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M.E./M.Tech. Degree Examinations, January 2017

First Semester

INTERNAL COMBUSTION ENGINEERING

IC16103 – ALTERNATE FUELS FOR IC ENGINES

(Regulation 2016)

QP Code: 692155

Time: Three hours

Maximum : 100 marks

Answer **ALL** questions

PART A - (10 X 2 = 20 Marks)

1. What are oxygenated fuels? Give examples.
2. What is bio-diesel? State its merits.
3. Define “Fuel reformation” with an example.
4. State any four alternate liquid fuels used in S.I. Engine.
5. List the differences between blends and emulsions.
6. What are ignition accelerators? Give examples.
7. State the advantages of hydrogen over other gaseous fuels for S.I. Engine.
8. Give the constituents of LPG and their proportions.
9. Differentiate dual fuel engine and variable fuel engine.
10. Why are gaseous fuels not used as sole fuel in C.I. Engine?

PART B - (5 X16 = 80 Marks)

11. (a) Compare the properties, combustion and emission characteristics of gasoline (16) and ethanol/ethanol blends in S.I. Engine with graphs.

(OR)

- (b) Discuss in detail the usage of LPG in S.I and C.I. Engines and the effect in (16) engine performance and emissions.
12. (a) Explain storage, safety, performance and emission aspects of any one (16) reformed fuel in S.I. Engine.

(OR)

- (b) Discuss in detail the process of carburetion and direct injection of gasoline and neat ethanol respectively highlighting the issues. **(16)**

13. (a) Discuss the following for diesel - bio diesel blends fuelled C.I. Engine, by comparing with that of neat diesel. **(16)**

(i) Heat release (ii) specific fuel consumption (iii) NO_x emissions

(OR)

- (b) Discuss in detail the effect of additives in properties of diesel, combustion and emissions characteristics of C.I. Engine. **(16)**

14. (a) Compare CNG and LPG in the following aspects in S.I. Engine. **(16)**

(i) Maximum temperature (ii) bmep (iii) CO and HC emissions

(OR)

- (b) Discuss in detail the following for Biogas in S.I. Engine. **(16)**

(i) production, (ii) Usage with required engine modifications, (iii) combustion and emission behaviour.

15. (a) Explain how does a gaseous fuel in dual- fuel mode improve fuel economy, engine performance and emissions in C.I. Engine. **(16)**

(OR)

- (b) Compare the suitability of gaseous hydrogen, LPG, CNG and bio-gas in C.I. Engine with regard to modification in induction system, fuel system and engine design. **(16)**