

## All The best For Exams - Rejinpaul Team

Anna University Exams Nov / Dec 2016 – Regulation 2013  
Rejinpaul.com Unique Important Questions – 3rd Semester BE/BTECH  
AT6504 Automotive Fuels and Lubricants

### Unit I

1. List the important products of refining process. Also write the boiling range and uses of these Products
2. Explain the chemical structure of petroleum. Give the general formula of the following fuels: Paraffin, Olefin, Naphthene, Aromatic. Also state their molecular arrangements and mention whether they are saturated or unsaturated.
3. Explain the chemical structure of petroleum for Paraffin and Olefin series
4. (i) List the physical, chemical & combustion properties of fuel. (ii) What are the advantages of catalytic cracking over thermal cracking.
5. Discuss about manufacture of lubricating oil base stocks and of finished automotive lubricants.

### Unit II

1. Discuss the effect of volatility (i)Starting (ii)Warm up (iii)vapour lock (iv)crank case dilution
2. Describe with neat sketch the following calorimeters used for determination of heating values. (i) Bomb calorimeter (ii) Junkers gas calorimeter
3. Write a brief note on: (i)Diesel index (ii)Performance number (iii)Effect of knocking (iv)Effect of cetane number on noise levels
4. Explain the significance of following qualities of CI engine fuels. (i)Viscosity (ii)Ignition quality (iii)Flash point and Fire point
5. Explain the significance of following qualities of SI engine fuels. (i)Volatility (ii)Crank Case dilution (iii)Gum deposits

### Unit III & IV

1. What are the two main properties of grease? Explain in detail the measurement of those properties.
2. Discuss the additives and additive mechanism for lubricants.
3. Explain the consistency and drop point tests on grease with neat sketches
4. Explain the various testing methods to evaluate lubricants.
5. (i) Explain the requirements for automotive lubricants. (ii)Explain in detail about synthetic lubricants
6. What is the significance of flash point and pour point? Using the suitable sketches explain the method to find out flash and pour point.
7. An internal combustion engine is supplied with a mixture of octane vapor ( $C_8H_{18}$ ) and air. Under steady running conditions the dry exhaust gas analysis shows 13%CO. Assuming combustion to be complete, determine the ratio by volume of fuel to air supplied, and express this as a percentage of the chemically correct ratio.
8. Enlist and discuss the important properties of a lubricant which affect engine performance.

### Unit V

1. Explain the phenomenon of knock in CI engines and compare it with SI engine knock.
2. Discuss the effect of the following engine variables on flame propagation: (i)Fuel-air ratio (ii)Compression ratio (iii)Engine load and (iv)Engine speed
3. How to conduct the exhaust gas analysis by orsat apparatus?
4. Petrol for SI engine contains 84% carbon and 16% hydrogen. The fuel air ratio is 1:14. Assume all hydrogen is burnt, no burnt carbon residue remains and there is no free oxygen in the products of combustion. Calculate (i) the mass of carbon burning to  $CO_2$ . (ii)the mass of carbon burning to CO.(iii)the mass of individual constituents gases in the products combustion
5. Enumerate the methods by which air fuel ratio can be calculated when analysis of combustion products I known.
6. A fuel consists of the following % analysis by mass. C =84%,  $H_2$ =10%,  $O_2$ =2%, S=1%. Calculate the amount of air required to completely burn 1kg of the fuel. Also determine the products of combustion by % of mass.

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