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Note : Remove "Table of Content" before including in CP Book

Each Course Plan shall be printed and made into a book with cover page

Blooms Level in all sections match with A.2, only if you plan to teach / learn at higher levels

15EC743: Real Time Systems

A. COURSE INFORMATION

1. Course Overview

Degree:	BE	Program:	EC
Year / Semester :	04/07	Academic Year:	2019-20
Course Title:	Real Time Systems	Course Code:	15EC743
Credit / L-T-P:	03/T	SEE Duration:	180 Minutes
Total Contact Hours:	40	SEE Marks:	80 Marks
CIA Marks:	20	Assignment	1 / Module
Course Plan Author:	Anitha Grace	Sign	Dt:
Checked By:		Sign	Dt:

2. Course Content

Module	Module Content	Teaching Hours	Module Concepts	Blooms Level
1	**Introduction to Real-Time Systems:** Historical background, Elements of a Computer Control System, RTS-Definition, Classification of Real-time Systems, Time Constraints, Classification of Programs. **Concepts of Computer Control:** Introduction, Sequence Control, Loop Control, Supervisory Control, Centralized Computer Control, Hierarchical Systems.	08	Fundamentals of RTS, Computer Control Statergies	L2,L2
2	**Computer Hardware Requirements for Real-Time Applications:** Introduction, General Purpose Computer, Single Chip Microcomputers and Microcontrollers, Specialized Processors, Process-Related Interfaces, Data Transfer Techniques, Communications, Standard Interface	08	Microprocessors in Real time applications, Interfacing Techniques	L2,L2
3	**Languages for Real-Time Applications:** Introduction,		Real time	

	Syntax Layout and Readability, Declaration and Initialization of Variables and Constants, Modularity and Variables, Compilation of Modular Programs, Data types, Control Structures, Exception Handling, Low-level facilities, Co-routines, Interrupts and Device Handling, Concurrency, Real-Time Support, Overview of Real-Time Languages.	08	languages, Techniques of modularity	L3,L3
4	**Operating Systems:** Introduction, Real-Time Multi-Tasking OS, Scheduling Strategies, Priority Structures, Task Management, Scheduler and Real-Time Clock Interrupt Handler, Memory Management, Code Sharing, Resource Control, Task Co-Operation and Communication, Mutual Exclusion.	08	Scheduling and task management, Resource Management	L2,L2
5	**Design of RTS** - General Introduction: Introduction, Specification Document, Preliminary Design, Single-Program Approach, Foreground/Background System.**RTS Development Methodologies**: Introduction, Yourdon Methodology, Ward and Mellor Method, Hately and Pirbhai Method.	08	Design Approach, Modelling and methodology	L3,L3

3. Course Material

Module	Details	Available
1	Text books	
	Real-Time Computer Control, by Stuart Bennet, 2nd Edn. Pearson Education. 2008	In Lib
2	Reference books	
1 2 3	C.M. Krishna, Kang G. Shin, "Real -Time Systems", McGraw -Hill International Editions, 1997. Real-Time Systems Design and Analysis, Phillip. A. Laplante, second edition, PHI, 2005. Embedded Systems, Raj Kamal, Tata McGraw Hill, India, third edition, 2005	In dept

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3	Others (Web, Video, Simulation, Notes etc.)	
		Not Available

4. Course Prerequisites

SNo	Course Code	Course Name	Module / Topic / Description	Sem	Remarks	Blooms Level
1	15Ec42	Microprocessor	2.Knowledge of microprocessor and interface	4		L2
2	15Ec553	Operating System	4. Knowledge of Operating System	5		L2

Note: If prerequisites are not taught earlier, GAP in curriculum needs to be addressed. Include in Remarks and implement in B.5.

B. OBE PARAMETERS

1. Course Outcomes

#	COs	Teach. Hours	Concept	Instr Method	Assessment Method	Blooms' Level
15EC743.1	Understand the basics and importance of RTS Using a generalized Computer Control System	03	Fundamentals of RTS	Lecture	Assignment	L2 Understand
15EC743.2	Describe the process control applications and types of control strategies	05	Computer Control Strategies	Lecture	Assignment	L2 Understand
15EC743.3	Summarize the major features of the microprocessors using Schematic diagram	04	Microprocessors in real time applications	Lecture/ Tutorial	Assignment and Slip Test	L2 Understand
15EC743.4	Describe the standard interfacing techniques and communication methodology	04	Interfacing techniques	Lecture / PPT	Assignment	L2 Understand

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15EC743.5	Explain and prioritize the major requirements for a real time language	04	Real time language	Lecture	Slip test	L3 Apply
15EC743.6	Explain the techniques of modularity	04	Techniques of modularity	Lecture and Tutorial	Assignment	L3 Apply
15EC743.7	Describe the scheduling and task management using task state diagram	04	Scheduling and task management	Lecture	Assignment and Slip Test	L2 Understand
15EC743.8	A generalise the problem of resource sharing and explain the techniques for providing mutual exclusion	04	Resource management	Lecture	Assignment	L2 Understand
15EC743.9	Outline the planning and design of a computer based system using single program approach	04	Design approach	Lecture/tutorial	Assignment	L3 Apply
15EC743.10	Design and implement a system using software modelling and describe major methodologies	04	Software modeling and methodology	Lecture	Assignment	L3 Apply
-	**Total**	**40**	-	-	-	-

Note: Identify a max of 2 Concepts per Module. Write 1 CO per concept.

2. Course Applications

SNo	Application Area	CO	Level
1	Used in Metal industry applications in real time monitoring control	CO1	L2
2	The water system is monitored and controlled by dual redundant computers which also serve as hosts to a large number of distributed satellite computers	CO2	L2
3	Environmental variables such as temperature and air flows are monitored and controlled to optimize comfort and operating costs in large buildings	CO3	L2
4	Used by electric utilities as an energy management system (EMS)	CO4	L2
5	RTS also provide structural and aerodynamic testing and simulation during the development of aeroplane and space shuttles	CO5	L3
6	RTS collect and analyze data from space exploration missions, used as real-time trainers and simulators	CO6	L3
7	Domestic and international data communication networks use RTSs as communication processors to provide key features of packet switched networks such as high speed real-time communication	CO7	L2
8	The production of high commodity chemicals such as ethylene and prophylene is supervised and controlled by computers.	CO8	L2

9	Set up of digital thermometer	CO9	L3
10	Data acquisition system design	CO10	L3

Note: Write 1 or 2 applications per CO.

3. Articulation Matrix

(CO – PO MAPPING)

–	Course Outcomes	Program Outcomes												
#	COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	Level
15EC743.1	Understand the basics and importance of RTS Using a generalized Computer Control System	3	2	1	2	–	–	–	–	–	–	–	–	L2
15EC743.2	Describe the process control applications and types of control strategies	3	1	2	3	3	–	–	–	–	---	–	–	L2
15EC743.3	Summarize the major features of the microprocessors using Schematic diagram	3	2	2	1	–	–	–	–	–	–	–	–	L2
15EC743.4	Describe the standard interfacing techniques and communication methodology	3	–	1	2	–	2	–	–	–	–	–	–	L2
15EC743.5	Explain and prioritize the major requirements for a real time language	3	3	2	–	2	–	–	–	–	–	–	–	L3
15EC743.6	Explain the techniques of modularity	3	–	3	3	–	–	–	–	–	–	–	–	L3
15EC743.7	Describe the scheduling and task management using task state diagram	3	3	1	–	–	–	–	–	–	–	–	–	L2
15EC743.8	A generalise the problem of resource sharing and explain the techniques for providing mutual exclusion	3	–	3	–	2	–	–	–	–	–	–	–	L2
15EC743.9	Outline the planning and design of a computer based system using single program approach	3	3	–	–	–	–	–	–	–	–	–	–	L3
15EC743.10	Design and implement a system using software modelling and describe major methodologies	3	2	–	3	–	–	–	–	–	–	–	–	L3

Note: Mention the mapping strength as 1, 2, or 3

4. Mapping Justification

Mapping		Justification	Mapping Level
CO	**PO**		**-**
CO1	PO1	Knowledge of computer control system is used to predict the performance of the computer devices	L2
CO1	PO2	Analysing problems in computer controlled systems and also for performance analysis of devices	L2
CO1	PO3	Design of the supervisory computer control systems	L2
CO1	PO4	Interpretation of the real time systems and elements of computer control system	L2
CO2	PO1	Knowledge of loop control system for the analysis of computer systems	L2
CO2	PO2	Centralized computer control processes for analysing the problems of centralized systems	L2
CO2	PO3	Designing of the Centralized computer control systems hence use full for society and environment considerations.	L2
CO2	PO4	Interpretation of complex problems in the deigning of control system of devices	L2
CO3	PO1	Knowledge of general purpose computer to predict behaviour of the systems	L2
CO3	PO2	Analysing the problems of microcomputer & microcontrollers systems	L2
CO3	PO3	Designing the components & elements of microcomputer and microcontroller	L2
CO3	PO4	Determination of the specialized processors working and solving the problems of complex problems	L2
CO4	PO1	Knowledge on data transfer techniques to build communication between devices	L2
CO4	PO3	Design of standard interfacing devices for testing of computer data transfer conditions	L2
CO4	PO6	Knowledge of data security while data transfer should be taken care	L2
CO5	PO1	Knowledge on the syntax and readability of programming	L3
CO5	PO2	Analysis of the programming structure and declaration on the components	L3
CO5	PO5	Different programming tools are available for the computing the data	L3
CO6	PO1	Basic knowledge on the modularity of the system	L3

CO6	PO3	Designing the control structure for the modularity of the system	L3
CO6	PO4	Predicting the interrupts and handling the device modularity	L3
CO7	PO1	Knowledge on the scheduling and task management strategies	L2
CO7	PO2	Analysis of task management and memory allocation for the computed task	L2
CO7	PO3	Development of the task and scheducling systems to manage the resources	L2
CO8	PO1	Knowledge on the memory and resource management	L2
CO8	PO3	Designing the complete memory allocation system for the data storage	L2
CO8	PO5	Modern tools for the resource allocating and code sharing are used	L2
CO9	PO1	Basic knowledge on the desiging of the foreground/Background systems	L3
CO9	PO2	Analysing the preliminary design approaches for the RTS	L3
CO10	PO1	Different methodologies for the designing of the Rts devices and components	L3
CO10	PO2	Analysis of the modelling system	L3
CO10	PO4	Investigation on the different methodology and modelling	L3
CO10	PO5	Design of the hately and pirbhai method RTS systems	L3

Note: Write justification for each CO-PO mapping.

5. Curricular Gap and Content

SNo	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1					
2					
3					
4					
5					

Note: Write Gap topics from A.4 and add others also.

6. Content Beyond Syllabus

SNo	Gap Topic	Actions Planned	Schedule Planned	Resources Person	PO Mapping
1					
2					
3					
4					

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5					
6					
7					
8					
9					
10					

Note: Anything not covered above is included here.

C. COURSE ASSESSMENT

1. Course Coverage

Module #	Title	Teaching Hours	No. of question in Exam						CO	Levels
			CIA-1	CIA-2	CIA-3	Asg	Extra Asg	SEE		
1	Introduction to real time systems	8	2	-	-	1	1	2	CO1, CO2	L2,L2
2	Computer hardware requirements for real time applications	8	2	-	-	1	1	2	CO3, CO4	L2,L2
3	Languages for real time applications	8	-	2	-	1	1	2	CO5, CO6	L3,L3
4	Operating Systems	8	-	2	-	1	1	2	CO7, C08	L2,L2
5	Design of RTS	8	-	-	4	1	1	2	CO9, CO10	L3,L3
-	**Total**	**40**	**4**	**4**	**4**	**5**	**5**	**10**	**-**	**-**

Note: Distinct assignment for each student. 1 Assignment per chapter per student. 1 seminar per test per student.

2. Continuous Internal Assessment (CIA)

Evaluation	Weightage in Marks	CO	Levels
CIA Exam – 1	15	CO1, CO2, CO3, CO4	L2,L2,L2,L2,
CIA Exam – 2	15	CO5, CO6, CO7, C08	L3,L3,L2,L2
CIA Exam – 3	15	CO9, CO10	L3,L3
Assignment – 1	05	CO1, CO2, CO3, CO4	L2,L2,L2,L2,
Assignment – 2	05	CO5, CO6, CO7, CO8	L3,L3,L2,L2
Assignment – 3	05	CO9, CO10	L3,L3

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Seminar – 1	–	CO1, CO2, CO3, CO4	L2,L2,L2,L2,
Seminar – 2	–	CO5, CO6,CO7,CO8	L3,L3,L2,L2
Seminar – 3	–	CO9, CO10	L3,L3
Other Activities – define – Slip test		CO1 to Co9	L2, L3, L4 . ..
Final CIA Marks	**20**	**-**	**-**

Note : Blooms Level in last column shall match with A.2 above.

D1. TEACHING PLAN - 1

Module - 1

Title:	Introduction to Real Time System	Appr Time:	8Hrs
a	***Course Outcomes***	–	**Blooms**
–	The student should be able to:	–	**Level**
1	Understand the basics and importance of RTS Using a generalized Computer Control System	CO1	L2
2	Describe the process control applications and types of control strategies	CO2	L2
b	***Course Schedule***	–	–
Class No	**Module Content Covered**	**CO**	**Level**
1	Definition of real time system,Historical background of real time system with real time examples	C01	L2
2	Elements of a Computer Control System, Classification of Real-time Systems with examples of computer controlled real time applications	CO1	L2
3	Time Constraints-outlining the concept of real time with examples ,Classification of Programs.	CO1	L2
4	Introduction to computer control systems,sequence control	CO2	L2
5	Loop Control	CO2	L2
6	Supervisory Control	CO2	L2
7	Centralized Computer Control	CO2	L2
8	Hierarchical Systems	CO2	L2
c	**Application Areas**	**CO**	**Level**
1	Water tank control system	CO1	L2
2	Temperature and pressure monitoring and control system	CO2	L2
d	**Review Questions**	–	–
1	Define Real time system,classify them based on time constrains	CO1	L1

2	Explain the different types of programs in system design	CO1	L2
3	Explain the computer control system showing communication tasks with the block diagram	CO1	L2
4	Explain different classifications of RTS with examples.	CO1	L2
5	Define the term “time constraints”. How are RTS classified based on time constraint? Explain them with appropriate equation	CO1	L2
6	Differentiate (i)Real time and non real time with examples. (ii) Hard and soft real time with examples	CO1	L2
7	Describe the elements of computer control system with examples.	CO1	L2
8	Classify RTS based on Time constraints.	CO1	L2
9	Explain the following: i) Clock based tasks (ii) Event based tasks iii) Interative systems	CO1	L2
10	Explain the following programs: i)Sequential ii) Multitasking iii) Real time.	CO1	L2
11	Explain different classifications of RTS with examples.	CO1	L2
12	Explain Direct digital control (DDC) with a neat diagram.	CO2	L2
13	What is DDC? List the advantages of DDC over analog control.	CO2	L2
14	Discuss PID control algorithm with suitable formula.	CO2	L2
15	What do you mean by adaptive control? With a neat block diagram ,explain the types of adaptive control.	CO2	L2
16	Explain Supervisory control, with an example.	CO2	L2
17	Explain the dual computer scheme.	CO2	L2
18	Write a note on Hierarchical systems.	CO2	L2
19	List out the responsibilities of a control engineer in designing the suitable computer system	CO2	L1
20	Explain distributed system, with a neat diagram and a mention the feature of HCI.	CO2	L2
21	Explain the following: (i) Supervisory control system (ii) Batch process and continuous proc	CO2	L2
e	**Experiences**	-	-
1			
2			
3			
4			
5			

Module – 2

Title:	Computer Hardware requirement for Real Time applications	Appr Time:	8 rs
a	***Course Outcomes***	-	**Blooms**

-	The student should be able to:	-	**Level**
1	Summarize the major features of the microprocessors with the schemetic	CO3	L2
2	Describe standard interfacing techniques and communication methodology	CO4	L2
b	***Course Schedule***	-	-
Class No	**Module Content Covered**	**CO**	**Level**
9	Introduction to the microprocessors in the real time applications	CO3	L2
10	General Purpose Computer	CO3	L2
11	Single Chip Microcomputers and Micro controllers	CO3	L2
12	Specialized Processors	CO3	L2
13	Process-Related Interfaces	CO4	L2
14	Process-Related Interfaces	CO4	L2
15	Data Transfer Techniques,	CO4	L2
16	Communications, Standard Interface.	CO4	L2
c	**Application Areas**	**CO**	**Level**
1	security devices like anti-lock breaking system	CO3	L2
2	Used in Systems that are widely used in automobiles	CO4	L2
d	**Review Questions**	-	-
22	Explain schematic diagram of a general purpose digital computer.Write a flow chart of basic interrupt mechanism	CO3	L2
23	Mention the features of specialized processors and explain MIMD, with a neat diagram.	CO3	L2
24	List the various requirements in programming languages used for real time applications	CO3	L1
25	Write the block diagram of a single chip micro computer and explain the following blocks (i)Interrupt controller (ii) Series communication (iii) EPROM	CO4	L2
26	Explain various Computer system Architectures.	CO4	L2
27	Explain Analog signal interference, with a neat diagram.	CO3	L2
28	Write the block diagram of an interrupt vectoring using priority encoding circuit and explain. Show the timing diagram of simplified READ operation.	CO3	L2
29	Explain the following : (i) HDLC protocol (ii) Asynchronous and synchronous transmission techniques	CO4	L2
30	Explain pulse interface for input and output operation, with a neat block diagram.	CO4	L2
31	Explain digital signal interference, with a neat diagram.	CO4	L2

32	Write a note on Real time Clock	CO4	L2
33	Explain Daisy-chain interrupt structure.	CO4	L2
34	Describe multi-level interrupts.	CO4	L2
35	Explain Interrupt masking with a neat diagram.	CO4	L2
36	Write a note on Direct memory Access.	CO4	L2
37	Explain various LAN topologies.	CO4	L2
38	Explain the ISO seven layer model for data communication.	CO4	L2
e	**Experiences**	-	-
1		CO1	L2
2			
3			
4		CO3	L3
5			

E1. CIA EXAM – 1

a. Model Question Paper - 1

Crs Code:	15EC743	Sem:	7	Marks:	30	Time:	75 minutes
Course:	Real Time Systems						

-	-	**Note: Answer any 2 full questions one from each module**	**Marks**	**CO**	**Level**
1	a	Explain the computer control system showing communication tasks with the block diagram	4	CO1	L2
	b	Differentiate (i)Real time and non real time with examples (ii) Hard and soft real time with examples	8	CO1	L2
	c	Define the following programs: i)Sequential ii) Multitasking iii) Real time.	3	CO1	L2
		(OR)			
2	a	Explain distributed system, with a neat diagram and a mention the feature of HCI.	5	CO2	L2
	b	What do you mean by adaptive control? With a neat block diagram ,explain the types of adaptive control.	5	CO2	L2
	c	Explain Supervisory control, with an example.	5	CO2	L2

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3	a	Explain schematic diagram of a general purpose digital computer.Write a flow chart of basic interrupt mechanism	5	CO3	L2
	b	Write the block diagram of an interrupt vectoring using priority encoding circuit and explain. Show the timing diagram of simplified READ operation.	5	CO3	L2
	c	Mention the features of specialized processors and explain MIMD, with a neat diagram.	5	CO3	L2
		(OR)			
4	a	Explain various Computer system Architectures.	5	CO4	L2
	b	Explain the following : (i) HDLC protocol (ii) Asynchronous and synchronous transmission techniques	4	CO4	L2
	c	Explain digital signal interference, with a neat diagram.	6	CO4	L2

b. Assignment -1

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:	15EC743	Sem:	7	Marks:	5	Time:	90 – 120 minutes
Course:	Real Time Systems						
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.							

SNo	USN	Assignment Description	Marks	CO	Level
1	1KT15EC001	Explain the following programs: i)Sequential ii) Multitasking iii) Real time.	5	CO1	L2
2	1KT15EC003	Explain different classifications of RTS with examples.	5	CO1	L2
3	1KT15EC004	Explain Direct digital control (DDC) with a neat diagram.	5	CO2	L2
4	1KT15EC005	What is DDC? List the advantages of DDC over analog control.	5	CO2	L2
5	1KT15EC006	Discuss PID control algorithm with suitable formula.	5	CO2	L2
6	1KT15EC007	Discuss PID control algorithm with suitable formula.	5	CO2	L2
7	1KT15EC008	What do you mean by adaptive control? With a neat block diagram ,explain the types of adaptive control.	5	CO2	L2
8	1KT15EC009	Explain Supervisory control, with an example.	5	CO2	L2
9	1KT15EC010	Explain the dual computer scheme.	5	CO2	L2
10	1KT15EC011	Write a note on Hierarchical systems.	5	CO2	L2
11	1KT15EC012	List out the responsibilities of a control engineer in designing the suitable computer system	5	CO2	L1
12	1KT15EC013	Define Real time system,classify them based on time constrains	5	CO1	L1
13	1KT15EC014	Explain the different types of programs in system design	5	CO1	L2
14	1KT15EC015	Explain the computer control system showing communication tasks with the block diagram	5	CO1	L2

15	1KT15EC017	Explain different classifications of RTS with examples.	5	CO1	L2
16	1KT15EC019	Define the term “time constraints”. How are RTS classified based on time constraint? Explain them with appropriate equation	5	CO1	L2
17	1KT15EC020	Differentiate (i)Real time and non real time with examples. (ii) Hard and soft real time with examples	5	CO1	L2
18	1KT15EC021	Describe the elements of computer control system with examples.	5	CO1	L2
19	1KT15EC022	Classify RTS based on Time constraints.	5	CO1	L2
20	1KT15EC023	Explain the following: i) Clock based tasks (ii) Event based tasks iii) Interative systems	5	CO1	L2
21	1KT15EC024	Explain the following programs: i)Sequential ii) Multitasking iii) Real time.	5	CO1	L2
22	1KT15EC025	Explain different classifications of RTS with examples.	5	CO1	L2
23	1KT15EC026	Explain Direct digital control (DDC) with a neat diagram.	5	CO2	L2
24	1KT15EC028	What is DDC? List the advantages of DDC over analog control.	5	CO2	L2
25	1KT15EC029	Discuss PID control algorithm with suitable formula.	5	CO2	L2
26	1KT15EC030	What do you mean by adaptive control? With a neat block diagram ,explain the types of adaptive control.	5	CO2	L2
27	1KT15EC031	Define Real time system,classify them based on time constrains	5	CO1	L1
28	1KT15EC032	Explain the different types of programs in system design	5	CO1	L2
29	1KT16EC401	Explain the computer control system showing communication tasks with the block diagram	5	CO1	L2
30	1KT16EC403	Explain different classifications of RTS with examples.	5	CO1	L2
31	1KT16EC406	Define the term “time constraints”. How are RTS classified based on time constraint? Explain them with appropriate equation	5	CO1	L2
32	1KT16EC408	Differentiate (i)Real time and non real time with examples. (ii) Hard and soft real time with examples	5	CO1	L2
33	1KT16EC411	Describe the elements of computer control system with examples.	5	CO1	L2
34	1KT15EC036	Classify RTS based on Time constraints.	5	CO1	L2
35	1KT15EC037	Explain the following: i) Clock based tasks (ii) Event based tasks iii) Interative systems	5	CO1	L2
36	1KT15EC038	Explain the following programs: i)Sequential ii) Multitasking iii) Real time.	5	CO1	L2
37	1KT15EC039	Explain different classifications of RTS with examples.	5	CO1	L2
38	1KT15EC041	Explain Direct digital control (DDC) with a neat diagram.	5	CO2	L2

39	1KT15EC043	What is DDC? List the advantages of DDC over analog control.	5	CO2	L2
40	1KT15EC044	Discuss PID control algorithm with suitable formula.	5	CO2	L2
41	1KT15EC045	What do you mean by adaptive control? With a neat block diagram ,explain the types of adaptive control.	5	CO2	L2
42	1KT15EC046	Define Real time system,classify them based on time constrains	5	CO1	L1
43	1KT15EC047	Write the block diagram of a single chip micro computer and explain the following blocks (i)Interrupt controller (ii) Series communication (iii) EPROM	5	CO4	L3
44	1KT15EC048	Explain various Computer system Architectures.	5	CO4	L2
45	1KT15EC049	Explain Analog signal interference, with a neat diagram.	5	CO3	L3
46	1KT15EC051	Write the block diagram of an interrupt vectoring using priority encoding circuit and explain. Show the timing diagram of simplified READ operation.	5	CO3	L2
47	1KT15EC052	Explain the following : (i) HDLC protocol (ii) Asynchronous and synchronous transmission techniques	5	CO4	L2
48	1KT15EC053	Explain Analog signal interference, with a neat diagram.	5	CO3	L3
49	1KT15EC054	Write the block diagram of an interrupt vectoring using priority encoding circuit and explain. Show the timing diagram of simplified READ operation.	5	CO3	L2
50	1KT15EC055	Explain the following : (i) HDLC protocol (ii) Asynchronous and synchronous transmission techniques	5	CO4	L2
51	1KT15EC056	Explain pulse interface for input and output operation, with a neat block diagram.	5	CO4	L2
52	1KT15EC058	Explain digital signal interference, with a neat diagram.	5	CO4	L2
53	1KT15EC059	Write a note on Real time Clock	5	CO4	L2
54	1KT15EC061	Explain Daisy-chain interrupt structure.	5	CO4	L2
55	1KT15EC062	Explain Analog signal interference, with a neat diagram.	5	CO3	L3
56	1KT15EC063	Write the block diagram of an interrupt vectoring using priority encoding circuit and explain. Show the timing diagram of simplified READ operation.	5	CO3	L2
57	1KT15EC064	Describe multi-level interrupts.	5	CO4	L2
58	1KT15EC067	Explain Interrupt masking with a neat diagram.	5	CO4	L2
59	1KT16EC412	Write a note on Direct memory Access.	5	CO4	L2
60	1KT16EC416	Explain various LAN topologies.	5	CO4	L3
61	1KT16EC419	Explain the ISO seven layer model for data communication.	5	CO4	L3
62	1KT16EC420	Describe multi-level interrupts.	5	CO4	L2
63	1KT16EC421	Explain Interrupt masking with a neat diagram.	5	CO4	L2
64	1KT16EC422	What do you mean by adaptive control? With a neat block diagram ,explain the types of adaptive control.	5	CO2	L2

65	1KT16EC423	Define Real time system,classify them based on time constrains	5	CO1	L1
66	1KT16EC424	Write the block diagram of a single chip micro computer and explain the following blocks (i)Interrupt controller (ii) Series communication (iii) EPROM	5	CO4	L3
67	1KT16EC426	Explain various Computer system Architectures.	5	CO4	L2
68	1KT14EC067	Explain Analog signal interference, with a neat diagram.	5	CO3	L3

D2. TEACHING PLAN - 2

Module – 3

Title:	Languages of real time application	Appr Time:	16 Hrs
a	***Course Outcomes***	–	**Blooms**
–	The student should be able to:	–	**Level**
1	Explain and prioritize the major requirements for a real time language	CO5	L3
2	Explain the techniques of modularity	CO6	L3
b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
17	Introduction	CO5	L2
18	Syntax Layout and Readability, Declaration and Initialization of Variables and Constants	CO5	L3
19	Syntax Layout and Readability, Declaration and Initialization of Variables and Constants	CO5	L3
20	Modularity and Variables, Compilation of Modular Programs,	CO5	L3
21	Data types, Control Structures,	CO6	L3
22	Exception Handling, Low-level facilities, Co-routines,	CO6	L3
23	Interrupts and Device Handling, Concurrency,	CO6	L3
24	Real-Time Support, Overview of Real-Time Languages.	CO6	L3
c	**Application Areas**	**CO**	**Level**
1	Use in avionics application	CO5	L3
2	Used in monitoring system	CO6	L3
d	**Review Questions**	–	–
39	How do strong data typing contribute to the security of programming language	CO5	L3
40	What are the requirements, which CUTLASS has to meet? With a neat	CO5	L3

	diagram, show CUTLASS host –target configuration.		
41	How do strong data typing contribute to the security of programming language?	CO5	L2
42	Explain the approaches of application oriented software.	CO5	L3
43	Explain the use of co-routines showing an examples.	CO5	L3
44	A stream of data in character form is received from a remote station over a serial link. The data has to be processed character by character by a routine process item until the EOT character is received. The EOT must not be processed. Write a simple loop structure using EXIT statement.	CO5	L3
45	Explain simple table-driven approach used for application oriented software.	CO6	L3
46	Discuss the features that a real time language should posses in order to meet the real time applications	CO6	L2
47	Explain how the completion of program is carried out in the real time system	CO6	L3
48	With a neat diagram of table driven application system and explain the working	CO6	L2
e	**Experiences**	–	–
1		CO1	L2
2			
3			
4		CO3	L3
5			

Module – 4

Title:	Operating System	Appr Time:	16 Hrs
a	***Course Outcomes***	–	**Blooms**
–	The student should be able to:	–	**Level**
1	Describe the Scheduling and task management using the task state diagram	CO7	L2
2	Generalize the problems of resource sharing and explain the techniques for providing the mutual exclusion	CO8	L3
b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
25	Introduction	CO7	L2

26	Real-Time Multi-Tasking OS	CO7	L2
27	Scheduling Strategies, Priority Structures	CO7	L2
28	Task Management	CO7	L2
29	Scheduler and Real-Time Clock Interrupt Handler	CO7	L3
30	Memory Management	CO8	L2
31	Code Sharing, Resource Control	CO8	L2
32	Task Co-Operation and Communication	CO8	L2
33	Mutual Exclusion	CO8	L3
c	**Application Areas**	**CO**	**Level**
1	Used in digital televisions and ATMS	CO7	L3
2	Used in GPS monitoring system	CO8	L3
d	**Review Questions**	-	-
49	Explain general purpose operating system with a neat diagram	CO7	L2
50	Explain with a suitable diagram the multi user and multi tasking operating systems.	CO7	L3
51	Explain the two basic Scheduling strategies.	CO7	L2
52	Explain the priority levels in an RTOS.	CO7	L3
53	Explain Clock level tasks with examples.	CO7	L3
54	What are the functions of a task management module? Explain various tasks states, with the help of a task state diagram.	CO7	L3
55	What is a Task descriptor. List RTOS task state transition commands.	CO7	L2
56	Explain RTOS search for work by the dispatcher with a neat flow diagram.	CO7	L3
57	Explain software modules for foreground/background system showing data storage	CO7	L3
58	Write a note on (i) Non-partition memory (ii) Partitioned memory	CO8	L2
59	Explain with a neat diagram, the general structure of IOSS.	CO8	L3
60	List IOSS system commands for RTOS.	CO8	L1
61	What is the principal difference between pool and channel?	CO8	L2
62	Define liveness. List the set of functions and primitives for RTOS.	CO8	L1
63	Explain the typical structure of a RTOS.	CO8	L3
64	Write notes on (i) Semaphore (ii) Swapping	CO8	L3
65	Explain: (i) Task chaining and swapping (ii) Task overlaying	CO7	L2
66	Explain the Scheduling policies.	CO7	L2
67	What is code sharing? Explain the serially reusable and reentrant code.	CO7	L2
68	Explain the mutual exclusion using binary semaphore.	CO8	L2
69	Write a note on semaphore with three permissible operations.	CO8	L3

70	List the minimum set of operation that RTOS kernel need to support, with examples.	CO8	L1
71	Explain data transfer without synchronization.	CO8	L2
72	Define the following (I)Live lock (ii) Deadlock (iii) Indefinite postponement	CO8	L2
73	List and explain three levels of priority structures.	CO8	L2
e	**Experiences**	-	-
1		CO7	L2
2			
3			
4		CO8	L3
5			

E2. CIA EXAM – 2

a. Model Question Paper - 2

Crs Code:	15EC743	Sem:	7	Marks:	30	Time:	75 minutes
Course:	Real Time Systems						

-	-	**Note: Answer any 2 full questions,One from each module**	**Marks**	**CO**	**Level**
1	a	What are the requirements, which CUTLASS has to meet? With a neat diagram, show CUTLASS host –target configuration.	7	CO5	L3
	b	Explain the use of co-routines showing an examples.	8	CO5	L3
		(OR)			
2	a	Explain simple table-driven approach used for application oriented software.	7	CO6	L3
	b	Explain how the completion of program is carried out in the real time system	8	CO6	L3
3	a	With a neat diagrams explain multi-tasking and multi-user operating system	7	CO7	L3
	b	What are the functions of task management module? Explain various states of a task with suitable diagrams	8	CO7	L2
		(OR)			
4	a	Explain data transfer without synchronization.		CO8	L2
	b	Explain (i) task chaining & swaping (ii) task overlaying	8	CO7	L2

b. Assignment – 2

Note: A distinct assignment to be assigned to each student.

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Model Assignment Questions

Crs Code:	15EC743	Sem:	7	Marks:	5	Time:	90 – 120 minutes
Course:	Real Time Systems						

Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.

SNo	USN	Assignment Description	Marks	CO	Level
1	1KT15EC001	Explain the approaches of application oriented software.	5	CO5	L3
2	1KT15EC003	Explain the use of co-routines showing an examples.	5	CO5	L3
3	1KT15EC004	A stream of data in character form is received from a remote station over a serial link. The data has to be processed character by character by a routine process item until the EOT character is received. The EOT must not be processed. Write a simple loop structure using EXIT statement.	5	CO5	L3
4	1KT15EC005	Explain simple table-driven approach used for application oriented software.	5	CO6	L3
5	1KT15EC006	Discuss the features that a real time language should posses in order to meet the real time applications	5	CO6	L2
6	1KT15EC007	Explain how the completion of program is carried out in the real time system	5	CO6	L3
7	1KT15EC008	With a neat diagram of table driven application system and explain the working	5	CO6	L2
8	1KT15EC009	Write a note on (i) Non-partition memory (ii) Partitioned memory	5	CO8	L2
9	1KT15EC010	Explain with a neat diagram, the general structure of IOSS.	5	CO8	L3
10	1KT15EC011	List IOSS system commands for RTOS.	5	CO8	L1
11	1KT15EC012	What is the principal difference between pool and channel?	5	CO8	L2
12	1KT15EC013	Define liveness. List the set of functions and primitives for RTOS.	5	CO8	L1
13	1KT15EC014	Explain the typical structure of a RTOS.	5	CO8	L3
14	1KT15EC015	Write notes on (i) Semaphore (ii) Swapping	5	CO8	L3
15	1KT15EC017	Explain: (i) Task chaining and swapping (ii) Task overlaying	5	CO7	L2
16	1KT15EC019	Explain the Scheduling policies.	5	CO7	L2
17	1KT15EC020	What is code sharing? Explain the serially reusable and reentrant code.	5	CO7	L2
18	1KT15EC021	Explain the mutual exclusion using binary semaphore.	5	CO8	L2
19	1KT15EC022	Write a note on semaphore with three permissible operations.	5	CO8	L3
20	1KT15EC023	List the minimum set of operation that RTOS kernel need to support, with examples.	5	CO8	L1
21	1KT15EC024	Explain general purpose operating system with a neat diagram	5	CO7	L2

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22	1KT15EC025	Explain with a suitable diagram the multi user and multi tasking operating systems.	5	CO7	L3
23	1KT15EC026	Explain the two basic Scheduling strategies.	5	CO7	L2
24	1KT15EC028	Explain the priority levels in an RTOS.	5	CO7	L3
25	1KT15EC029	Explain Clock level tasks with examples.	5	CO7	L3
26	1KT15EC030	What are the functions of a task management module? Explain various tasks states, with the help of a task state diagram.	5	CO7	L3
27	1KT15EC031	What is a Task descriptor. List RTOS task state transition commands.	5	CO7	L2
28	1KT15EC032	Explain RTOS search for work by the dispatcher with a neat flow diagram.	5	CO7	L3
29	1KT16EC401	Explain software modules for foreground/background system showing data storage	5	CO7	L3
30	1KT16EC403	Explain general purpose operating system with a neat diagram	5	CO7	L2
31	1KT16EC406	Explain with a suitable diagram the multi user and multi tasking operating systems.	5	CO7	L3
32	1KT16EC408	Explain the two basic Scheduling strategies.	5	CO7	L2
33	1KT16EC411	Explain the priority levels in an RTOS.	5	CO7	L3
34	1KT15EC036	Explain Clock level tasks with examples.	5	CO7	L3
35	1KT15EC037	What are the functions of a task management module? Explain various tasks states, with the help of a task state diagram.	5	CO7	L3
36	1KT15EC038	What is a Task descriptor. List RTOS task state transition commands.	5	CO7	L2
37	1KT15EC039	Explain RTOS search for work by the dispatcher with a neat flow diagram.	5	CO7	L3
38	1KT15EC041	Explain software modules for foreground/background system showing data storage	5	CO7	L3
39	1KT15EC043	Write a note on (i) Non-partition memory (ii) Partitioned memory	5	CO8	L2
40	1KT15EC044	Explain with a neat diagram, the general structure of IOSS.	5	CO8	L3
41	1KT15EC045	List IOSS system commands for RTOS.	5	CO8	L1
42	1KT15EC046	What is the principal difference between pool and channel?	5	CO8	L2
43	1KT15EC047	Define liveness. List the set of functions and primitives for RTOS.	5	CO8	L1
44	1KT15EC048	Explain the typical structure of a RTOS.	5	CO8	L3
45	1KT15EC049	Write notes on (i) Semaphore (ii) Swapping	5	CO8	L3
46	1KT15EC051	Explain RTOS search for work by the dispatcher with a neat flow diagram.	5	CO7	L3
47	1KT15EC052	Explain software modules for foreground/background	5	CO7	L3

		system showing data storage			
48	1KT15EC053	Write a note on (i) Non-partition memory (ii) Partitioned memory	5	CO8	L2
49	1KT15EC054	Write a note on semaphore with three permissible operations.	5	CO8	L3
50	1KT15EC055	List the minimum set of operation that RTOS kernel need to support, with examples.	5	CO8	L1
51	1KT15EC056	Explain general purpose operating system with a neat diagram	5	CO7	L2
52	1KT15EC058	Explain with a suitable diagram the multi user and multi tasking operating systems.	5	CO7	L3
53	1KT15EC059	Explain the two basic Scheduling strategies.	5	CO7	L2
54	1KT15EC061	Explain the priority levels in an RTOS.	5	CO7	L3
55	1KT15EC062	Explain Clock level tasks with examples.	5	CO7	L3
56	1KT15EC063	What are the functions of a task management module? Explain various tasks states, with the help of a task state diagram.	5	CO7	L3
57	1KT15EC064	What is a Task descriptor. List RTOS task state transition commands.	5	CO7	L2
58	1KT15EC067	Explain RTOS search for work by the dispatcher with a neat flow diagram.	5	CO7	L3
59	1KT16EC412	Explain software modules for foreground/background system showing data storage	5	CO7	L3
60	1KT16EC416	Explain general purpose operating system with a neat diagram	5	CO7	L2
61	1KT16EC419	Explain with a suitable diagram the multi user and multi tasking operating systems.	5	CO7	L3
62	1KT16EC420	Explain the two basic Scheduling strategies.	5	CO7	L2
63	1KT16EC421	Explain the approaches of application oriented software.	5	CO5	L3
64	1KT16EC422	Explain the use of co-routines showing an examples.	5	CO5	L3
65	1KT16EC423	A stream of data in character form is received from a remote station over a serial link. The data has to be processed character by character by a routine process item until the EOT character is received. The EOT must not be processed. Write a simple loop structure using EXIT statement.	5	CO5	L3
66	1KT16EC424	Explain simple table-driven approach used for application oriented software.	5	CO6	L3
67	1KT16EC426	Discuss the features that a real time language should posses in order to meet the real time applications	5	CO6	L2
68	1KT14EC067	Explain the approaches of application oriented software.	5	CO5	L3

D3. TEACHING PLAN - 3

Module – 5

Title:	Design of RTS	Appr Time:	16 Hrs
a	***Course Outcomes***	–	**Blooms**
–	The student should be able to:	–	**Level**
1	Outline the planning and design of a computer based system using single program approach	CO9	L3
2	Design and implement a system using software modeling and describe major methodologies	CO10	L3
b	***Course Schedule***		
Class No	**Module Content Covered**	**CO**	**Level**
34	Introduction to design approach	CO9	L2
35	Specification Document	CO9	L2
36	Preliminary Design	CO9	L2
37	Single-Program Approach	CO9	L3
38	Foreground/Background System.	CO9	L3
39	Introduction to design implementation	CO10	L2
40	Yourdon Methodology	CO10	L2
41	Ward and Mellor Method	CO10	L3
42	Hately and Pirbhai Method.	CO10	L3
c	**Application Areas**	**CO**	**Level**
1	Set up of digital thermometer	CO9	L2
2	Data acquisition system design	CO10	L2
d	**Review Questions**	–	–
74	Explain the different phases involved in the design of a RTS.	CO9	L2
75	Explain foreground and background system with flow chart.	CO9	L2
76	How data will be shared with common memory?	CO9	L2
77	Write the flowchart for a single program approach.	CO9	L3
78	Explain the concept of data sharing using common memory.	CO9	L2
79	Considering a system comprising of several hot air blowers. Prepare a specificator document of the same. (Assume planning phase has been completed)	CO9	L3
80	Explain software design for RTS using software module.	CO9	L2
81	Explain attempt at mutual exclusion using condition flags.	CO9	L2
82	Explain transfer of controller parameters by using semaphore.	CO9	L2
83	Mention the importance of conditions flag and binary semaphores.	CO9	L3
84	Explain the different phases involved in the design of a RTS.	CO9	L1

85	Explain Software modeling in the real time system development.	CO10	L2
86	Write a note on Yourdon methodology.	CO10	L2
87	Explain the general arrangement of drying oven.	CO10	L3
88	Explain building the essential model-the environmental model in Ward and mellor methodology.	CO10	L3
89	Write Level-1 and Level-2 transformation diagrams in Ward and mellor methodology.	CO10	L2
90	Write explanatory notes on the following : (i) Hatley and pirbhai method (ii) Ward and Mellor method	CO10	L3
91	What do you mean by enhancing the model? Explain with a neat diagram, the relationship between real environment and virtual environment.	CO10	L3
92	Write short notes on (i)PSPEC and CSPEC (ii) software modeling (iii) YOURDON methodology	CO10	L2
93	Show the outline of abstract modeling approach of ward and mellor and explain.	CO10	L3
94	Explain various synchronous data flows.	CO10	L2
95	Write state transition diagram and state transition table for CSPEC.	CO10	L3
96	Explain the CFDO drying oven controller using Hatley and pirbhai notation	CO10	L3
e	**Experiences**	-	-
1		CO10	L2
2			
3			
4		CO9	L3
5			

E3. CIA EXAM – 3

a. Model Question Paper - 3

Crs Code:	15EC743	Sem:	7	Marks:	30	Time:	75 minutes
Course:	Real Time Systems						

-	-	**Note: Answer any 2 full questions,One from each module**	**Marks**	**CO**	**Level**
1	a	Explain the different phases involved in the design of a RTS.	5	CO9	L2
	b	Explain software design for RTS using software module.	5	CO9	L2
	c	Explain attempt at mutual exclusion using condition flags.	5	CO9	L3
2	a	Write the flowchart for a single program approach	5	CO9	L2

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	b	Explain transfer of controller parameters by using semaphore	5	CO9	L2
	c	Explain foreground and background system with flow chart	5	CO9	L3
3	a	Write Level-1 and Level-2 transformation diagrams in Ward and mellor methodology.	5	CO10	L2
	b	Write explanatory notes on the following : (i) Hatley and pirbhai method (ii) Ward and Mellor method	5	CO10	L2
	c	Write a note on Yourdon methodology	5	CO10	L2
4	a	Write state transition diagram and state transition table for CSPEC.	5	CO10	L2
	b	Explain the CFDO drying oven controller using Hatley and pirbhai notation	5	CO10	L2
	c	Write Level-1 and Level-2 transformation diagrams in Ward and mellor methodology	5	CO10	L2

b. Assignment – 3

Note: A distinct assignment to be assigned to each student.

Model Assignment Questions							
Crs Code:	15EC743	Sem:	7	Marks:	5	Time:	90 – 120 minutes
Course:	Real Time systems						
Note: Each student to answer 2-3 assignments. Each assignment carries equal mark.							

SNo	USN	Assignment Description	Marks	CO	Level
1	1KT15EC001	Considering a system comprising of several hot air blowers. Prepare a specificator document of the same. (Assume planning phase has been completed)	5	CO9	L3
2	1KT15EC003	Explain software design for RTS using software module.	5	CO9	L2
3	1KT15EC004	Explain attempt at mutual exclusion using condition flags.	5	CO9	L2
4	1KT15EC005	Explain transfer of controller parameters by using semaphore.	5	CO9	L2
5	1KT15EC006	Mention the importance of conditions flag and binary semaphores.	5	CO9	L3
6	1KT15EC007	Explain the different phases involved in the design of a RTS.	5	CO9	L2
7	1KT15EC008	Explain Software modeling in the real time system development.	5	CO10	L2
8	1KT15EC009	Write a note on Yourdon methodology.	5	CO10	L2
9	1KT15EC010	Explain the general arrangement of drying oven.	5	CO10	L3
10	1KT15EC011	Explain building the essential model-the environmental model in Ward and mellor methodology.	5	CO10	L3

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11	1KT15EC012	Write Level-1 and Level-2 transformation diagrams in Ward and mellor methodology.	5	CO10	L2
12	1KT15EC013	Explain the different phases involved in the design of a RTS.	5	CO9	L2
13	1KT15EC014	Explain foreground and background system with flow chart.	5	CO9	L2
14	1KT15EC015	How data will be shared with common memory?	5	CO9	L2
15	1KT15EC017	Write the flowchart for a single program approach.	5	CO9	L3
16	1KT15EC019	Explain the concept of data sharing using common memory.	5	CO9	L2
17	1KT15EC020	Considering a system comprising of several hot air blowers. Prepare a specificator document of the same. (Assume planning phase has been completed)	5	CO9	L3
18	1KT15EC021	Explain software design for RTS using software module.	5	CO9	L2
19	1KT15EC022	Explain attempt at mutual exclusion using condition flags.	5	CO9	L2
20	1KT15EC023	Explain transfer of controller parameters by using semaphore.	5	CO9	L2
21	1KT15EC024	Mention the importance of conditions flag and binary semaphores.	5	CO9	L3
22	1KT15EC025	Explain the different phases involved in the design of a RTS.	5	CO9	L2
23	1KT15EC026	Explain Software modeling in the real time system development.	5	CO10	L2
24	1KT15EC028	Write Level-1 and Level-2 transformation diagrams in Ward and mellor methodology.	5	CO10	L2
25	1KT15EC029	Write explanatory notes on the following : (i) Hatley and pirbhai method (ii) Ward and Mellor method	5	CO10	L3
26	1KT15EC030	What do you mean by enhancing the model? Explain with a neat diagram, the relationship between real environment and virtual environment.	5	CO10	L3
27	1KT15EC031	Write short notes on (i)PSPEC and CSPEC (ii) software modeling (iii) YOURDON methodology	5	CO10	L2
28	1KT15EC032	Show the outline of abstract modeling approach of ward and mellor and explain.	5	CO10	L3
29	1KT16EC401	Explain various synchronous data flows.	5	CO10	L2
30	1KT16EC403	Write state transition diagram and state transition table for CSPEC.	5	CO10	L3
31	1KT16EC406	Explain the CFDO drying oven controller using Hatley and pirbhai notation	5	CO10	L3
32	1KT16EC408	Explain the different phases involved in the design of a RTS.	5	CO9	L2
33	1KT16EC411	Explain Software modeling in the real time system	5	CO10	L2

		development.			
34	1KT15EC036	Write a note on Yourdon methodology.	5	CO10	L2
35	1KT15EC037	Explain the general arrangement of drying oven.	5	CO10	L3
36	1KT15EC038	Explain building the essential model-the environmental model in Ward and mellor methodology.	5	CO10	L3
37	1KT15EC039	Write Level-1 and Level-2 transformation diagrams in Ward and mellor methodology.	5	CO10	L2
38	1KT15EC041	Explain the different phases involved in the design of a RTS.	5	CO9	L2
39	1KT15EC043	Explain foreground and background system with flow chart.	5	CO9	L2
40	1KT15EC044	How data will be shared with common memory?	5	CO9	L2
41	1KT15EC045	Write the flowchart for a single program approach.	5	CO9	L3
42	1KT15EC046	Explain the concept of data sharing using common memory.	5	CO9	L2
43	1KT15EC047	Considering a system comprising of several hot air blowers. Prepare a specificator document of the same. (Assume planning phase has been completed)	5	CO9	L3
44	1KT15EC048	Explain software design for RTS using software module.	5	CO9	L2
45	1KT15EC049	Explain attempt at mutual exclusion using condition flags.	5	CO9	L2
46	1KT15EC051	Write the flowchart for a single program approach.	5	CO9	L3
47	1KT15EC052	Explain the concept of data sharing using common memory.	5	CO9	L2
48	1KT15EC053	Considering a system comprising of several hot air blowers. Prepare a specificator document of the same. (Assume planning phase has been completed)	5	CO9	L3
49	1KT15EC054	Explain software design for RTS using software module.	5	CO9	L2
50	1KT15EC055	Explain attempt at mutual exclusion using condition flags.	5	CO9	L2
51	1KT15EC056	Explain transfer of controller parameters by using semaphore.	5	CO9	L2
52	1KT15EC058	Mention the importance of conditions flag and binary semaphores.	5	CO9	L3
53	1KT15EC059	Explain the different phases involved in the design of a RTS.	5	CO9	L1
54	1KT15EC061	Explain Software modeling in the real time system development.	5	CO10	L2
55	1KT15EC062	Write Level-1 and Level-2 transformation diagrams in Ward and mellor methodology.	5	CO10	L2
56	1KT15EC063	Write explanatory notes on the following : (i) Hatley and pirbhai method (ii) Ward and Mellor method	5	CO10	L3
57	1KT15EC064	What do you mean by enhancing the model? Explain with a neat diagram, the relationship between real environment	5	CO10	L3

		and virtual environment.			
58	1KT15EC067	Write short notes on (i)PSPEC and CSPEC (ii) software modeling (iii) YOURDON methodology	5	CO10	L2
59	1KT16EC412	Show the outline of abstract modeling approach of ward and mellor and explain.	5	CO10	L3
60	1KT16EC416	Explain various synchronous data flows.	5	CO10	L2
61	1KT16EC419	Write state transition diagram and state transition table for CSPEC.	5	CO10	L3
62	1KT16EC420	Explain the CFDO drying oven controller using Hatley and pirbhai notation	5	CO10	L3
63	1KT16EC421	Explain the different phases involved in the design of a RTS.	5	CO9	L2
64	1KT16EC422	Explain Software modeling in the real time system development.	5	CO10	L2
65	1KT16EC423	Considering a system comprising of several hot air blowers. Prepare a specificator document of the same. (Assume planning phase has been completed)	5	CO9	L3
66	1KT16EC424	Explain software design for RTS using software module.	5	CO9	L2
67	1KT16EC426	Explain attempt at mutual exclusion using condition flags.	5	CO9	L2
68	1KT14EC067	Explain transfer of controller parameters by using semaphore.	5	CO9	L2

F. EXAM PREPARATION

1. University Model Question Paper

Course:	Real Time Systems					Month / Year	May /2018
Crs Code:	15Ec743	Sem:	7	Marks:	100	Time:	180 minutes

-	**Note**	Answer all FIVE full questions. All questions carry equal marks.	**Marks**	**CO**	**Level**
1	a			CO1	
	b				
	c			CO2	
	d				
		OR			
-	a		16 / 20	CO1	
	b			CO2	
	c				
	d				

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2	a		16 / 20	C03	
	b				
	c			CO4	
	d				
		OR			
–	a		16 / 20	CO3	
	b			CO4	
	c				
	d				
3	a		16 / 20	CO5	
	b				
	c			CO6	
	d				
–	a		16 / 20	CO5	
	b				
	c			CO6	
	d				
4	a		16 / 20	CO7	
	b				
	c			C08	
	d				
		OR			
–	a		16 / 20	CO7	
	b			CO8	
	c				
	d				
5	a		16 / 20	CO9	
	b			CO10	
	c				
	d				

		OR			
	a		16 / 20	CO9	
	b				
	c			C010	
	d				

2. SEE Important Questions

Course:	Real Time Systems					Month / Year	May /2018	
Crs Code:	15EC743	Sem:	7	Marks:	100	Time:	180 minutes	
	Note	Answer all FIVE full questions. All questions carry equal marks.				-	-	
Module	Qno.	Important Question				**Marks**	**CO**	**Year**
1	1	Write the block diagram of a computer control system in an industry and explain its operation				8	CO1	2018
	2	Give the classification of Real Time Systems and give suitable applications.				6	CO1	2018
	3	Describe the computer control process in the following operations with the help of diagrams. i) Sequential control ii) Loop control iii) Supervisory control.				15	CO2	2018
	4	Define the term "Time constraint"? How are RTS classified based on time constraint?				6	CO1	2017
	5	Discuss different types of programs in system design.				6	CO2	2017
2	1	What are parallel computers? Write the different architectures of parallel computer systems and explain their working principles				8	CO3	2018
	2	Explain DDC and its advantages with neat diagram.				5	CO3	2018
	3	Describe the Interrupt driven data transfer and DMA data transfer, working principles.				6	CO4	2018
	4	Explain parallel computers concepts with SISD, SIMD, MIMD and bMISD with its advantages and disadvantages.				10	CO3	2016
	5	Explain process related interface with suitable example.				10	CO4	2016
3	1	Explain, how the compilation of programs is carried out in the real time systems?				5	CO5	2018
	2	Discuss the features that a real time language should possess in order to meet the real time applications.				9	CO5	2018
	3	Write the diagram of table driven application system and explain the working.				6	CO6	2017

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	4	List and explain various requirements in programming languages used in real time applications.	9	CO6	2017
	5	What is cutlass and what are the major requirements of CUTLASS?	6	CO5	2016
4	1	Write the block diagram of multitasking operating system and explain its functioning.	10	CO7	2018
	2	Discuss the task priority structures employed in the real time systems	10	CO7	2018
	3	Explain different scheduling strategies.	6	CO7	2018
	4	Explain the problem of shared memory. How semaphores are used to overcome this problem	10	CO8	2017
	5	Explain live-lock, deadlock and indefinite postponement in brief	6	CO8	2017
5	1	With neat flow chart, describe single program approach with reference to RTS design	10	CO9	2017
	2	Explain software design of RTS using software module	10	CO9	2017
	3	Write the typical planning phase and development phase diagrams of RTS design process and explain.		CO9	2018
	4	Discuss the i Yourdon methodology ii) Ward and Mellor methods of RTS developments.	14	CO10	2018
	5	Eplain functional specifications with respect to a drying oven	6	CO10	2018