B.TECH/ ECE/IT/7TH SEM/AEIE 4182/2018
INTRODUCTION TO EMBEDDED SYSTEMS
(AEIE 4182)

Time Allotted : 3 hrs **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) ARM processors where basically designed for _____
(a) Main frame systems (b) Distributed systems
(c) Mobile systems (d) Super computers.

(ii) Which of the following provides a buffer between the user and the low-level interfaces to the hardware?
(a) operating system (b) kernel (c) software (d) hardware.

(iii) Size of internal EEPROM data memory of ATmega 16 is
(a) 2 KB (b) 1KB (c) 32 KB (d) 64 KB.

(iv) No of general purpose registers present in AVR is
(a) 6 (b) 12 (c) 24 (d)32.

(v) The internal ADC of ATmega 16 is
(a) 8 bit (b)10 bit (c)12 bit (d)16 bit.

(vi) Each instruction in ARM machines is encoded into ___ Word.
(a) 2 byte (b)3 byte (c)4 byte (d)8 byte.

(vii) ATmega 32 has __IO pins
(a)8 (b) 20 (c)16 (d) 32.

(viii) Total numbers of GPRS in AVR –
(a) 8 (b) 20 (c) 16 (d) 32.

(ix) Which forms the heart of the operating system?
(a) kernel (b) applications
(c) hardware (d) operating system.

(x) Which of the following locates a parameter block by using an address pointer?
(a) OS (b) kernel (c) system (d) memory.

Group – B

2. (a) What Is Arduino? What Do You Mean By Open-source Hardware?

(b) Differentiate between Harvard and Princeton (Von Neumann) architecture in detail.

(3 + 3) + 6 = 12

3. (a) Differentiate between CISC and RISC architecture in detail. Why are RISC processors important for embedded system?

(b) Write short note
(i) ARM processor
(ii) Real Time Clock

(3 + 3) + (3 × 2) =12

Group – C

4. (a) Write the features of AVR microcontroller. What is the purpose of ALU? What is the difference between Program(Code) and Data Memory.

(b) Draw and describe the 8bit Status register.

3+ 2 + 3 + 4= 12

5. (a) Discuss about the External hardware interrupts of AVR microcontroller.

(b) Describe the functions and bit operations of two timer registers TCNT0 and TCCR0. With assembly codes give an example how to load data 25H in TCNT0 register.

4+ (3+ 3 + 2) =12

Group – D

6. What is an operating system? What is kernel in OS and its types? List the functions of a kernel. What can be the functions outside the kernel?

3 + 3 + 3 + 3 =12

7. (a) Explain Encapsulating Semaphores with suitable example.

(b) Discuss the Task control Block? Mention some of the component of TCB?

6 + 6 = 12

Group – E

8. Interface one DIP switch (SW_0) to Port A and one stepper motor to Port D of ATmega 328. Write a program to rotate the stepper motor clockwise or anti-clockwise with the change in switch status. **12**

9. Design an interface between ATmega 328 and LCD. Write a program to display 'HELLO' word on the LCD. **12**