

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2021

Course Name : Microcontroller and Embedded systems

Semester: V

Program Name : B. Tech ECE

Time : 03 hrs

Course Code : ECEG 3006

Max. Marks : 100

No of page : 02

Instructions:

- 1) Attempt and answer all Questions in serial manner
- 2) Answer must be in brief and diagrams must be clear.

SECTION A

Each Question will carry 4 Marks

Instruction: Complete the statement / Select the correct answer(s)

S. No.	Question	CO
Q 1	How do you classify embedded systems based on complexity and performance?	CO2
Q 2	What are the major level of abstraction in the design process of embedded system?	CO2
Q 3	What is the difference between the N and S flags in AVR microcontroller?	CO1
Q 4	What are the different processor modes of ARM7 processor?	CO3
Q 5	What is the difference between process and thread in the real time systems?	CO4

SECTION B

Each question will carry 10 marks

Instruction: Write short / brief notes

Q 1	Write an AVR C program to toggle all pins of port B continuously by a) using the inverting operator b) using the EX-OR operator. A switch is connected to pin PB0 and an LED to pin PB7. Write a program to get the status of switch and send it to LED.	CO1
Q 2	What are assembler directives and how are they used? Write a program for the AVR chip to toggle all the bits of PORTB, PORTC and PORTD every $\frac{1}{4}$ of a second . assume crystal frequency of 1 MHz	CO3
Q 3	What are the features of ARM7 processor? Explain the architecture of ARM7 processor with the help of a block diagram.	CO4

Q 4	What are the differences between process and thread? What is a device driver? What are the advantages and disadvantages of preemptive and nonpreemptive scheduling in real time system?	CO4
<p>SECTION C</p> <p>Each Question carries 20 Marks.</p> <p>Instruction: Write long answer.</p>		
Q 1	<p>a) Write a program using ATmega32 to receive bytes of data serially and put them on port B . Set the baud rate at 9600,8bit data and 1 stop bit . use both interrupt and polling method.</p> <p>b) Design an LCD interfacing circuit with Atmega to send command and data . how will you initialize the LCD. Take any LCD IC of your choice</p>	CO1/C04
Q 2	<p>a) Design an interfacing circuit to get data from channel 0 of ADC in Atmega and display the results in port C and port D</p> <p>b) Design an interfacing circuit to interface an unipolar stepper motor with Atmega .The design should include the coding for rotating the stepper motor continuously with 2 degree step angle to make 80 degree move .Use four step sequence.</p>	CO1/C02
