



B.E DEGREE EXAMINATIONS: APRIL 2018

(Regulation 2014)

Eighth Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U14ECTE35 : Real-Time Embedded Systems

COURSE OUTCOMES

CO1: Describe hardware and software architecture of Embedded systems

CO2: Classify the I/O interface and protocols for an embedded system

CO3: Interpret the concepts of real time operating system

CO4: Illustrate the various tools used for building RTOS

CO5: Develop an embedded system application using microcontrollers

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Match the List I with List II

CO1 [K₂]

List I	List II
A. Storing copies of instruction and datas	i. Assembler
B. Assembly mnemonics translated to binary opcode	ii. Realtime clock
C. RTOS	iii. Cache
D. Drives timers for various timing needs	iv. Processing multiple task

- | | A | B | C | D |
|----|-----|----|-----|----|
| a) | iv | ii | iii | i |
| b) | iii | i | iv | ii |
| c) | iii | i | ii | iv |
| d) | ii | i | iii | iv |

2. What is CISC?

CO1 [K₁]

- | | |
|--|--|
| a) Computing instruction set complex | b) Complex instruction set computing |
| c) Complementary instruction set computing | d) Complex instruction set complementary computing |

3. Assertion (A): PCI is the most used parallel system bus for integrating PC based device than ISA bus. CO2 [K₂]
Reason (R): (PCI) It is platform independent
- a) Both A and R are Individually true and R is the reason for A b) A is true and R is false
c) A is false and R is true d) Both are true and R is not the reason for A
4. Which of the following can transfer multiple bits of data simultaneously? CO2 [K₁]
a) serial port b) sequential port
c) concurrent unit d) parallel port
5. Which file is converted to an object file? CO3 [K₁]
a) hex file b) assembly file
c) coded file d) decoded file
6. Sequencing the steps given for converting ALP into machine implementable file and obtaining ROM image file CO3 [K₂]
1. Linker links the code for binary file
 2. Locating the codes as ROM image
 3. Assembler translates the ALP into machine code
 4. Loader program perform reallocation of codes
- a) 3-1-4-2 b) 1-3-2-4
c) 4-3-1-2 d) 2-4-3-1
7. MUCOS II RTOS is preferable for Embedded System development CO4 [K₄]
1. It is portable
 2. It does not have full source code availability
 3. It is used in automotive, consumer electronics and other applications
 4. It is not elegantly documented
- a) 1,2 b) 2,3
c) 1,3 d) 1,4
8. A binary semaphore is a semaphore with integer values : CO4 [K₁]
a) 0.5 b) 0.8
c) 1 d) -1
9. The operator used to get value at address stored in a pointer variable is CO5 [K₁]
a) & b) *
c) || d) &&

10. For the following expression to work, which option should be selected? CO5 [K₁]
string p = "HELLO";
- a) typedef char [] string; b) typedef char *string;
c) Syntax error d) Expression cannot be generated in C

PART B (10 x 2 = 20 Marks)

(Answer not more than 40 words)

11. Define Embedded System. What are the components of embedded system? CO1 [K₁]
12. Explain any two uses of VLSI designed circuits. CO1 [K₂]
13. What are the classifications of I/O devices? CO2 [K₁]
14. What is a CAN bus? Where is it used? CO2 [K₁]
15. Mention the elements of C program. CO3 [K₁]
16. What are the three conditions that must be satisfied by the re-entrant function? CO3 [K₁]
17. Differentiate counting semaphore and binary semaphore. CO4 [K₂]
18. What is Priority inversion? How it can be solved? CO4 [K₁]
19. List the functions of cross compiler. CO5 [K₁]
20. Recall the responsibilities of host and target machines. CO5 [K₂]

Answer any FIVE Questions:-

PART C (5 x 14 = 70 Marks)

(Answer not more than 300 words)

Q.No. 21 is Compulsory

21. (a) Explain the hardware units that must be present in the embedded systems. (10) CO1 [K₂]
(b) Discuss the Exemplary applications of each type of embedded system. (4) CO1 [K₂]
22. (a) Explain the different processors in an Embedded System. (6) CO1 [K₂]
(b) Describe the Challenges faced by Embedded systems? (8) CO1 [K₂]
23. (a) Explain μ C/OS-II and its features. (4) CO4 [K₂]
(b) Illustrate the three methods by which an RTOS responds to a hardware source call on interrupt? (10) CO4 [K₂]
24. Explain in detail the various kernel objects used in Real Time Operating Systems. CO4 [K₂]

25. (a) Summarize the following parallel bus protocols. (10) CO2 [K₂]
i. ISA
ii. PCI
(b) Show the format of bits in synchronous HDLC protocol based networked devices. (4) CO2 [K₂]
26. (a) Discuss the way in which memory codes can be optimized. (8) CO3 [K₂]
(b) Consider a function that takes parameters. Explain with an example how the parameter is passed. (6) CO3 [K₂]
27. Explain the architecture and functions of an embedded smart card with relevant block diagram. CO5 [K₂]
