

**Diploma in Civil Engineering / Diploma
in Electrical & Mechanical Engineering**

Term-End Examination

June, 2011

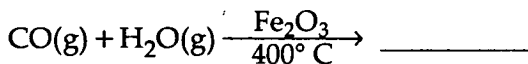
BET-013 : CHEMISTRY

Time : 2 hours

Maximum Marks : 70

- Note :** 1. *Question number 1 is compulsory.*
 2. *Answer any other four questions from question numbers 2 to 8.*
 3. *All questions carry equal marks.*

1. (a) Write down the electronic configuration of ${}_{17}\text{Cl}$ and ${}_{29}\text{Cu}$. 2
 (b) What are the oxidation states of nitrogen in NO and NH_3 ? 2
 (c) Arrange the following in the increasing order of their size. 2
 Na , Na^+ and Mg^{2+} .
 (d) Complete the following equation. 2
 ${}^6_3\text{Li} + (\text{---}) \longrightarrow {}^3_1\text{H} + {}^4_2\text{He}$
 (e) Which of these elements form a set of triad : 2
 Na , Cl , K , Br , Mg , I
 (f) Which isotopes of hydrogen is radioactive ? 2
 (g) Complete the following equation. 2



2. (a) Give details of *any two* :
- (i) What is the similarity between Na^+ , F^- and Mg^{2+} ? and which among them has the smallest size and why ? 4
 - (ii) Explain reasons of changes in Ionisation Energy and Atomic Radii in a group and a period. 4
 - (iii) What do you mean by the term Nitrogen fixation ? Give the structure of hydrazine. 4
- (b) What do you mean by hardness of water ? Explain in detail about any one of the methods of the removal of temporary hardness of water. 6
3. (a) How can oxygen be prepared in laboratory ? List out its important properties. 8
- (b) Explain Haber Process for the preparation of ammonia. 4
- (c) What are the main uses of nitrogen ? 2
4. (a) Explain in detail the preparation of chlorine in laboratory and list out its important uses. 8
- (b) What do you mean by atmosphere ? What are the major components and their percentages in the air that we inhale ? 4
- (c) Name two important zones of atmosphere and write one sentence each about them. 2
5. (a) Enlist different sources of water ? 2
- (b) Briefly describe the hydrological cycle. 4
- (c) What are the main causes for the formation of scales in Boilers ? 4
- (d) How can the scale formation be prevented in boilers ? 4

6. (a) What is the difference between primary and secondary fuels ? Give an example each for both. 2
- (b) What are the characteristics of good fuels ? 4
- (c) Explain preparation of metallurgical coke using Behve Oven Process. 4
- (d) Explain the process of fractional distillation for refining of petroleum. 4
7. (a) What are the important functions of lubricants ? List out the merits of solid lubricants. 6
- (b) What is meant by flash point and Fire point of an oil ? Name the apparatus used for their determination. 4
- (c) Define cationic polymerization. Explain initiation and propagation steps in cationic polymerisation. 4
8. (a) What is meant by thermoplastics and setting polymers ? 4
- (b) Explain the important methods used for protection against brittle fracture of glass. 4
- (c) List any eight properties of refractories. 4
- (d) What is bleaching powder ? Name the plant used for the manufacture of bleaching powder. 2
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