Type: DES

Q1. Crude oil contains paraffins, naphthenes, aromatics. Differentiate these fractions? 3x1=3

Q2. Estimate the viscosity of pure organic solvent at 15 °C and its specific gravity is 0.9 The solvent contains: carbon -6 atoms, Hydrogen 6 atoms (one 6 member ring and three double bonds). (3 steps x 1)

$$\log(\log 10\mu) = \frac{I}{M}\rho - 2.9$$

M = molecular weight ρ = specific gravity at $t°C$ μ = viscosity in CPs. at $t°C$

where I is a parameter give for different liquid and is calculated from the group contributions

I in Souder's equation

Atom	H	O	C	Double bond	−15.5
Contribution	+2.7	+29.7	+50.2	6 member ring	−21

Q3. Desalter is very important equipment as a pre-treatment step to process the crude oil in atmospheric distillation unit. Justify the statement with working principle of desalter? Dia =1 + theory 3marks

Q4. Distinguish the various averages boiling points used in petroleum refinery (5) (5 averages x1 =5)

Q5. Make use of the composition of propane and butane, classify the types of LPG and Evaluate the quality of domestic LPG with weathering test. (3) (diagram =1/2 mark, classification 1 , test 1.5 mark)

Q6. Differentiate the calcium and Lithium soaps used in grease manufacturing (2) (2x1=2)

Q7. Comparatively kerosene, diesel may have more sulphur content present, Explain the procedure to remove this from diesel with the help of flow sheet. (5) (dia 3 + theory 2 marks=5 marks)

Q8. List the major properties usually measured for aviation turbine fuel and explain two properties (3)

Q9. Define the burning quality test for kerosene (2)

Q10. Lighter boiling fractions can be generated from heavy petroleum fractions. Justify the statement with the help of fluidized bed reactor (draw the flow sheet also) (5)
(Diagram 1 mark + theory 4 marks)

Q11. Explain the two important properties required to use the Bitumen in highway construction? (2) (Any two x1 =2 marks)

Q12. Differentiate between bearing, hydraulic and compressor lubricants? (3) (3x1 mark=3)

Q13. Discuss the reactions involved in Naphtha reforming process? (5) (5types of reactions x1 =5 marks)

Q14. The LPG containing sulphur is removed using sweetening merox process, Give the two reactions which involved in the process. (2) (2 reactions x1 =2 marks)

Q15. Briefly explain the Naphtha pre-treatment method (3)