



[4261] – 108

Seat No.	
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**F.E. (Semester – II) Examination, 2012**  
**APPLIED SCIENCE – II (Chemistry)**  
**(2008 Pattern)**

Time : 2 Hours

Max. Marks : 50

**Instructions :** 1) Solve Q. 1 or Q. 2, Q. 3 or Q. 4 and Q. 5 or Q. 6.

2) **Neat** diagrams must be drawn **wherever** necessary.

3) **Assume** suitable data, if necessary.

1. a) What is rocket propellant ? Explain different types of propellants with suitable example. 7

b) Explain :

1) Octane no. of petrol

2) Cetane no. of diesel. 6

c) 2.4 g of coal sample was heated in a silica crucible at 110°C for 1 hr. The residue weighed 2.35 g. The crucible was then covered with a vented lid and heated at 950°C for 7 min. The residue weighed 2.04 g. The residue was then ignited to a constant weight of 0.36 g. Calculate the percentage of fixed carbon. 4

OR

2. a) Explain different types of calorific values of a fuel with the help of Boy's gas calorimeter. 7

b) How will you calculate % C, H and S by ultimate analysis ? 6

c) A producer gas has following composition by volume  $H_2$  – 30%, CO – 14%,  $CH_4$  – 4%,  $CO_2$  – 18% and  $N_2$  – 34%.

Find the volume of air required for complete combustion of 1 m<sup>3</sup> of the gas. 4

3. a) How metal is protected by using cathodic protection method ? 6

b) Discuss the factors affecting rate of corrosion of metals. 6

c) Explain with reactions corrosion of Al and Mo by oxygen. 4

OR

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4. a) Explain the hydrogen evolution and oxygen absorption mechanism of electrochemical corrosion. 6
- b) Differentiate between :  
i) E.C.S. and G.S.  
ii) Anodic coating and cathodic coating. 6
- c) Discuss any 2 methods of surface conversion coatings. 4
5. a) Discuss the causes of scale formation in boilers. Explain the prevention of scale formation by using phosphate conditioning method. 7
- b) Draw and explain the phase diagram for water system. 6
- c) How many litres of 9% NaCl will be required to regenerate the exhausted zeolite which has capacity of softening 20 litres of a water sample and having hardness 320 ppm ? 4
- OR
6. a) How is alkalinity in a water sample determined ? State the types of alkalinities ? 7
- b) Explain the terms involved in Gibb's phase rule. Give its limitations. 6
- c) Explain corrosion in boilers due to dissolved gases and methods for prevention of it. 4