Q. Code: 538379

Reg. No. | | | | | | | | | | | | | |

B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2023

Eighth Semester

ME18004 – ADVANCED I.C ENGINES

(Mechanical Engineering)

(Regulation 2018/2018A)

TIME: 3 HOURS **MAX. MARKS: 100**

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	The students can understand the various operations and combustion chambers of spark ignition engines	**2**
CO 2	The students will be capable to analyze the various operations of compression ignition engines, stratified charge engine, and low heat rejection engine	**4**
CO 3	The students will be familiar with various alternate fuels for IC engines and also interpret mechanism of various pollutant formation and their control	**4**
CO 4	The students can analyze the effects of various sensors in I.C engine systems	**3**
CO 5	The student can interpret the concepts of Electronic Engine Management systems and recent trends in I.C Engines	**3**

PART- A (10 x 2 = 20 Marks)

(Answer all Questions)

		CO	RBT LEVEL
1.	Write the desirable qualities of fuel for SI engine.	**1**	**2**
2.	Differentiate the air fuel ratio for SI and CI engines.	**1**	**2**
3.	What is ignition delay period ?	**2**	**2**
4.	Why CRDI is preferred over mechanical fuel injection system ?	**2**	**3**
5.	What are the techniques of using alcohol as fuel in diesel engine?	**3**	**2**
6.	Write any two merits and de-merits of using Hydrogen as fuel in IC engines.	**3**	**2**
7.	What is the function of the lambda sensors ?	**4**	**2**
8.	List out the various sensors used in engine management system.	**4**	**2**
9.	Write the strategies used to control the HCCI engine combustion.	**5**	**2**
10.	State the need of hybrid electric vehicles.	**5**	**2**

PART- B (5 x 14 = 70 Marks)

		Marks	CO	RBT LEVEL
11. (a)	State the process of combustion in SI engines and also explain the various stages of combustion.	**(14)**	**1**	**2**

	(OR)			
(b)	Briefly explain the factors affecting knocking in SI engine.	**(14)**	**1**	**2**
12. (a)	Bring out clearly the process of combustion in CI engines and also explain the various stages of combustion. What are the factors that affect the delay period?	**(14)**	**2**	**2**
	(OR)			
(b)	What are the main factors affecting the penetration of the fuel spray in CI engines?	**(14)**	**2**	**2**
13. (a)	Explain alcohols as alternate fuels for IC engines bringing out their merits and demerits.	**(14)**	**3**	**2**
	(OR)			
(b)	Explain the NO_x and particulate matter formation mechanism and explain the NO_x-PM trade-off in diesel engine.	**(14)**	**3**	**2**
14. (a)	Explain the principle and analyze the working of a sensor based on Hall Effect and its application.	**(14)**	**4**	**2**
	(OR)			
(b)	Describe the principle and working of cam and crankshaft position sensors with its typical waveforms.	**(14)**	**4**	**2**
15. (a)	Explain the methods of achieving HCCI combustion mode in CI engines and list the challenges.	**(14)**	**5**	**3**
	(OR)			
(b)	Explain electrical operated thermostat operation in engine cooling system with neat sketch.	**(14)**	**5**	**3**

PART- C (1 x 10 = 10 Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL
16.	Discuss the effects of turbo charging on CI engines.	**(10)**	**2**	**3**

****