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**Question Paper Code : 60541**

**B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2026.**

**Seventh/Eighth Semester**

**Electronics and Communication Engineering**

**EC8791 – EMBEDDED AND REAL TIME SYSTEMS**

**(Common to Biomedical Engineering/Medical Electronics)**

**(Regulations 2017)**

**Time : Three hours**

**Maximum : 100 marks**

**Answer ALL questions.**

**PART A — (10 × 2 = 20 marks)**

1. Enumerate the challenges in design of embedded computing system.
2. Mention the factors to be considered while designing an embedded system process.
3. Write the differences between MULS and MULSEQ.
4. What are single and double edged PWM?
5. What are the significances of compiler and cross compiler?
6. What action is done during the step 'linking' after compilation of a program?
7. What are the features of offline and online scheduling?
8. What do you mean by the term "Clock Drift"?
9. What are the major functions of POSIX RTOS?
10. What is the concept of multitasking?

**PART B — (5 × 13 = 65 marks)**

11. (a) Describe the major operations and data flows of a GPS moving map and draw its architecture.

**Or**

- (b) Explain in detail the need of Quality Assurance techniques in Embedded System design with an example.

12. (a) What are the types of stacks and subroutines supported by ARM processor with the instruction sets and explain.

Or

- (b) Draw the architecture of ARM Cortex M3 MCU processor and describe its functional units.

13. (a) Explain the various methods for program optimization with suitable examples.

Or

- (b) Interpret the need of dead code elimination to optimize the program with a code snippet. Explain the steps.

14. (a) Give an account on mathematical understanding of the priority ceiling algorithm using a series of results.

Or

- (b) Describe the completely connected zero propagation time system in hardware fault tolerant synchronization.

15. (a) Describe the performance of the Earliest – Deadline – First scheduling. Compare it with other scheduling algorithms with suitable example.

Or

- (b) Explain the concepts of Multiprocessor System-on-Chip (MPSoC) and shared memory multiprocessor that are used in embedded applications.

PART C — (1 × 15 = 15 marks)

16. (a) Using the relevant mathematical concepts explain identical linear reward functions in uniprocessor scheduling with examples.

Or

- (b) Generate the statement translation into ARM instruction for the expression  $a*b + 5*(c-d)$  with necessary illustrations. Explain the steps.