B.E. (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL/MAY 2012

MECHANICAL ENGINEERING BRANCH

SIXTH SEMESTER

ME 518 ADVANCED INTERNAL COMBUSTION ENGINEERING

(REGULATIONS 2004)

Time : 3 hr Max Mark : 100

Answer ALL Questions

PART - A (10 x 2 = 20 Marks)

1. List down the air fuel ratio requirements of a S.I. engine.
2. What do you understand by normal and abnormal combustion?
3. What do you understand by DI and IDI engines?
4. Mention the function of a turbocharger.
5. What is a three way catalytic converter?
6. Indicate the principle of chemiluminescent analyser.
7. Compare the self ignition temperature and calorific value of hydrogen with gasoline.
8. What do you understand by transesterification? Why vegetable oils have to be transesterified?
9. Mention the principle of air assisted combustion.
10. What do you understand by stratified charge engine?

PART – B (5 x 16 = 80 Marks)

11. i). Discuss the various stages of combustion in a S.I. engine with a p-θ diagram. **(6)**
    ii). Explain the temperature and composition factors that influence knocking in a SI engine. **(10)**

12. a i). Explain with the help of a p-θ diagram the stages of combustion in a CI engine. **(10)**
    ii). Draw a neat sketch of a fuel spray and briefly explain the structure and the mechanism of fuel evaporation. **(6)**

(OR)

b i). Discuss the principle of M and Air cell combustion chambers employed in C.I. engines. **(10)**

ii). What do you understand by swirl and squish? Explain its importance in a diesel engine. **(6)**

13. a i). Describe the mechanism of formation of CO, UBHC and NOx emissions. **(10)**

ii). What are driving cycles? Explain the various stages in Indian driving cycle with a neat sketch. **(6)**

(OR)

b i). Why three way catalytic converters are employed in the modern day S.I engine driven vehicles? Show the plot of pollutants versus air fuel ratio and conversion efficiency versus air fuel ratio for all the major pollutants from S.I engines. **(8)**

ii). With the help of a neat sketch explain the principle of operation of FID. **(8)**

14. a i). Compare the important properties of ethanol and natural gas with petrol. **(8)**

ii). List down the advantages and disadvantages of using LPG in engines. **(8)**

(OR)

b i). Explain briefly the techniques of using alternative fuels in C.I engines. **(10)**

ii). Discuss the steps involved in the conversion of a diesel engine to petrol operation for using 100 % gas. **(6)**

15.a i). What is a lean burn engine? Explain its advantages and disadvantages. **(6)**

ii). With a neat sketch explain principle of operation of an air assisted fuel injector. **(10)**

(OR)

b i). Discuss the principle of operation of Laser Doppler Anemometer with a neat schematic. **(10)**

ii). Explain the salient features of plasma ignition system. **(6)**

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