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MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

VII SEMESTER B.TECH. (AUTOMOBILE ENGINEERING)

MAKE UP EXAMINATIONS, 2018

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

**REVISED CREDIT SYSTEM
 (26/12/2017)**

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 are the types of smoke observed in diesel engine? Explain in detail any SIX factors causing smoke formation in diesel engines. **(03)**
- 1B.** What are the requirements of gasoline fuel? **(02)**
- 1C.** Describe with neat sketch constructional and functional details of alkaline fuel cell, its advantages and disadvantages, applications. **(05)**
- 2A.** Explain with neat sketch constructional & functional details of Non dispersive infra-red (NDIR) absorption type analyzer. **(05)**
- 2B.** With a schematic diagram describe the European emission test procedure. **(05)**
- 3A.** 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 temperature
- 3B.** With neat sketch explain the working principle of Chemiluminescence Analyzer. What is the role of ozone in this analyser? **(05)**

- 4A.** Sketch and explain the working principle and functional details of updraft type gasifier. Name different working zones of updraft gasifier. **(04)**
- 4B.** Explain the term 'Detonation' in CI engine. How and when does it happen? What are the measures you recommend to control the diesel knock. **(02)**
- 4C.** Define and describe thermionic energy converter. What are the advantages, disadvantages and application of this technology? How this technology does is useful in curbing automotive pollution? **(04)**
- 5A.** Describe the working principle of homogeneous charge compression ignition (HCCI) combustion engine, advantages and challenges **(03)**
- 5B.** Explain the reason for the formation of soot particles in diesel engine. What is the effect of soot on emission? What remedy do you suggest for minimizing the effect? **(02)**
- 5C.** What is the need for biodiesel production by vegetable oils? Explain with neat block diagram transesterification process. Enumerate the advantages of biodiesel. **(05)**