# Government College of Engineering, Aurangabad

(An Autonomous Institute of Government of Maharashtra)

## B.E. (ETC) Examination

End Semester Examination 2016-17

**ET442: EMBEDDED SYSTEMS**

*Time: Three Hours* 18 NOV 2016 *Max. Marks: 60*

"Verify the course code and check whether you have got the correct question paper"

*N.B.: -*

- ***All Questions are compulsory***
- ***Figures to the right indicates full marks***
- ***Assume suitable data if necessary and state it clearly***
- ***Use of non-programmable calculator is allowed***

**I** **Attempt any THREE** **15**

a) Point out differences between embedded and general purpose computing system. Write about any two challenges in designing embedded system?

b) Explain the frame format of CAN bus. State advantages of CAN bus over I2C?

c) Draw action plan for designing an embedded system. Explain the importance of clarity in specifications while developing an embedded system.

d) Give the significant features of PCI/X compared to PCI bus.

**II** **Attempt the following**

a) Draw schematic to interface 7 segment common cathode display to GPIO P0.0 to P0.7 port pins of LPC 2148 and write a program in embedded 'C' to display character 'H'. Draw flowchart **08**

**OR**

a) Draw schematic to interface LEDs to GPIO P0.16 to P0.23 pins and buzzer to P0.24. Write a program in embedded 'C' to turn 'ON' LEDs, then buzzer 'ON' (5secs), LEDs 'OFF' and buzzer OFF (2.5secs). This process is to be repeated continuously. Draw flowchart. **08**

b) Write about the steps in programming a graphics LCD display to generate four horizontal lines. **02**

**III** **Attempt the following**

**A)** **Attempt any TWO** **10**

i) Which are the features of ARM common to many other RISC architectures.

ii) Illustrate register map of ARM7 for all operating modes. Summarize how exceptions are handled in ARM.

iii) Explain how instruction scheduling helps in efficient code execution for ARM processor.

**B)** Draw block schematic and explain password based security system to operate a locker. Draw flowchart to indicate how password can be changed using cell phones. **10**

**OR**

Draw block diagram to interface stepper motor to ARM microcontroller. Write an embedded 'C' program to rotate motor in clockwise directions. Explain the role played by sequence in rotating motor either in clockwise and anticlockwise direction.

**IV Attempt any ONE** **05**

a) Analyze how three stage and five stage pipeline helps in improved performance with proper reasoning.

b) Data transfer from memory of an embedded system to an output device is to be performed. State different techniques which can be used. Identify the technique which will give high speed data transfer with proper reasoning.

**V Attempt any TWO** **10**

a) Write about any two types of pre-emptive scheduling algorithms giving their merits and demerits.

b) Write about security issues in RTOS.

c) Discuss the role of RTOS in interrupt handling and task scheduling