Reg. No. :

Question Paper Code : 51097

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2014.

Fifth Semester

Automobile Engineering

AT 2305/AU 54/10122 AU 506 — AUTOMOTIVE FUELS AND LUBRICANTS

(Regulation 2008/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the various hydrocarbons present in crude oil?
2. Show the structural formulas for n-heptanes and iso-octane.
3. What is higher calorific value of a fuel?
4. Define the term 'cetane number'.
5. What is stoichiometric air-fuel ratio?
6. What is gravimetric analysis?
7. What are the various frictional losses in an engine?
8. What is elasto hydrodynamic lubrication?
9. Give the classification of lubricanting oils.
10. What do you mean by oiliness of a lubricating oil?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Briefly explain the petroleum refining process with a neat sketch. (12)

(ii) What are the advantages of catalytic cracking over thermal cracking? (4)

Or

(b) (i) What are the products of refining process? (6)

(ii) Explain the manufacture of lubricating oil base stocks and finished automotive lubricants. (10)

12. (a) Discuss the effect of volatility on

(i) Starting

(ii) Warm-up

(iii) Vapour lock

(iv) Crank case dilution. (16)

Or

(b) (i) What are the desirable characteristics of CI engine fuels. (6)

(ii) Explain the laboratory method of finding cetane number of a fuel. (10)

13. (a) A fuel consists of the following percentage analysis by mass:

C = 84%, H_2 = 10%, O_2 = 2%, S = 1% and N_2 = 3% calculate the amount of air required to completely burn 1Kg of this fuel. Also determine the products of combustion by percentage of mass. (16)

Or

(b) Explain the principle, construction and working of orsat apparatus with a neat sketch. (16)

14. (a) Explain the six classes of mechanical friction and the various factors affecting them. (16)

Or

(b) Explain the hydrodynamic and boundary lubrication with neat sketches. (16)

15. (a) (i) What are the specific requirements for automotive lubricants. (6)

(ii) Discuss the additives and additive mechanism. (10)

Or

(b) Explain the important two tests on lubricants with neat sketches. (16)