17BEECOE01   REAL TIME EMBEDDED SYSTEMS   L T P C   100   3 0 0 3

OBJECTIVES:

- To introduce students to the embedded systems, its hardware and software.
- To introduce devices and buses used for embedded networking.
- To study about task management
- To learn about semaphore management and message passing
- To study about memory management

INTENDEDOUTCOMES:

- Ability to understand embedded systems, its hardware and software.
- Gain knowledge about devices and buses used for embedded networking.
- Gain knowledge about task management.
- Gain knowledge about semaphore management and message passing.
- Gain knowledge about memory management.

UNIT-I   INTRODUCTION TO EMBEDDED SYSTEM   9

Introduction- Embedded systems description, definition, design considerations & requirements- Overview of Embedded System Architecture (CISC and RISC)- Categories of Embedded Systems- embedded processor selection & tradeoffs- Embedded design life cycle -Product specifications- hardware / software partitioning- iterations and implementation- hardware software integration – product testing techniques–ARM7.

UNIT-II   OPERATING SYSTEM OVERVIEW   9

Introduction–Advantage and Disadvantage of Using RTOS–Multitasking–Tasks-Real Time Kernels – Scheduler- Non-Preemptive Kernels – Preemptive Kernels – Reentrancy – Reentrant Functions– Round Robin Scheduling- Task Priorities- Static Priorities– Mutual Exclusion–Deadlock– Inter task Communication–Message Mailboxes–Message Queues- Interrupts- Task Management–Memory Management-Time Management–Clock Ticks.

UNIT-III   TASK MANAGEMENT   9

Introduction-μ C/OS-II Features-Goals ofμ C/OS-II-Hardware and Software Architecture–Kernel

Structures: Tasks–Task States–Task Scheduling–Idle Task–Statistics Task–Interrupts Under μC/OS-II –Clock Tick-μ C/OS- II Initialization. Task Management: Creating Tasks–Task Stacks–Stack Checking–Task's Priority–Suspending Task–Resuming Task. **Time Management:** Delaying a Task–Resuming a Delayed Task–System Time. Event Control Blocks-Placing a Task in the ECB Wait List–Removing a Task from an ECB wait List.

UNIT-IV   SEMAPHORE MANAGEMENT AND MESSAGE PASSING   9

Semaphore Management: Semaphore Management Overview– Signalling a Semaphore. Message Mailbox Management: Creating a Mailbox –Deleting Mailbox– Waiting for a Message box–Sending Message to a Mailbox- Status of Mailbox. Message Queue Management: Creating Message Queue– Deleting a Message Queue–Waiting for a Message Queue–Sending Message to a Queue– Flushing a Queue.

UNIT-V   MEMORY MANAGEMENT   9

Memory Management: Memory Control Blocks–Creating Partition-Obtaining a Memory Block– Returning a Memory Block. Getting Started with µC/OS-II–Installing µC/OS-II–Porting µC/OS-II: Development Tools–Directories and Files– Testing a Port - IAR Workbench with µC/OS-II-µC/OS- II Porting on a 8051 CPU– Implementation of Multitasking- Implementation of Scheduling and Rescheduling –Analyze the Multichannel ADC with help of µC/OS-II.

Total: 45

TEXTBOOKS:

S.NO.	Author(s) Name	Title of the book	Publisher	Year of publication
1	JeanJ. Labrosse	Micro C/OS–II The Real Time Kernel	CMPBOOKS	2009
2	David Seal	ARM Architecture Reference Manual.	Addison-Wesley	2008
3	Steve Furbe,	ARM System-on-Chip Architecture,	Addison-Wesley Professional, California	2000

REFERENCES:

S.NO.	Author(s) Name	Title of the book	Publisher	Year of publication
1	K.V.K.K.Prasad	Embedded Real-Time Systems: Concepts, Design & Programming	Dream Tech Press	2005
2	Sriram V Iyer, Pankaj Gupta	Embedded Real Time Systems Programming	Tata McGraw Hill	2004

STAFF SIGNATURE   **HOD**

KARPAGAM ACADEMY OF HIGHER EDUCATION
(Deemed to be University Established Under Section 3 of UGC Act 1956)
Pollachi Main Road, Eachanari Post,
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FACULTY OF ENGINEERING
DEPARTMENT OF BIO MEDICAL ENGINEERING

LECTURE PLAN

NAME OF THE STAFF   : Mrs.P.SASIKALA

DESIGNATION   : ASSISTANT PROFESSOR

CLASS   : B.E-IV YEAR BME

SUBJECT   : REAL TIME EMBEDDED SYSTEMS

SUBJECT CODE   : 16BEEC7OE01

S.No	TOPICS TO BE COVERED	TIME DURATION	SUPPORTING MATERIALS	TEACHING AIDS
UNIT I LOUDSPEAKERS AND MICROPHONES				
1	Introduction- Embedded systems description, Definition	01	R1- Page.no 50	BB
2	Design Considerations & Requirements	01	R1- Page.no 50	BB
3	Overview of Embedded System Architecture (CISC and RISC)	01	R1 Page.no 41-50	BB
4	Categories of Embedded Systems, Embedded Processor Selection & Tradeoffs	01	R1- Page.no.52	BB
5	Embedded design Life Cycle, Product Specifications	01	R1 Page.no.61-64	PPT
6	Hardware / Software Partitioning	01	R1 page.no.18	PPT
7	Iterations and Implementation,	01	R1 page.no.36	PPT
8	Hardware Software Integration	01	R1 page.no.33-41	PPT
9	Product testing Techniques ARM7.	01	R1 page.no.40	PPT
Introduction		**01**		
Total Lecture Hours		**08**		
Total Hours		**09**		

UNIT – II TELEVISION STANDARDS AND SYSTEMS				
10	Introduction–Advantage and Disadvantage of Using RTOS	01	R1 Page.no 304	Smart Board
11	Multitasking–Tasks-Real Time Kernels	01	R1 Page.no 308	BB, PPT
12	Scheduler- Non-Preemptive	01	R1 Page.no 311	PPT

	Kernels – Preemptive Kernels			
13	Reentrancy – Reentrant Functions	01	R1 Page.no 371	PPT
14	Round Robin Scheduling- Task Priorities	01	R1 Page.no 342-353	PPT
15	Static Priorities– Mutual Exclusion, Deadlock	01	R1 Page.no 375	PPT
16	Inter task Communication– Message Mailboxes	01	R1 Page.no 354	PPT
17	Message Queues- Interrupts- Task Management	01	R1 Page.no 388	PPT
18	Memory Management- Time Management–Clock Ticks.	01	www.television.remote.com	PPT
Total Lecture Hours		**09**		
Total Hours		**09**		

UNIT – III OPTICAL RECORDING AND REPRODUCTION				
19	Introduction-µ C/OS-II Features-Goals ofµ C/OS-II-Hardware and Software Architecture	01	R1 Page.no.290	Smart board
20	Introduction-µC/OS-II Features-Goals of µC/OS-II-Hardware and Software Architecture,	01	R1 Page.no 290	Smart board
21	Kernel, **Structures:** Tasks–Task States–Task Scheduling	01	R1 Page.no 292	Smart board
22	Idle Task–Statistics Task–Interrupts Under µC/OS-II	01	R1 Page.no 301	Smart board
23	Clock Tick-µ C/OS- II Initialization.	01	R1 Page.no 262	Smart board
24	Task Management: Creating Tasks–Task Stacks–Stack Checking	01	R1 Page.no 264	Smart board
25	Task's Priority–Suspending Task–Resuming Task.	01	R1 Page.no 275 & 286	Smart board
26	**Time Management:** Delaying a Task–Resuming a Delayed Task–System Time.	01	R1 Page.no.286	Smart board
27	Event Control Blocks-Placing a Task in the ECB Wait List–Removing a Task from an ECB wait List.	01	-	Smart board
Total Lecture Hours		**09**		
Total Hours		**09**		

UNIT – IV TELECOMMUNICATION SYSTEMS				
28	Semaphore Management: Semaphore Management Overview	01	R1 Page.no.1-42	BB
29	Signaling a Semaphore	01	R1 Page.no.1-5	BB
30	Message Mailbox Management: Creating a Mailbox	01	R1 Page.no.16	BB

31	Deleting Mailbox	01	R1 Page.no.348	BB
32	Waiting for a Message box	01	R1 Page.no.414	BB
33	Sending Message to a Mailbox-Status of Mailbox	01	R1 Page.no.455-467	BB
34	Message Queue Management: Creating Message Queue	01	R1 Page.no.492-559	BB
35	Deleting a Message Queue– Waiting for a Message Queue	01	R1 Page.no 560-586	BB
36	Sending Message to a Queue, Flushing a Queue.	01	R1 Page.no 560-586	BB
Total Lecture Hours		**09**		
Total Hours		**09**		

UNIT – V HOME APPLIANCES				
37	Memory Control Blocks– Creating Partition	01	R1 Page.no 487	PPT
38	Obtaining a Memory Block– Returning a Memory Block.	01	R1 Page.no 487	PPT
39	Getting Started with µC/OS-II– Installing µC/OS-II	01	T1. www. safaribooksonline.com	PPT
40	Porting µC/OS-II	01	T1. www. safaribooksonline.com	PPT
41	Development Tools–Directories and Files	01	www.aceac.com	PPT
42	Testing a Port -IAR Workbench with µC/OS-II	01	www.aceac.com	PPT
43	µC/OS- II Porting on a 8051 CPU, Implementation of Multitasking	01	//berg.group.com/	PPT
44	Implementation of Scheduling and Rescheduling	01	//berg.group.com/	PPT
45	Analyze the Multichannel ADC with help of µC/OS-II.	01	-	PPT
Total Lecture Hours		**09**		
Total Hours		**09**		

Total No of Hours for Introduction: 01 Hrs

Total No of Lecture Hours Planned: 44 Hrs

Total No of Hours Planned   :   45 Hours

TEXT BOOKS:

S.NO.	Author(s) Name	Title of the book	Publisher	Year of the publication
1.	S.P.Bali	Consumer Electronics	Pearson Education	2005

REFERENCE BOOKS:

S.NO.	Author(s) Name	Title of the book	Publisher	Year of the publication
1.	R.G.Gupta	Audio & Video Systems	Tata Mc Graw hill Publishing Company Ltd	2004
2.	Ajay sharma,	Audio Video & TV Engineering consumer electronics	Dhanpat Rai & Co.(P).Ltd	2007
3.	Manav Bhathagar	Telecommunication Switching systems & Network	PHI Learning Pvt.Ltd	2015

STAFF IN-CHARGE   **HOD/ECE**

KARPAGAM ACADEMY OF HIGHER EDUCATION
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COIMBATORE - 641 021.
(For the candidate admitted from 2016 onwards) – FULL TIME

BE DEGREE EXAMINATIONS, NOV 2019
DEPARTMENT OF BIOMEDICAL ENGINEERING
SEVENTH SEMESTER
REAL TIME EMBEDDED SYSTEMS

Time: 3 hours   Maximum : 100 marks

PART - A (20 x 1 =20 Marks)
Answer all the questions

1. _____ is a general purpose processor with instruction set designed not specific to the applications.
   a)GPP b)ASIP c)DSP   d)ASSP

2. Processors operate at a clock frequency of _____.
   a) 3 ghz.   **b) 4 ghz.**   c) 8 mhz.   d)5 mhz

3. IBM PC'S use _____ and the embedded systems incorporated inside the pc for specific task.
   a)80×86 series   b)80×81 series c)80×85   series   d)80×51 series

4. A _____ architecture means that the instructions have between 3 and 9 stages.
   a)super scalar   b)ALU   c)floating point   **d) pipeline**

5. _____ is also called MOSI.
   a)Synchronous serial input.   b) Synchronous serial output.
   c) Asynchronous serial input.   d) Asynchronous serial output.

6. Synchronous serial input is also called as____when the receiver and slave is synchronised as master clock outputs.
   a)MOSI   **b)MISO**   c)SCLK   d)UART

7. ____is the special case when the maximum time interval can be varied.
   a)synchronous   b)asynchronous   **c)isosynchronous**   d)none of above

8. Synchronous serial communication frames are sent over a_____
   a)LAN b)WAN   c)Both A and B   d)MAN

9. _____ codes may need only a few assembly instructions.
   a)assembly codes   b) machine codes   c)both a and b   **d) driver codes**

10. ____ are compact processor and memory sensitive.
    a)assembly codes   **b) machine codes**   c)both a and b   d) driver codes

11. _____ gives a precise control of the processor.
    a) assembly codes   b) machine codes   c)both a and b   d) driver codes

12. ____ are the files of the codes already available in include pre-processor.
    a) including constant data file   **b) including code file**
    c)including header file   d)including string data file

13. ____ improves the system performance.
    a)RTOS   b)ASIP   c)ASSP   d)DESP

14. An OS provides for __ memory allocation and de allocation functions
    a)static   **b)dynamic**   c)both a and b   d) none.

15. ____ provides the codes denying the device resources.
    a) device sharing   b)device control   **c)device deletion**   d)device driver.

16. A software driver is also called as___
    a) device sharing   b)device control   c)device deletion   **d)device driver.**

17. MUCOS has _____ lines.
    a)10000+   b)20000+   c)30000+   d)40000+

18. Memory functions are required to __ size memory blocks.
    a)fixed   b)variable.   c)both a and b   d)none of the above

19. MUCOS permits a ___ of an array of pointers.
    a) tree   b)list   **c)queue**   d)stack

20. Task creation and activation is____
    a) Task delay   **b) task spawning**   c) task creation   d) embedded systems

PART - B (5 x 2 = 10 Marks)
Answer ALL the questions.

21. Define Embedded System.
22. What is meant by Kernel?
23. Define Task Scheduling.
24. Define Mail Box.
25. How to installing the µc/os-II.

PART – C (5 x 14 = 70 Marks)
Answer ALL the questions.

26.a)Explain the overview of embedded system architecture.   (14)
                 Or
   b) Explain embedded design life cycle.   (14)

27.a)Explain the inter task communication .   (14)
                 Or
   b) Details about the message, mailboxes and message queues.   (14)

28.a)Explain the kernel structure.   (14)
                 Or
   b) Explain the task management.   (14)

29.a)Explain the semaphore management.   (14)
                 Or
   b) Explain the mailbox management.   (14)

30.a)Details about the memory management.   (14)
                 Or
   b) Explain the porting of µc/OS-II.   (14)

Prepared by   : **Mrs.P.Sasikala**
                 :**Assistant Professor / ECE**

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BE DEGREE EXAMINATIONS, NOV 2019
DEPARTMENT OF BIOMEDICAL ENGINEERING
SEVENTH SEMESTER
REAL TIME EMBEDDED SYSTEMS

Time: 3 hours   Maximum : 100 marks

PART - A (20 x 1 =20 Marks)
Answer all the questions

1. _____ is a processor with a instruction set designed for specific applications on a VLSI chip.

    a)GPP   **b)ASIP**   c)DSP   d)ASSP

2. A____ is used as general purpose processor when large embedded software has to be located in the external memory chips.

    a) Embedded processor   b) single purpose processor

    c) Microprocessor   d) network processor

3. A_____ functions are to establish a connection, finish, sent, receive acknowledgements.

    a) Embedded processor   b) single purpose processor

    c) Microprocessor   **d) network processor**

4. _____ System processor and units are used in most high performance system.

    a)5 volt   b)6 volt   c)7 volt   d)8 volt

5. There are _____methods of encoding the clock information into a serial stream of bits.

    a) 4   b)3   **C)5**   d)8

6. In synchronous device port bits the data bits are___

    a) optional   **b)compulsory** C)mostly not optional   d)always optional

7. In synchronous device port bits the clock bits are___

    a) optional   b)compulsory   **C)mostly not optional** d)always optional

8. The example for asynchronous communication_____

    a) Mobile communication   **b) keypad communication**

    c) Digital communication   d) none of the above

9. ____ are the files of the strings and may have the extension.

    a) Including constant data file   b) including code file

    c) Including header file   **d) including string data file**

10. _____executes a named small collection of codes.

    a)macro   b)function   c)main   d)recursive

11. _____is a important element of any program

    a) embedded   b)c   **c)data structure**   d both a and b

12. ___ function is used by several tasks and routines synchronously.

    a)macro   b)function   c)main   **d)re-entrant**

13. No of directories referring to is ___

    a)identity   **b)count**   c)state   d)sharing permission

14. ___ can be shared for execution, reading or writing.

a)identity   b)count c)state   **d)sharing permission**

15. In RTOS ____ is for critical section handling.

a)time slicing   **b)spin locks.**   C)memory allocation   d)process predictability

16. ____ is the execution of processes which have equal priority.

a)time slicing   b)spin locks.   C)memory allocation   d)process predictability

17. ___ task is unable to run its codes further.

a)Task delay   b)task spawning   c)task creation   d)task suspension.

18. TCB is____

a)task count block.   **b)task control block.**   c)task code block.   d)both a and c.

19. Vx works has ____functions.

a)3   b)4   c)8   d)5

20. Vx works provides _____

a)system timer function b)watch dog timer function

c)delay function   **d)all the above**

PART - B (5 x 2 = 10 Marks)
Answer ALL the questions.

21. What is RISC?
22. Define reentrant function.
23. What is the purpose of resuming task?
24. Define message queue.
25. Define IAR work bench.

PART - C (5 x 14 = 70 Marks)
Answer ALL the questions.

26.a)Explain the general block of embedded system architecture.   (14)

Or

b) Explain the hardware/software partitioning.   (14)

27.a)i)task priorities .   (4)
ii)mutual exclusion .   (5)
iii)dead lock .   (5)

Or

b) Details about the scheduler and types of scheduling.   (14)

28.a)Explain the Event Control Blocks.   (14)

Or

b) Explain the time management.   (14)

29.a)Explain the semaphore management .   (14)

Or

b) Explain the message queues.   (14)

30.a)Explain the implementation of multitasking.   (14)

Or

b) Analyze the multichannel ADC with help of µc/OS-II.   (14)

Prepared by   : **Mrs.P.Sasikala**

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PART - A (20 x 1 =20 Marks)
Answer all the questions

1. _____ is used for converting object codes or executable codes for a processor.

   a)simulator.   b) compiler.   **c) cross assembler**.   d) prototyper.

2. ___ uses the complete set of codes.

   a)simulator.   **b)compiler.**   c)cross assembler.   d) prototyper.

3. _____ is required for line by line translation to machine executable codes.

   a) editor   b)RTOS   c)locator   **d)interpreter**

4. ____ is needed for writing c codes or assembly mnemonics using the keyboard of the pc for entering the program.

   a) editor   b)RTOS   c)locator   d)interpreter

5. UART is usually either in____bit format.

   a)10 or 11   b)12 or 13   c)14 or 15   d)16 or 17

6. HDLC communication is _____

   a)simplex   b) half duplex   C)both a and b   **d)full duplex**

7. The half duplex synchronous mode of operation in SI_____

   a)mode 1   b)mode 0   c)mode2   d)mode 3

8. In parallel deice ports the inputs_____may be to a keypad controller.

   a) I0 TO I7   b)I3 to I5   C)I6 to I8   d)I4 to I8

9. ____ is a processor in which the string manipulation functions are needed in program using strings

   a) including constant data file   b)including code file

   c)including header file   d)including string data file

10. A compiler version may not process the declaration as _____

    a)signed bit.   **b) unsigned byte**.   c)signedcharacter.   d)unsigned character.

11. ____ can be used as a data type.

    a)signed bit.   b)unsigned byte.   c)signedcharacter.   **d) unsigned character**

12. Pointer can be assigned as___ address.

    a)constant fixed.   b)unconstant fixed.   c)constant varied.   d)unconstant varied.

13. ___ provides running the user threads in kernel space.

    a)RTOS   b)UART   c)ISR   d)IPC

14. ___ can only post the message for the RTOS

    a)RTOS   b)UART   **c)ISR**   d)IPC

15. ____function can be used before a critical section

   a) time slicing   **b)spin locks**.   c) Memory allocation   d) process predictability

16. ___is basic unit for OS.

   a)kernel.   b)lock   c)unlock   d)round robin.

17. MUCOS are useful for letting a _____pirority task run.

   a)high   **b)low**   c)medium   d)very high

18. A signal servicing routine is the___function.

   a)c   b)c++   c)java   d)embedded

19. Vx works has____different semaphore functions.

   a)5   b)7   **c)3**   d)2

20. Queue can be used as_____ in MUCOS

   a)FIFO   **b)LIFO**   c)both a and b   d)none of the above

PART - B (5 x 2 = 10 Marks)
Answer ALL the questions.

21. Define WDT.
22. Define deadlock.
23. How to creating the task.
24. Define MCB.
25. What is meant by message?

PART - B (5 x 14 = 70 Marks)
Answer ALL the questions.

26. a) Explain the Hardware architecture of CISC and RISC.   (14)
                    (or)
    b) Explain the hardware / software partitioning in detail.   (14)

27. a) (i) Explain the pre-emptive kernels and non-pre emptive kernels in detail.   (7)
       (ii) Explain in detail about round robin schedule.   (7)
                    (or)
    b) Explain memory management in detail.   (14)

28. a) Explain time management in detail.   (14)
                    (or)
    b) Explain task management in detail.   (14)

29. a) Explain mail box management in detail.   (14)
                    (or)
    b) Explain message queue management in detail.   (14)

30. a) Explain the memory management in detail.   (14)
                    (or)
    b) Analyses the multi dimensional ADC with the help of µC / OS-II.   (14)

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Time: 3 hours   Maximum : 100 marks

PART - A (20 x 1 =20 Marks)
Answer all the questions

1. _____ uses a cross assembler output and memory allocation map.

   a) editor   b)RTOS   **c)locator**   d)interpreter

2. _____ tools are used to develop software for designing an embedded systems

   a)software.   b)debugging   c)prototype   d)sophisticated.

3. _____ is essential in most embedded systems to process multiple tasks and ISRs.

   a) editor   **b)RTOS**   c)locator   d)interpreter

4. Multiple standard source solutions are called ____ core

   a)FPGA   b)IP   c)ASIP   d)ASSP

5. In parallel deice ports the outputs_____may be to a LCD display controller.

   a)O3 to O5   **b)O0 to O7**   C)O4 to O8   d)O6 toO8

6. Sophisticated interfacing device are used for_____

   a)long distance communication   b)short distance communication

   c)both a and b   d)none of the above

7. _____is the device that counts the regular interval clock pulses at its input.

   a)counter   b)timer cum counter   **c)timer**   d)counter cum timer

8. _____is the device that counts the regular or irregular interval clock pulses at its input.

   a)counter   b)timer cum counter   c)timer   d)counter cum timer

9. ___ is a data set allocated with a memory block for key and value pairs.

   a)table   b)pipe   **c)hash table**   d)table base

10. The pointers are available in queue is _____.

    a)3   **b)2**   c)4   d)5

11. ____ can be used as a data type.

    a)signed bit.   b)unsigned byte.   c)signed character.   **d) unsigned character**

12. Which one is root element?

    a)tree   b)list   c)queue   d)stack

13. ___ is a function to release the lock at end of the critical solution.

    a)kernel**.**   b)lock   **c)unlock**   d)round robin.

14. An aperiodic tasks needs to be pre-empted only ___

    a)once   b)twice   c)thrice   d) none of the above

15. RTOS uses __memory block location with predicable memory allocation.

    a)fixed   b)variable.   c)both a and b   d)none of the above

16. in round robin slicing decomposition consists of ___ tasks.

a)one   **b)more**   c)three   d)five

17. MUCOS has the IPC function for____

  a)semaphore b)mailbox c)queue **d)all the above**

18. The ISR may have _____functions.

  a)calling   b)sending c)receiving d)none of the above

19. Vx function systems have___piriority.

  a)lowest   **b)highest** c)very low d)very high

20. kernel time slicing period is___

  a)25ms   b)75ms **c)50ms** d)15ms

PART - B (5 x 2 = 10 Marks)
Answer ALL the questions.

21. What are the categories of embedded System?
22. Explain the non preemptive kernel.
23. Define µc/os-II.
24. Define semaphore.
25. Define memory management.

PART – C (5 x 14 = 70 Marks)
Answer ALL the questions.

26 .a) Explain in detail about the categories of embedded systems.   (14)
        Or
  b) Explain embedded design life cycle.   (14)

27.a) Explain in detail about the preemptive kernel and non preemptive kernels. (14)
        Or
  b)Explain the inter task communication.   (14)

28.a) Explain the time management.   (14)
        Or
  b)Explain the task management.   (14)

29.a) Explain the mailbox management.   (14)
        Or
  b)Explain the message queues.   (14)

30.a) Analyze the multichannel ADC with help of µc/OS-II.   (14)
        Or
  b)Explain the porting of µc/OS-II.   (14)

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        : **Assistant Professor / ECE**

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PART - A (20 x 1 =20 Marks)
Answer all the questions

1. ____ embedded systems have enormous hardware and software complexities.

   a) small   b)large   c)medium   **d)sophisticated**

2. ____ embedded systems are usually designed with a single 8 or 16 bit micro controller.

   a) small   b)large   c)medium   d)sophisticated

3. ____ embedded systems are usually designed with a single 16 or 32 bit micro controller.

   a) small   b)large   **c)medium**   d)sophisticated

4. Embedded systems locate a software image in ___

   a)ROM   b)RAM   c)EROM   d)EPROM

5. _____is the corresponding hardware signal timeout from the hardware timer.

   a) interrupt flag   **b)status flag**   c)both a and b   D)none of the above

6. In I2C there are _____ bus standards.

   a)4   b)6   **c)3**   d)7

7. In USB bus there are _____ devices connected to a HOST.

   a)127 b)125 c)129 d)115

8. CAN bus is used in_____

   a)automotive electronics   b)medical electronics

   c)industrial plant controllers   **d)all the above**

9. In ___ each element has a pointer to its next element.

   a)tree   **b)list**   c)queue   d)stack

10. Modifiers permit only ___ values.

    a)positive   b)negative   c)both a and b   d)integer

11. The programming model concept is one which uses the function is____

    a)tree   b)list   **c)queue**   d)stack

12. ____ is a basic structural unit in a java programme.

    a)class   b)local variable   c)interface   d)inheritance

13. A ____ scheduling is very efficient for handling periodic tasks

    a)non cyclic   b)pre cyclic   **c)cyclic**   d)post cyclic

14. scheduling consist of____

    a)periodic   b)aperiodic   c)sporadic   **d)all the above**

15. ___ when the processor the external memories and the chips are waiting state,

    a)10 mA   b)5 mA   c)50 mA   d)75mA

16. In a___ circuit power dissipates only at the instance of change in input.

    a)n-mos   b)p-mos   **c)cmos**   d)both a and b

17. _____arguments define the no of nano seconds for delay.

    a)data   b)constant   **c)integer**   d)both a and b

18. functions nano sleep will delay the task by____

    a)1ms   b)3ms   c)6ms   d)6ms

19. task id is a_____positive number.

    a)16 bit   b)64 bit   **c)32 bit**   d)8 bit

20. _____library function are in the header files in task management.

    a)Vx works   b)kernel   **c)both a and b**   d)none

PART - B (5 x 2 = 10 Marks)
Answer ALL the questions.

21. Explain the ARM 7.
22. Explain the preemptive kernel.
23. Define deadlock.
24. Difference between directories and files.
25. Difference b/w suspending task and resuming task.

PART – C (5 x 14 = 70 Marks)
Answer ALL the questions.

26.a) Explain the overview of embedded system architecture (CISC and RISC).   (14)

                    Or
   b) Explain embedded design life cycle.   (14)

27.a)(i) Explain the pre-emptive kernels and non-pre emptive kernels in detail.   (7)
      (ii) Explain in detail about round robin schedule.   (7)

                    Or
   b) i)task priorities (4)   ii)mutual exclusion (5)   iii)dead lock (5)

28.a)Explain the event control blocks.   (14)

                    Or
   b)Explain the kernel structure.   (14)

29.a) Explain the message queues.   (14)

                    Or
   b) Explain the semaphore management.   (14)

30 a) Explain in detail about the Memory Control Blocks.   (14)

                    Or
   b) Explain the implementation of scheduling and rescheduling.   (14)

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