Name:

Enrolment No:

UPES

End Semester Examination, December 2023

Course: Automotive Electrical and Electronics **Semester:**

Program: B Tech (Automotive Design Engineering) **Time : 03 hrs.**

Course Code: MECH2051 **Max. Marks: 100**

Instructions: Assume suitable data as per the subject.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	What are the different types of batteries used in electric vehicles? Can EV batteries be replaced?	**4**	**CO1**
Q 2	Describe the differences between a star-wound and a delta-wound stator.	**4**	**CO2**
Q 3	State two advantages and two disadvantages of a permanent magnet starter for automotive cars.	**4**	**CO2**
Q 4	Describe the purpose of an ignition system.	**4**	**CO1**
Q 5	What is a thermistor and how does an automotive thermistor work?	**4**	**CO5**

SECTION B
(4Qx10M= 40 Marks)

Q 6	The three-phase alternating voltage generated by an engine is described by $V=415\times\sin(314t-\alpha)$. Calculate a) frequency of voltage generation b) line voltage c) phase voltage d) phase current for a load of 300W and at $\alpha=0$ e) phase current for a load of 300W and 400VAR at $\alpha=0$	**10**	**CO3**
Q 7	What is radio interference? How it is produced and what are the different methods to reduce it in an automotive system.	**10**	**CO2**

Q 8	What are the different types of motors used in automotive vehicles? Explain the working principle of a DC motor with the help of suitable figures.	**10**	**CO5**
Q 9	State what is meant by active and passive safety.	**10**	**CO5**
	SECTION-C **(2Qx20M=40 Marks)**		
Q 10	The different electric load in an automobile is rated as 500W, 1000W, and 1500W in parallel with 240V supply. Find the current drawn & resistance of each load. Also develop and explain the working of a headlamp. Or Design a 4-bit counter by using D Flip-Flops and discuss the applications of these counters.	**20**	**CO4**
Q 11	Draw the block diagram of a microcontroller system. Explain the functions of each sub-block in detail and draw the flowchart for the computer program of intelligent parking system.	**20**	**CO3**