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 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.
3. Course Outcome: Table

Qn.1	CO1	Qn.2	CO2	Qn.3	CO3	Qn.4	CO4	Qn.5	CO5

1. a) What is software engineering? Why it is needed? What are the key challenges?

   b) i) What process adaptations are required if the prototype will evolve into a deliverable system or product? Why? (3)

   ii) Consider a project with the following information domain characteristics: Number of user inputs=26; Number of user outputs=32; Number of user enquires=10; Number of files=06; Number of external interfaces=04. Assume all complexity adjustment factors are average (Scale factor = 3) and weighting factors are high (EI=6, EO=7, EQ=6, ILF=15, EIF=10). Compute the function point. (4)

   c) Suppose a system for office automation is to be designed. It is clear from requirements that there will be five modules of size 4 KLOC, 3 KLOC, 2 KLOC, 5 KLOC and 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.

2. a) What is the significance of requirement engineering? Who does it?

   b) i) What does “win-win” mean in the context of negotiation during the requirements engineering activity? (3)

   ii) Identify the functional requirements for the case study given below:

   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 will issue the 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. (4)

c) Thesaurus is a form of dictionary describing the synonyms of primary words in a particular language. Imagine various activities (functions) involved in maintaining a digital form of thesaurus. Give an SRS document towards development of such a thesaurus. How your SRS meets the expected properties of a good SRS? Explain.

3. a) What is the purpose of domain analysis? How is it related to the concept of requirements pattern?

b) i) How the structured analysis model and object oriented model are helpful in problem analysis? (3)

ii) Design a data objects, relationships and attributes for an automobile company to provide to its dealers to assist them in maintaining customer records and dealer inventory and to assist sales staff in ordering cars. Each vehicle is identified by a vehicle identification number (VIN). Each individual vehicle is a particular model of a particular brand offered by the company (e.g., the XF is a model of the car brand Jaguar of Tata Motors). Each model can be offered with a variety of options, but an individual car may have only some (or none) of the available options. The data dictionary needs to store information about models, brands, and options, as well as information about individual dealers, customers, and cars. Also, your design should include an E-R diagram to depict the relationships among data objects. (4)

c) The case study about an Estate Agency is given below:

Clients wishing to put their property on the market visit the estate agent, who will take details of their house, flat or bungalow and enter them on a card which is filed according to the area, price range and type of property. Potential buyers complete a similar type of card which is filed by buyer name in an A4 binder. Weekly, the estate agent matches the potential buyer's requirements with the available properties and sends them the details of selected properties. When a sale is completed, the buyer confirms that the contracts have been exchanged, client details are removed from the property file, and an invoice is sent to the client. The client receives the top copy of a three part set, with the other two copies being filed. On receipt of the payment the invoice copies are stamped and archived. Invoices are checked on a monthly basis and for those accounts not settled within two months a reminder (the third copy of the invoice) is sent to the client. Draw a Context Level Model and Level 1 DFD.

4. a) What are the characteristics of a good design?

b) i) What do you understand from functional dependency and how can be achieved in software design? (3)

ii) A computer supplies firm called True Disk has set up accounts for countless business in Dosville. True disk sends out invoices monthly and will give discounts if payments are made within 10 days. The discounting policy is as follows: If the amount of the order for computer supplies is greater than $1,000, subtract 4 percent for the order; if amount is between $500 and $1,000, subtract 2 percent discount; if the amount is less than $500, do not apply any discount. All orders made via Web automatically receive an extra 5 percent discount. Any special order (computer furniture, for example) is exempt from all discounts. Develop a decision table for True Disk discounting decisions, for which the condition alternatives are limited to Y and N. (4)

c) A XYZ organization uses the following method to compute Gross Pay for their employees:

Every employee may either be on regular pay-scale or on a consolidated salary. For all other employees, gross pay is a combination of the Basic, DA, HRA and CCA. DA

depends on Basic. If Basic is below Rs.8000 per month, DA is Rs.4000 per month else it is Rs.6000. In towards HRA, the employee is paid up to a maximum of 30% of his or her basic. For the rent paid by the employee, 10% of basic is first deducted. If the remaining amount is less than 30% of the Basic of the employee, the full remaining is paid as HRA, otherwise 30% of the Basic is paid as HRA, CCA is only paid for employee posted is Delhi or Mumbai and is Rs.1000 per month for Basic less than Rs.8000 per month and Rs.1600 per month otherwise. Represent the above calculation using the design tools called Structure Chart and Nassi-Shneiderman diagram.

5. a) What is a “critical module” and how you identify it?

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

ii) Draw the flow graph and determine the cyclomatic complexity for the following program segment:

```
#define YES 1
#define NO 0
void main(void)
{
  int c, nl, nw, nc, inword;
  inword = NO;
  nl = 0;nw = 0;nc = 0;
  c = getchar( );
  while (c != EOF) {
     nc = nc + 1;
     if (c == '\n')
       nl = nl + 1;
     if (c == ' ' || c == '\n' || c == '\t')
       inword   =   NO;
     else if (inword == NO) {
       inword   =   YES;
       nw = nw + 1;
     }
     c = getchar( );
   }
  printf("%d\n",   nl);
  printf("%d\n",   nw);
  printf("%d\n",   nc);
}
```

(4)

c) Develop Test cases for 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
- ✓ All credit card payments are collected thru a centralized banking option
- ✓ Customer has option to take a ‘Membership card’ for points accumulation
- ✓ Points accumulated can be used for discount during future purchases
- ✓ Purchase value above Rs. 1000 is eligible for a free home delivery

/END/

FD/RL