Name: Enrolment No:	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, Nov-Dec 2021

Programme Name: B.Tech. Automotive Design Engineering **Semester : V**
Course Name : Microprocessor-based Control System **Time : 03 hrs.**
Course Code : MECH3002 **Max. Marks : 100**
Nos. of page(s) : 01
Instructions: 1. Assume any missing data
2. Section B has an internal choice in Q.9. Section C has an internal choice in Q.11.

SECTION A

S. No.		Marks	CO
Q 1	Compute the results. a) F5H + 0BH b) 3FH – 23H c) 25H x 65H d) 2762H – 1296H (Solve using 2's complement)	4	CO1
Q 2	Show how the AVR would represent -7.	4	CO1
Q 3	Differentiate between the static and dynamic characteristics of measurement instruments. Describe one static and one dynamic characteristics.	4	CO5
Q 4	Discuss the concept of interrupts.	4	CO4
Q 5	Discuss the overflow problem in 'signed' number operations. How this problem is addressed in AVR ?	4	CO2
	SECTION B		
Q 6	Explain the conversion of BCD to ASCII using the digits 0 to 9.	10	CO2
Q 7	Discuss how the choice of programming language and compilers affect the compiled program size.	10	CO2
Q 8	Derive the transfer function of a first order system and hence find out its dynamic response to a periodic harmonic input.	10	CO5
Q 9	Describe the various data types widely used by C compilers. **OR** Explain the bitwise operations in C with examples.	10	CO2
	SECTION-C		
Q 10	Describe the basics of serial communication and hence explain serial communication protocol.	20	CO4
Q 11	Describe the SPI protocol and the I2C protocol. **OR** Describe the process of speed control of a D.C. motor using pulse width modulation.	20	CO3