Roll No:
(To be filled in by the candidate)

PSG COLLEGE OF TECHNOLOGY, COIMBATORE - 641 004

SEMESTER EXAMINATIONS, SEPTEMBER / OCTOBER 2018

MSc - SOFTWARE SYSTEMS   Semester: 4

15XW45 SOFTWARE ENGINEERING TECHNIQUES

Time: 3 Hours   **Maximum Marks: 100**

INSTRUCTIONS:
1. Answer **ALL** questions. Each question carries 20 Marks.
2. Subdivision (a) carries 3 marks each, subdivision (b) carries 7 marks each and subdivision (c) carries 10 marks each.

1. a) "Software is developed or engineered; it is not manufactured in the classical sense". Comment this statement.

   b) i) How the qualities of a software are measured?   (3)

   ii) What is the need of software engineering? Who are the peoples involved in the software engineering activities? Why?   (4)

   c) What do you understand by the term life cycle model of software development? What problems might a software development organization face if it does not follow any life cycle models during development of a large software product?

2. a) Umbrella activities occur throughout the software process. Do you think they are applied evenly across the process, or are some concentrated in one or more framework activities?

   b) i) What are the basic guidelines for conducting a collaborative requirements gathering meeting?   (3)

   ii) An application has the following characteristics; 10 low external inputs (EI=3), 12 high external outputs (EO=7), 20 low external logical files (ILF=7), 15 high external interface files (EIF=10), 12 average external inquiries (EQ=4) and a value of complexity adjustment factor is 1.10. Calculate the unadjusted and adjusted function point counts?   (4)

   c) Consider a project to develop a full screen editor. The major components identified are Screen Edit consists of 4 KLOC, Command Language Interpreter consists of 3 KLOC, File input and output consists of 2 KLOC, Cursor movement consists of 5 KLOC and Screen movement consists of 3 KLOC respectively. Complexity and reliability requirements are very high (CPLX=1.30; RELY=1.40). Programmers capability and experience is low (PCAP=1.17; AEXP=1.13). All other factors are of nominal rating. Use COCOMO model to determine the overall cost and schedule estimates. Also calculate the cost schedule estimates for different phases. The coefficients for intermediate COCOMO are a_i=3.2; b_i=1.05; c_i=2.5; d_i=0.38. The phase wise effort distribution (μ_p) for System design=0.16; Detail design=0.26; Module code & test=0.46; Integration and test=0.16 and phase wise development duration (τ_p) for System design=0.19; Detail design=0.24; Module code & test=0.39; Integration and test=0.18.

3. a) What is requirement engineering process? Why it is needed?

   b) i) Identify and describe data objects, relationships, and attributes about a web-based order processing system for a computer store.   (3)

ii) The software is being constructed to keep track of the teams and games of a sports league. A team has a number of players, not all of whom participate in each game. It is desired to keep track of the players participating in each game for each team, the positions they played in that game, and the result of the game. Identify the functional requirements and propose a data model with appropriate data dictionary and an ER schema diagram. (4)

c) A Video-Rental Ltd., is a small video rental store. The store lends videos to customers for a fee, and purchases its videos from a local supplier. A customer wishing to borrow a video provides the empty box of the video they desire, their membership card, and payment – payment is always with the credit card used to open the customer account. The customer then returns the video to the store after watching it. If a loaned video is overdue by a day the customer's credit card is charged, and a reminder letter is sent to them. Each day after that a further card is made, and each week a reminder letter is sent. This continues until either the customer returns the video, or the charges are equal to the cost of replacing the video. New customers fill out a form with their personal details and credit card details, and the counter staff gives the new customer a membership card. Each new customer's form is added to the customer file. The local video supplier sends a list of available titles to Video-Rental Ltd., who decide whether to send them an order and payment. If an order is sent then the supplier sends the requested videos to the store. For each new video a new stock form is completed and placed in the stock file. Draw a Context Level DFD and Level 1 DFD for the above case study.

4. a) What are the five attributes developed by the HP to assess the quality of a software design?

b) i) What is structure chart? How it is differ from flow chart? Give an example. (3)

ii) A computer supplier supplies firm called True Disk has set up accounts for countless businesses in Dosville. True Disk sends out invoices monthly and will give discounts is payments are made within 10 days. The discounting policy is as follows: If the amount of the order for computer supplies is greater than Rs. 60000, subtract 4% for the order; if the amount is between Rs. 30000 and Rs. 60000, subtract 2% discount; if the amount is less than Rs. 30000, do not apply any discount. All order made via web automatically receives an extra 5% discount and any special order exempt from all discounting (for example computer furniture etc.). Write a Structured English to solve the True Disk company situation. (4)

c) Draw a decision table and decision tree for the following case study:

Azure Isle Resort has a pricing structure for vacationers in one of the dwelling categories: the hotel, villas and beach bungalows. The base price is for staying in the hotel is Rs. 5400. Beach bungalows have a 10 percent surcharge and renting a villa has a 15 percent surcharge. The final price includes a discount of 4 percent for returning customers. Further conditions apply to how close the resort is filled to capacity and whether requested date is within one month from the current date. If the resort is 50 percent full and the time is within one month, there is 12 percent discount. If the resort is 70 percent full and the time is within one month, there is a 6 percent discount. If the resort is 85 percent full and the time is within one month, there is a 4 percent discount.

5. a) What is debugging process? Why is debugging so difficult?

b) i) What are the characteristics of a testability? When you say a test is "good" test? (3)

ii) Consider the following code snippet: (4)

```
main( )
{
    float A, B, C;
    printf("Enter three values\n");
    scanf("%f%f%f", &A, &B, &C);
    printf("\n Largest value is");
    if ( A > B ) {
      if ( A > C)
        printf("%f\n", A);
      else
        printf("%f\n", C);
    }
    else {
      if ( C > B)
        printf("%f\n", C);
      else
        printf("%f\n", A);
    }
}
```

Draw the flow graph and calculate cyclomatic complexity.

c) Write all possible Test Cases for the following Online Shopping application:
   ➢ Valid Mail Id and Mobile Number are mandatory fields
        ✓ Check for standard rules of Mail Id validation and Contact Number
   ➢ An active order can have maximum of 6 products per transaction
   ➢ Each Product can be ordered for a maximum of 10 quantities
   ➢ Order value can be anywhere between Rs. 100 and Rs. 10,000

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FD/RL