KIIT Deemed to be University
Online End Semester Examination(Autumn Semester-2020)

Subject Name & Code: SE (IT-3003) **Applicable to Courses: CSE, IT**

Full Marks=50 **Time:2 Hours**

SECTION-A(Answer All Questions. Each question carries 2 Marks)

Time:30 Minutes **(7×2=14 Marks)**

Question No	Question Type (MCQ/SAT)	Question	CO Mapping	Answer Key (For MCQ Questions only)
Q.No:1	SAT	What difficulties would Software development company face, if it tries to use the exploratory program development style in its development projects?	1	
	SAT	What do you mean by software service? Give two examples.	1	
	SAT	Are the terms SDLC and software development synonym? Explain.	1	
	SAT	How object-oriented software designs are different from the data flow-oriented design methodology?	1	
Q.No:2	SAT	"The classical waterfall model is an idealistic model". Justify the above assertion is true.	1	
	SAT	Extreme Programming development framework claims risk reduction and improved quality. How does Risk reduction and	1	

		quality improvement is achieved in XP ?		
	SAT	"The primary purpose of phase containment of errors is to develop an error-free software".TRUE/FALSE justify.	1	
	SAT	"When the spiral model is used in a software development project, the number of loops in the spiral is fixed by the project manager during the project planning stage".TRUE/FALSE.	1	
Q.No:3	**SAT**	What are the relative advantages of Function point metric over LOC to measure the size of a software product?	3	
	SAT	Write four major responsibilities of a software project manager.	3	
	SAT	What is the order in which the following are estimated in the COCOMO estimation technique: cost, effort, duration, size?	3	
	SAT	Define risk in project? Mention major types of risks occurred in software development.	3	
Q.No:4	**SAT**	How you prioritize the following to finish a software project? i)fastest method ii)customer satisfaction	2	

		iii)cheapest iv)better acceptance by user Why?		
	SAT	Who are the different categories of users of the SRS document?	2	
	SAT	Give an example of an inconsistent functional requirement.	2	
	SAT	List four desirable characteristics of a good software requirements specification (SRS) document.	2	
Q.No:5	**SAT**	Identify the criteria that you would use to decide which one of two alternate function-oriented design solutions to a problem is superior.	4	
	SAT	If you break a large project into smaller projects, how would you prioritize which part to work on first?	4	
	SAT	What do you understand by abstraction and encapsulation in the context of software design?	4	
	SAT	"From the UML sequence diagram for a use case, it would be possible to infer the various scenarios in the use case".TRUE/FALSE justify.	4	
Q.No:6	**SAT**	What is a coding	5	

		standard? Identify any one problem that might occur if the engineers of an organization do not adhere to any coding standard?		
	SAT	Distinguish between effective testing and exhaustive testing.	5	
	SAT	Identify the types of defects that you would be able to detect during the following: (a) Code inspection (b) Code walkthrough.	5	
	SAT	"Branch coverage-based testing is a stronger testing strategy compared to path coverage-based testing".TRUE/FALSE. Justify.	5	
Q.No:7	**SAT**	What does the quality parameter "fitness of purpose" mean in the context of software products?	6	
	SAT	If an organization does not document its quality of the system, what problems would it face?	6	
	SAT	What is the difference between reliability and availability?	6	
	SAT	. "Corrective maintenance is the type of maintenance that is most frequently carried out on a typical software	6	

		product”.TRUE/FALSE. Justify.		

SECTION-B(Answer Any Three Questions. Each Question carries 12 Marks)

Time: 1 Hour and 30 Minutes **(3×12=36 Marks)**

<table>
<tr><th>Question No</th><th>Question</th><th>CO Mapping (Each question should be from the same CO(s))</th></tr>
<tr><td>Q.No:8</td><td>(a) XYZ is an international software house. XYZ is currently working on a project that is totally new for the development team and even the client is confused about the requirements of this project. Hence this company is facing difficulties because they fail to apprehend user requirements properly. For this project, it is decided to build a sample application and show it to the client for feedback. In the context of this above scenario as a project manager what will be the choice of the software life cycle model? Justify.
(b) Suppose you are the project manager of a software project requiring the following activities.
(i) Draw the Activity Network and Gantt chart representation of the project.
(ii) Determine float value for every non critical task of the project.
<table>
<tr><th>Activity No</th><th>Activity Name</th><th>Duration (weeks)</th><th>Immediate Predecessor</th></tr>
<tr><td>1</td><td>Obtain requirements</td><td>4</td><td>-</td></tr>
<tr><td>2</td><td>Analyse operations</td><td>4</td><td>-</td></tr>
<tr><td>3</td><td>Define subsystem</td><td>2</td><td>1</td></tr>
<tr><td>4</td><td>Develop database</td><td>4</td><td>1</td></tr>
<tr><td>5</td><td>Make decision analysis</td><td>3</td><td>2</td></tr>
<tr><td>6</td><td>Identify</td><td>2</td><td>5</td></tr>
</table></td><td>1&4</td></tr>
</table>

	constraints		
7	Build module1	8	3,4,6
8	Build module2	12	3,4,6
9	Build module3	18	3,4,6
10	Write report	10	6
11	Integration and test	8	7,8,9
12	Implementation	2	10,11

(a) Suppose you are the project manager of a software project requiring the following activities.

(i) Draw the Activity Network and Gantt chart representation of the project.

(ii) Determine float value for every non critical task of the project.

Activity No	Activity Name	Duration (weeks)	Immediate Predecessor
1	Obtain requirements	5	-
2	Analyse operations	5	-
3	Define subsystem	3	1
4	Develop database	5	1
5	Make decision analysis	4	2
6	Identify constraints	3	5
7	Build module1	9	3,4,6
8	Build module2	13	3,4,6
9	Build module3	19	3,4,6
10	Write report	11	6
11	Integration and test	9	7,8,9
12	Implementation	3	10,11

(b)Which life cycle model would you follow for developing software for each of the following applications? Mention the reasons behind your choice of a particular life cycle model.

“A software that would function as the controller of a telephone switching system”.

(a)Which life cycle model would you follow for developing software for each of the following applications? Mention the reasons behind your choice of a particular life cycle model

”A new library automation software that would link various libraries in the city.”

(b)Suppose you are the project manager of a software project requiring the following activities.

(i) Draw the Activity Network and Gantt chart representation of the project.

(ii) Determine float value for every non critical task of the project.

Activity No	Activity Name	Duration (weeks)	Immediate Predecessor
1	Obtain requirements	3	-
2	Analyse operations	3	-
3	Define subsystem	1	1
4	Develop database	4	1
5	Make decision analysis	2	2
6	Identify constraints	1	5
7	Build module1	7	3,4,6
8	Build module2	11	3,4,6
9	Build module3	18	3,4,6
10	Write report	19	6
11	Integration and test	7	7,8,9
12	Implementation	1	10,11

Q.No:9

(a)If you could create a completely new model without any flaws, what would its features and characteristics be? How would it overcome the flaws that are present in the already existing.

(b)Why swim lanes are required in Activity diagram? Prepare the **Activity Diagram** for air ticket reservation system of your own choice.

3,4

(a)Explain why according to the COCOMO model, when the size of a software is increased by two times, the time to develop the product usually increases

	by less than two times. (b)Why swim lanes are required in Activity diagram? Prepare the **Activity Diagram** for withdrawing money from ATM of your own choice	
	(a)What is requirement elicitation ? what are the different elicitation techniques used for development of an Enterprise solution? (b)Why includes and extends are required in use case diagram? Prepare the **Sequence Diagram** for withdrawing money from ATM of your own choice.	
Q.No:10	(a)state the role of stub and driver in unit testing process. (b)**Design the DFD upto level1 and structure chart for developing the following Restaurant Automation System using the SA/SD technique.** A restaurant owner wants to computerize his order processing, billing, and accounting activities. H e also expects the computer to generate statistical report about sales of different items. A major goal of this computerization is to make supply ordering more accurate so that the problem of excess inventory is avoided as well as the problem of non-availability of ingredients required to satisfy orders for some popular items is minimized. The computer should maintain the prices of all the items and also support changing the prices by the manager. Whenever any item is sold, the sale clerk would enter the item code and the quantity sold. The computer should generate bills whenever food items are sold. Whenever ingredients are issued for preparation of food items, the data is to be entered into the computer. Purchase orders are generated on a daily basis, whenever the stock for any ingredient falls below a threshold value. The computer should calculate the threshold value for each item based on the average consumption of this ingredient for the past three days and assuming that a minimum of two days stock must be maintained for all ingredients. Whenever the ordered ingredients arrive, the invoice data regarding the quantity and price is entered. If sufficient cash balance is available, the computer should print cheques	4,5

	immediately against invoice. Monthly sales receipt and expenses data should be generated whenever the manger would request to see them.	
	(a) What do you understand by integration testing? Which types of defects are uncovered during this? What type of integration testing method you can suggest for integration testing of a large software product? Write its merit. **(b)Design the DFD upto level-1 and structure chart for the following Newspaper Agency Automation Software:**The local newspaper and magazine delivery agency has asked us to develop a software for him to automate various clerical activities associated with his business.. This software is to be used by the manager of the news agency and his delivery persons. For each delivery person, the system must print each day the publications to be delivered to each address. The customers usually subscribe one or more news papers and magazines. They are allowed to change their subscription notice by giving one week's advance notice. Customers should be able to initiate new subscriptions and suspend subscription for a particular item either temporarily or permanently through a web browser. Considering the large customer base, at least 10 concurrent customer accesses should be supported. For each delivery person, the system must print each day the publications to be delivered to each address. The system should also print for the news agent the information regarding who received what and a summary information of the current month. At the beginning of every month bills are printed by the system to be delivered to the customers. These bills should be computed by the system automatically. The customers may ask for stopping the deliveries to them for certain periods when they go out of station. Customers may request to subscribe new newspapers/magazines, modify their subscription list, or stop their subscription altogether. Customers usually pay their monthly dues either by cheque or cash. Once the cheque number or cash received is entered in the system, receipt for the customer should be printed. If any customer has any outstanding due for one month, a	

	polite reminder message is printed for him and his subscription is discontinued if his dues remain outstanding for periods of more than two months. The software should compute and print out the amount payable to each delivery boy. Each delivery boy gets 2.5 per cent of the value of the publications delivered by him.	
	(a) **Perform SA/SD for the following University Department Information System.** This software concerns automating the activities of department offices of universities. Department offices in different universities do a lot of book-keeping activities the software to be developed targets to automate these activities. Various details regarding each student such as his name, address, course registered, etc. are entered at the time he takes admission. At the beginning of every semester, students do course registration. The information system should allow the department secretary to enter data regarding student course registrations. As the secretary enters the roll number of each student, the computer system should bring up a form for the corresponding student and should keep track of courses he has already completed and the courses he has back-log, etc. At the end of the semester, the instructors leave their grading information at the office which the secretary enter in the computer. The information system should be able to compute the grade point average for each student for the semester and his cumulative grade point average (CGPA) and print the grade sheet for each student. The information system also keep s track of a inventories of the Department, such as equipments, their location, furnitures, etc. The Department has an yearly grant and the Department spends it in buying equipments, books, stationery items, etc. Also, in addition to the annual grant that the Department gets from the University, it gets funds from different consultancy service it provides to different organizations. It is necessary that the Department information system keeps track of the Department accounts. The information system should also keep track of the research projects of the Department,	

	publications by the faculties, etc. These information are keyed in by the secretary of the Department. The information system should support querying the up-to-date details about every student by inputting his roll number. It should also support querying the details of the cash book account. The output of this query should include the income, expenditure, and balance. (b) Inheritance feature of the object oriented paradigm helps in code reuse. true/false. Justify. (c) List important advantages and disadvantages of of command language interface.	

Q.No:11	(a)Draw the control flow graph for the following function named find maximum. From the control flow graph, determine its cyclomatic complexity.
	int find-maximum(int i,int j, int k)
	{ int max;
	if(i>j) then
	if(i>k) then max=i;
	else max=k;
	else if(j>k) max=j
	else max=k;
	return(max); }
	
	(d) Write the importance of testing in quality assurance.
	
	(c)What do you mean by the term software reverse engineering? Why is it required? Explain the different activities undertaken during reverse engineering.
		5, 6

	(a)What does the control flow graph (CFG) of a program represent? Draw the CFG of the following program and determine its cyclomatic complexity. Find the test cases using path coverage.
	main()
	{
	int y=1;
	if(y<0)
	if(y>0) y=3;
	else y=0;	

	printf(“%d\n”,y); } (b)What do you understand by Key Process Area (KPA), in the context of SEI CMM? Would an organization encounter any problems, if it tries to implement higher level SEI CMM KPAs before achieving the lower level KPAs? Justify your answer. (c) In which aspects the client-server model is advantageous than traditional software.	

	(a)Explain the concept of Control flow graph? Draw the control graph and calculate cyclomatic complexity for the following program segment.
	I=0;
	n=4;
	while (i<n-1) do{
	j= I + 1;
	while (j<n) do{
	if A[i] < A[j]
	swap(A[i], A[j]);}
	i=i+1;
	}
	(b)How software reuse is helpful in software development.
	(c)Write the causes of difficulties faces in maintenance of software.	