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MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

VI SEMESTER B.TECH. (OPEN ELECTIVE)
END SEMESTER EXAMINATIONS, APR/MAY 2017

SUBJECT: AUTOMOTIVE POLLUTION & CONTROL [AAE 3284]

REVISED CREDIT SYSTEM
(03/05/2017)

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ❖ Answer **ALL** the questions.
- ❖ Missing data may be suitable assumed.
- ❖ Draw sketches in pencil only

- 1A.** What is the need for transesterification process? What are the different methods of production of bio diesel? **(02)**
- 1B.** Enlist major sources of automotive pollutants. Explain the terms: **(03)**
i) crank case emission ii) evaporative emission.
- 1C.** Describe how the following factors affects Hydrocarbon & Carbon monoxide emissions in SI engines **(05)**
i) Engine speed ii) Spark timing iii) Valve overlap iv) Intake manifold pressure v) Surface to volume ratio.
- 2A.** With a relevant graph explain how Air fuel ratio affects Hydrocarbons, Carbon monoxide & Nitrogen Oxide formation in SI engines. **(04)**
- 2B.** If port fuel injection system is compared with carburetor system, it is seen that PFI has some advantages. Justify three important advantages with proper reason. **(03)**
- 2C.** Write a note on overmixing and undermixing of fuel in CI engines with a relevant sketch. **(03)**
- 3A.** Explain with neat sketch constructional & functional details of Non dispersive infra-red (NDIR) absorption type analyzer. **(04)**
- 3B.** Explain with neat block diagram constructional & functional details of Orsat apparatus. **(04)**

- 3C.** What is the need for Common rail direct injection system in modern engine? (02)
What are the advantages of CRDI system?
- 4A.** Explain with the aid of neat sketch updraft type gasifier with its principle. (03)
Name different working zones of updraft gasifier.
- 4B.** Explain the characteristics of alcohols used in biodiesel production. (03)
- 4C.** With a schematic diagram describe the European emission test procedure. (04)
- 5A.** With a neat sketch explain processing of Liquefied petroleum gas by oil refining method. (04)
- 5B.** What is the working principle of solar cell? How sunlight is converted into electricity? (02)
- 5C.** Explain with neat block diagram and schematic sketch of transesterification reactor, biodiesel production process by catalytic transesterification method. (04)