Hall Ticket Number:

Code No. : 41113

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (C.S.E.) IV Year I-Semester Main Examinations, December-2017

Principles and Applications of Embedded Systems

Time: **3** hours Max. Marks: **70**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

1. List two ARM Instructions that utilizes barrel shifter.
2. Illustrate the process of embedded system design.
3. How will you interface a LED with Arduino Uno in Sinking and Sourcing modes? Justify.
4. How Co-processors provide flexibility in system design? Justify.
5. Demonstrate the use of semaphore with an example.
6. List various key features of uC/OS – II.
7. Classify types of multiprocessor systems.
8. Determine the utilization of CPU for the tasks P1, P2, P3 that have 15, 12, 10 as periods and 2, 3, 2 as execution times respectively.
9. List the features of a simulator for embedded system design.
10. Draw the block diagram of Host and Target system in embedded system development and explain in brief.

Part-B (5 × 10 = 50 Marks)

11. a) Design and realize automatic ticket vending machine. [6]

    b) Explain load and store architecture with ARM instructions. [4]

12. a) How will you interface stepper motor with Arduino? Draw and explain with appropriate circuit diagram. [5]

    b) Justify how the performance of the system is enhanced using Pipelining in ARM processor. [5]

13. a) What is priority inversion? Why it is important? Explain. [4]

    b) Explain the following uC/OS – II functions: [6]

    i) OSSemCreate (semVal)

    ii) OSSemPend(*eventPointer eventPointer, *timeOut timeOut, *SemErrPointer SemErrPointer)

14. a) Why automobile systems require Multi-rate control? Justify with proper analysis. [5]

    b) Determine the utilization of CPU and schedule the tasks using RMS. [5]

15. a) Explain embedded system development processes using ICE. [5]

    b) Explain how linker and locator is used in embedded software development. [5]

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16. a) List the steps for formalisms in system design. [4]

    b) How light intensity is controlled using PWM with Arduino, explain with suitable circuit diagram. [6]

Tasks	Execution time	Period/Deadline
P1	2	30
P2	4	40
P3	7	120
P4	5	60
P5	1	15

17. Answer any ***two*** of the following:

    a) Explain the working of mailboxes. [5]

    b) Describe how memory is shared in multiprocessor system. [5]

    c) Explain how embedded software is loaded in to target System. [5]