VII SEMESTER B.TECH. (AUTOMOBILE ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2018

SUBJECT: AUTOMOTIVE POLLUTION CONTROL AND ALTERNATIVE FUELS [AAE 4152]

REVISED CREDIT SYSTEM
(24/11/2018)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.

1A. What are the effects of the following operating variables on HC and CO emissions from I C engines? Justify your answer. **(04)**
(i) Compression ratio (ii) Stroke to bore ratio (iii) Number of cylinders (iv) Piston displacement

1B. What is fumigation? Which pollutant is affected by fumigation? How such a technique is effective in controlling the emission from diesel engines? **(03)**

1C. What are air injection systems? Which of the emissions are controlled by such systems? Why switching of such systems is necessary during cold and hot engine running modes? **(03)**

2A. What are the effects of the following variables on NO emission from engines? **(04)**
(i) Humidity (ii) Equivalence ratio (iii) Ignition timing (iv) Manifold pressure

2B. What are the effects of the following on odor intensity from diesel engine? **(02)**
(i) Engine operation mode (ii) Fuel air ratios

2C. How the exhaust gas analysis is carried out using Orsat analyzer? Explain with a neat sketch. **(04)**

3A. Discuss how water injection and Ammonia injection control emissions from engines. Which pollutant is controlled by such techniques? **(03)**

3B. Define the following terms w r t Gas chromatography (i) Retention time (ii) Capacity factor (iii) Phase ratio (iv) Selectivity **(04)**

3C. Draw a Temperature- evaporation plot for Spark Ignition engine fuels and discuss ideal properties required in such fuels. **(03)**

4A. What are dilution tunnels? Discuss with a neat diagram, how pollutant analysis is carried out in such systems. **(04)**

4B. Explain the constructional details and working principle of PCI Volkswagen stratified charge engine. **(03)**

4C. Compare liquid form and gaseous form on board automobile storage systems of Hydrogen fuel. **(03)**

5A. Propane is burned with 135% theoretical air in an automotive engine. Write the combustion equations and Determine (i) Air Fuel Ratio (ii) Fuel Air Ratio (iii) Equivalence ratio. **(03)**

5B. Discuss the engine system modifications required to use bio gas in diesel engines. **(04)**

5C. What are the advantages of using CNG as fuel in Automotive engines? Show pictorially a fuel supply system using CNG as dedicated fuel in spark ignited engines. **(03)**