No of Pages : 3 **Course Code : 15XW45**

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

PSG COLLEGE OF TECHNOLOGY, COIMBATORE - 641 004

SEMESTER EXAMINATIONS, APRIL 2017

MSc – SOFTWARE SYSTEMS Semester : 4

15XW45 SOFTWARE ENGINEERING TECHNIQUES

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

INSTRUCTIONS:

1. Answer **ALL** questions from GROUP – I.
2. Answer any **FIVE** questions from GROUP – II.
3. Answer any **ONE** question from GROUP – III.
4. Ignore the box titled as **"Answers for Group III"** in the Main Answer Book.

GROUP - I **Marks : 10 x 3 = 30**

1. Identify the functional and non-functional requirements for the given ticket issuing system.

   "An automated ticket issuing system sells train tickets. Users select their destination and input a credit card and personal identification number. When the user presses the 'START' button, a menu display of potential destinations is activated along with a message to the user to select a destination".

2. Identify at which stage of Software Development Life Cycle (SDLC) a prototype would be necessary for the given system specification:

   "A Security system which is intended to protect against intrusion and to detect fire. It incorporates smoke sensors, door sensors, video cameras under computer control, located at various places in the building, an operator console where the system status is reported and external communication facilities to call the appropriate services such as the police and fire departments"

3. Is it ethical for a software engineer to agree to deliver a software system with known faults to a customer? Justify your answer.

4. Which is the best process model applicable for developing the following system specification?

   "An interactive system that allows railway passengers to find train times from computer terminals installed in railway stations."

5. Can the degree of coupling be reduced so much that there is no coupling between components? Justify.

6. What factors have to be taken into account in the design of a menu-based interface for 'walk-up' systems such as bank ATMs?

7. What are the essential conditions for software re-engineering to be successful?

8. Why testing can only detect the presence of errors, not their absence?

9. Consider the given program :

```
input x, y, z:
w = x + y * z;
a = tan(w);
print a;
```

   Obtain the mutant for the program.

10. Derive a set of test cases for the following component :

    An object implements variable length character strings. Operations should include concatenation, length (to give the length of a string) and substring selection.

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GROUP - II **Marks : 5 x 10 = 50**

11. Consider the following case study :

    A petrol (gas) station is to be set up for fully automated operation. Drivers swipe their credit card through a reader connected to the pump; the card is verified by communication with a credit card company computer; and a fuel limit is established. The driver may then take the fuel required. When fuel delivery is complete and the pump hose is returned to its holster, the driver's credit card account is debited with cost of the fuel taken. The credit card is returned after debiting. If the card is invalid, the pump returns it before fuel is dispensed.

    Analyse this application and draw the following diagrams based on your understanding.

    i) Context analysis diagram

    ii) Data flow diagram for various levels

12. a) Explain how effort estimation is done through function points analysis model, through an example.

    b) Explain the merits and demerits of various software process models.

13. Consider the following case study :

    A new private airline organization, decided to open up its reservation online. Consider the following requirements.

    - Fare is fixed based on source-destination combination and day type (weekday, weekend, holiday)
    - A flight can be booked 6 months in advance and each booking can have maximum of 6 passengers
    - Agent can book flights for their clients (they will be paid 1% commission for this service)
    - Customer details will be maintained along with their seat preference (aisle and window) and meal preference (Vegetarian or Non-vegetarian), for further reference and booking.
    - Booking will be done against full payment (through payment gateway) along with preference (seat and meal) details.
    - Cancellation of booking (All passenger/Few) is allowed 3 days prior to travel. This should remove booking entries.

    Generate the following diagrams for the above application :

    i) Entity relationship diagram

    ii) Structure Chart and HIPO Diagram

4. a) Construct a State Transition Diagram for the given specification :

    A telephone answering machine which records incoming messages and displays the number of accepted messages on an LED display.

    b) Explain the various software quality attributes with examples.

15. You have been hired by a computer consulting firm to develop an income tax, calculation package for an accounting firm.

    (i) Design input forms

    (ii) What reports will be produced? Specify the layout.

    (iii) Construct a relevant data dictionary for the application.

16. A retail store wanted to automate their operations with the following requirements :

    - Products (items) are purchased from various suppliers based on the stock and reorder level

- Payment time for each purchase is 30 days from the date of billing
- Store has multiple billing counters which accepts cash and credit card.
- Purchase value above Rs. 2000 is eligible for a free home delivery.

Apply relevant testing methodology to test the above application and tabulate test cases planned and the results.

GROUP - III **Marks : 1 x 20 = 20**

17. Consider the given system description :

Salesmen in a company are paid commission for the products sold by them. The commission is based on the percentage of sale-value.

Case 1 : More than 300 items are sold. The value of items sold is greater than or equal to Rs.5,000/-

a) If the salesman's salary is below Rs.20,000/- then the commission is 10%

b) If the salesman's salary is in the range of Rs.20,000/- to Rs.25,000/- then the commission is 8%.

c) If the salary is above Rs.25,000/- then the commission is 7%.

Case 2 : Number of items sold is less than or equal to 300 and value if items sold is greater than or equal to Rs.5000/-

a) If salary is below Rs.20,000/- then the commission is 8%.

b) If the salary is in the range Rs.20,000/- to Rs.25,000/- then the commission is 7%.

c) If the salary is above Rs.25,000/- then the commission is 6%.

Case 3 : For items value under Rs.5,000/- and sales over 300 items are eligible for a flat commission of 8% to all categories of sales men.

Generate a decision table and decision tree for the given case study and construct a suitable Nassi Schneidermann diagram for the application.

18. Generate all possible test cases for an ATM application based on the following requirements.

- User need to enter 4 digit pass code (numeric) after swiping the card.
- User can choose from the following options.
  - o Withdrawal
    - Withdrawal amount (maximum Rs.50,000/- subject to availability of balance).
    - Confirmation for printing receipt.
  - o Deposit
    - Enter amount of cash deposit (maximum Rs.25,000).
    - Cash can be deposited with the help of envelop provided.
    - Acknowledgement of the same need to be printed.
  - o Change of password
    - Need to enter old password.
    - Provide new password.
    - Confirmation of new password.

FD/RL **/END/**