

Name: Enrolment No:			
UNIVERSITY OF PETROLEUM AND ENERGY STUDIES End Semester Examination, May 2023			
Course: Automotive Electrical and Electronics Program: B Tech (Automotive Design Engineering) Course Code: ECEG 2039		Semester: 4 th Time : 03 hrs. Max. Marks: 100	
Instructions: Assume suitable data as per the subject.			
SECTION A (5Qx4M=20Marks)			
S. No.		Marks	CO
Q 1	What kind of batteries do electric vehicles use? Can EV batteries be replaced?	4	CO2
Q 2	Draw the block diagram of a microcontroller system. Explain the functions of each sub-block in brief.	4	CO3
Q 3	State four advantages of a pre-engaged starter when compared with an inertia type.	4	CO3
Q 4	The ignition component that steps up voltage is the: 1. capacitor 2. condenser 3. coil 4. king lead Cruising conditions require the ignition timing to be: 1. retarded 2. reversed 3. allocated 4. advanced	4	CO4
Q 5	State four methods of converting electrical energy into light energy.	4	CO1
SECTION B (4Qx10M= 40 Marks)			
Q 6	Describe the operation of a synchronous motor with the help of suitable figure.	10	CO3
Q 7	What is radio interference? How it is produced and what are different methods to reduce it.	10	CO1
Q 8	Draw a simplified circuit of a lighting system showing the side- and headlight bulbs, light switch, dip switch and main beam warning light.	10	CO2
Q 9	State what is meant by active and passive safety.	10	CO5
SECTION-C (2Qx20M=40 Marks)			

Q 10	<p>Develop a full wave rectifier connected to an EV (RLE) load and draw the various waveforms.</p> <p style="text-align: center;">Or</p> <p>Design a 4-bit counter by using D Flip-Flops and discuss the applications of these counters.</p>	20	CO4
Q 11	<p>The three-phase alternating voltage is given by $V=415 \times \sin (314t-\alpha)$. Calculate</p> <ol style="list-style-type: none"> a) frequency b) line voltage c) phase voltage d) phase current for a load of 300W and at $\alpha=0^\circ$ <p>And draw the balance supply system for three phases mentioning the values of α for each phase.</p>	20	CO5