill-report.	**2**

4A.	Calculate cyclomatic complexity for the given program stub by first drawing a flow graph and also find the no. of linearly independent circuits in it.
	
	`main()`
	`{`
	`float num=0.0,num1=0.0,val=0.0,acc;`
	`int j,n=0;`
	`scanf("%f",&acc);`
	`j=1;`
	`do {`
	`n++;`
	`num1=num;`
	`val=(1.0/j);`
	`if ((j%2)==0)`
	`num=num-val;`
	`else`
	`num=num+val;`
		5

```
        j++;
    } while(val>=acc);
}
```

4B.	Discuss the various metrics to estimate software size from SRS?	**3**
4C.	Give a regular expression for a national population survey company record consisting of tuples (**Sl.no, BPO/APO, no of members, annual salary, address, contact no**).	**2**
5A.	Consider the following program, which takes in the values a,b,c in sorted order and determines the type of triangle represented by a,b,c. Symbolically execute the program and show whether it is correct or incorrect. Also draw the execution tree.	**5**

```
void triangle(int a,int b,int c)
{
1  int d;
2  if((a<b) || (b<c))
3  {
4     print("Illegal Inputs");
5     return;
6  }
7  if((a==b) || (b==c))
8  {
9     if((a==b)&& (b==c)
10    {
11      print("Equilateral Triangle");
12    }
13  else
14    print("Isosceles triangle")
15 }
16 else
17 {
18   a=a*a; b=b*b; c=c*c;
19   d=b+c;
20   if(a==d)
21        print("right triangle");
22   else if(a<d)
23        print("acute triangle");
24   else
25        print("obtuse triangle");
26 }
27}
```

5B.	Consider that a software development project that is beset with many risks. But, assume that it is not possible to anticipate all the risks in the project at the start of the project and some of the risks can only be identified much after the development is underway. As the project manager recommend the use of the prototyping or the spiral model? Explain your answer.	**3**
5C.	Assume that testing (and bug fixing) effort is proportional to the no. of errors detected (regardless of the nature of error). Suppose that testing detects 85% of the total errors in the software (15 % remain undetected). By adding design and code reviews, suppose the cost of the design and coding phases increases by 15% each (from the base distribution given earlier), and 15% of errors are detected in design review and 15% in code reviews. (So, testing now detects only 55% of errors). What is the impact on the overall cost of reviews?	**2**