

Name:

Enrolment No:



**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**End Semester Examination, December 2019**

**Course: Two and Three Wheeler Technology**

**Semester: VII**

**Program: B. Tech ADE**

**Time 03 hrs.**

**Course Code: ADEG-413**

**Max. Marks: 100**

**Instructions: Answer all the necessary questions precisely (Please do not write the answers in paragraphs)**

**SECTION A**

S. No.		Marks	CO
Q 1	Enlist the factors affecting the stability of any vehicle.	5	CO5
Q.2	Define the following terminologies of two wheeler A. Rack angle B. Trail	5	CO4
Q.3	Steering stability of vehicle can affect due to lift magnitude. Do you agree, Yes or NO, Justify.	5	CO5
Q.4	Explain the importance of structural efficiency while designing the frame.	5	CO1

**SECTION B**

Q.5	Compare and discuss the street commuter with sports bike on the basis of following parameters: A. Center of gravity B. Type of frame C. Braking system D. Handle bar	10	CO2
Q.6	Discuss the importance of below mentioned entities while designing the two wheeler suspension system: A. Cornering requirements B. Ride height and Pre-load	10	CO3
Q.7	Draw the layout of three-wheeled passenger vehicle by considering following components in it. Engine, clutch, gear box, crank shaft, final drive, rear wheels, drive	10	CO2

	axle, primary drive, UV joints, differential box, transmission box, propeller shaft, hub.		
<b>Q.8</b>	As an engineer, you need to select the appropriate components for the electric two-wheeler to be used in hilly region. Justify your selection A. Direct Drive or Indirect drive B. Electric Motor	<b>10</b>	<b>CO4</b>
	<b>OR</b>		
	As an engineer, you need to select the appropriate components for the electric two-wheeler. Justify your selection and its importance for below mentioned entities A. Battery balancer or Battery management system B. Motor controller		
<b>Q.9</b>	Discuss the importance of below mentioned entities while designing the two-wheeler suspension system. A. Suspension frequency B. Sprung and unsprung mass ratio C. Cornering requirements D. Spring rate and total wheel travel E. Wheelbase	<b>20</b>	<b>CO3</b>
<b>Q.10</b>	As a design engineer, you have been asked to discuss the important parameter need to be consider while designing hydraulic braking system for two-wheeler sports bike based on the following entities. <b>(Explain Precisely and No need to draw any diagrams)</b> A. Calipers B. Braking Disc C. Unsprung weight D. Forces which produce braking deceleration	<b>20</b>	<b>CO5</b>
	<b>OR</b>		

BMW Motorrad bike is as shown in figure, more popular for their semi-active suspension system. Based on this popularity, express your views on the following points:

- A. Semi-active suspension over conventional suspension system.
- B. ABS role in achieving the better suspension performance.
- C. ECU, Lean-Angle and travel sensor importance in dynamic damping control unit

