

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

**DCLEVI/DMEVI/DELVI/DECVI/DCSVI/
ACCLEVI/ACMEVI/ACELVI/ACECVI/ACCSVI**

01342

Term-End Examination

December, 2011

BET-013 : CHEMISTRY

Time : 2 hours

Maximum Marks : 70

Note : Answer *any five* questions. Question no. 1 is *compulsory*. All questions carry equal marks.

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| 1. | (a) | Write down the electronic configuration of $_{13}\text{Al}$ and $_{24}\text{Cr}$. | 2 |
| | (b) | How many different orbitals are in third shell ? And what is the maximum number of electrons in it ? | 2 |
| | (c) | Which one of Na and Na^+ is larger and why ? | 2 |
| | (d) | State the law of octaves. | 2 |
| | (e) | Explain why ice has lower density than water ? | 2 |
| | (f) | Write down the molecular formula of : | 2 |
| | | (i) Vinyl chloride | |
| | | (ii) Bleaching powder | |
| | (g) | What would be the product of thermal decomposition of potassium chlorate with manganese dioxide ? | 2 |
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2. (a) Answer *any two* of the following.
- (i) How does the ionisation energy change in a group and a period ? Explain giving reasons. 4
 - (ii) What is modern periodic law ? Discuss main features of periodic table. 4
 - (iii) Na^+ , F^- and Mg^{++} are isoelectronic but they differ in their atomic sizes, explain. 4
- (b) Explain hydrological cycle and different sources of water. 6
3. (a) What is atmosphere ? List two important zones of it. 4
- (b) How can chlorine be prepared in laboratory ? List the important uses of CaCl_2 and KClO_3 . 6
- (c) Explain *any one* of the following processes involved in preparation of steel from pig iron. 4
- (i) Open Hearth Process,
- OR**
- (ii) Basic Oxygen Process
4. (a) (i) Name two important ores of copper. 2
- (ii) Why does copper turn pale green on long standing in air ? 2
- (b) Define hardness of water. Explain removal of permanent hardness of water using demineralization method. 6
- (c) Write down the important characteristics of a good fuel. How calorific value of a fuel is determined ? 4

5. (a) How do solid lubricants decrease the friction between moving/sliding parts of a machine ? 2
- (b) What are the advantages of solid lubricants ? 2
- (c) What is biogas ? What are its important uses ? 2
- (d) What are the important methods involved in desalination of Brackish water ? Explain in brief. 8
6. (a) Define and distinguish between the : 6
- (i) Flash point
- (ii) Fire point and
- (iii) Power point of a lubricating oil
- (b) What do you mean by addition polymers ? 8
- Explain in brief the free radical mechanism of chain growth polymerisation.
7. (a) What do you mean by natural rubber ? 4
- Give the IUPAC name of isoprene whose molecular formula is :
- $$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_2 = \text{CH} - \text{CH} = \text{CH}_2 \end{array}$$
- (b) What are the functions of the following in the manufacture of glass ? 4
- (i) Alumina (ii) Borax
- (iii) Cullets (iv) Calcium Phosphate
- (c) Write note on : 4
- (i) Glass Transition temperature (T_g) 4
- (ii) Annealing 2

8. (a) Enlist the steps involved in manufacture of refractories. 2
- (b) Outline the important characteristics of refractories. 4
- (c) What is the composition of silica bricks ? Enlist important properties of Silica bricks. 4
- (d) What is available chlorine ? How is it determined in commercial samples of bleaching powder ? 4
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