Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2019

Programme Name: B.Tech. _ADE **Semester : IV**
Course Name : IC Engines **Time : 03 hrs**
Course Code : ADEG227 **Max. Marks : 100**
Instructions : Answer all the questions. Internal choices have been mentioned. Assume proper values for missing parameters if any.

SECTION A

S. No.		Marks	CO
Q 1	Discuss the conversion mechanism of linear motion to rotary motion in IC Engines. Also mention each component associated with this mechanism.	4	CO1
Q 2	Draw valve timing diagram of a CI engine for the given data. Intake valve opening and closing, degree CA: 43 before TDC & 67 after BDC Exhaust valve opening and closing, degree CA: 87 before BDC & 39 after TDC	4	CO2
Q 3	Distinguish premixed and diffusion combustion in IC engines with examples.	4	CO3
Q 4	Interpret the Mass fraction burnt (MFB); rate of pressure rise (RPR); motoring curve; in-cylinder pressure variation w.r.t crank angle if combustion happens	4	CO4
Q 5	Interpret the significance of flame speed for combustion in SI engines.	4	CO5

SECTION B

Q 6	(a) Describe the significance of volumetric efficiency in IC engines. [5 M] (b) Interpret the effects of turbocharger on engine performance. [5 M]	10	CO2
Q 7	(a) Interpret significant differences between knocking in SI and CI engines. [5 M] (b) Explain briefly effect of any three parameters on knocking in a SI engine. [5 M]	10	CO3
Q 8	Explain carburetion in SI engines. Illustrate the mixture requirements for Idling, cruising and high-power range with neat diagram and proper reasoning. (Or) Assess the different kinds of fuel injection methodologies in IC engines with neat diagram. Also illustrate the significant advantages and disadvantages of each method. Distinguish the fueling strategies in SI and CI engines.	10	CO4
Q 9	(a) Illustrate the principles of lubrication in IC engines. [5 M] (b) Describe the two different kinds of cooling systems used for IC engines. [5 M]	10	CO5

SECTION-C

Q 10	Derive the heat release rate (HRR) from the fundamental principles of	20	CO4

	thermodynamics. Draw neat diagram of HRR in a CI engine and explain the different combustion phases in detailed.		
Q 11	(a) Assess the lubrication and cooling systems in IC engines in terms of use, technologies and benefits etc.. [10 M] (b) Assess the lubricant characteristics for efficient operation of IC Engines. [10 M] **(or)** Distinguish the major pollutants from SI and CI engines. Also explain any 3 emission reduction technologies in detailed.	**20**	**CO5**