U.S.N | | | | | | | | | | |

P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Sixth Semester, B.E. - Mechanical Engineering

Semester End Examination; May / June - 2018

IC Engines

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I

1a. Show that the efficiency of the Otto cycle depends only on the compression ratio. 10

b. In a diesel engine combustion is assumed to begin at inner dead centre and to be at constant pressure the air fuel ratio is 28:1, the calorific value of fuel is 42 MJ/kg, the specific heat of product combustion is given by C_v = 0.678 + 0.00013T MJ/kg. R for the products = 287 J/kg.k, if the compression ratio is 14:1 and the temperature at the end of compression is 800 K. Find at what percentage of stroke combustion is complete. 10

2 a. Explain the term "dissociation", draw the relevant graph of effect of dissociation on temperature for difference air-fuel ratio. 10

b. How the constituents of crude petroleum are classified? Explain each series of constituents giving their chemical structure. Also mention whether they are saturated or not. 10

UNIT - II

3 a. Explain the sketch of a simple carburetor and name the parts. 10

b. Explain the effect of the following engine variable on ignition lag :

i) Fuel ii) Mixture ratio iii) Initial temperature and pressure 10

iv) Electrode gap v) Turbulence

4 a. Describe the phenomenon of detonation or knocking in SI engines. On what factors does detonation depend? 10

b. With a neat pressure verses crank angle diagram, explain the stages of combustion in SI engines. 10

UNIT - III

5 a. With a neat P-θ diagram, explain the stages of combustion in CI engine. 10

b. Explain the delay period in CI engine combustion. Also explain the effect of the following engine variable on delay period : 10

i) Fuel ii) Injection Pressure iii) Compression ratio

6 a. Draw the sketch of DI and IDI type of combustion chambers in CI engine showing injector sprays in each case. Discuss the important advantages and disadvantages in each case. 12

b. Distinguish between induction swirl and compression swirl with respect to different CI combustion chambers. 8

Contd…2

UNIT - IV

7 a.	Describe different types of injection nozzles and discusses their relative advantages and disadvantages.	10
b.	How injection system affects the cold starting performance of a diesel engine?	4
c.	Discuss the requirements of ideal injection.	6
8 a.	Sketch and explain the thermo siphon cooling.	8
b.	Compare the merits and demerits of air and water cooling system.	6
c.	What is the purpose of fan in radiator system? Is it required at all time? Why?	6

UNIT - V

9 a.	Briefly explain the methods of turbocharging with suitable sketches.	10
b.	What is supercharging? Explain the objectives of supercharging.	10
10 a.	What are the methods of controlling NO_x? Explain in brief.	8
b.	What are the sources of pollutants in petrol engine?	4
c.	Discuss the effect of EGR on NO_x, CO and HC emission.	8

* * * *