

0904

15116

3 Hours / 100 Marks

Seat No.

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- Instructions :** (1) All Questions are *compulsory*.
(2) Answer each next main Question on a new page.
(3) Figures to the right indicate full marks.
(4) Assume suitable data, if necessary.
(5) Abbreviations used convey usual meaning.

1. Answer any TEN :

Marks
10 × 2 = 20

- (a) Define 'quantum numbers'. State their 'significance'.
- (b) Define :
 - (i) Electrovalency
 - (ii) Covalency
- (c) Define 'weak electrolyte'. Give two examples.
- (d) Distinguish : Atom and Ion.
- (e) Define 'specific conductivity'. State its unit.
- (f) Define 'zeolite'. Write molecular formula of sodium zeolite.
- (g) State effects of using hard water in textiles.
- (h) What is 'wood metal' ? State its 'uses'.
- (i) Define an 'extender'. Give two examples.
- (j) Define :
 - (i) Varnish
 - (ii) Enamel
- (k) Define a lubricant. Give an example each of a solid lubricant and a semi-solid lubricant.
- (l) State 'limitations' of 'natural rubber'.
- (m) Name a 'thermoset' plastic. State its 'engineering applications'.
- (n) Write sources of 'water pollution'.

P.T.O.

2. Answer any FOUR :**4 × 4 = 16**

- (a) State and explain 'duplet and octet rule'.
- (b) Describe U.V. method to sterilise water. State hazard, if any.
- (c) Describe 'froth floatation' process with an example.
- (d) Describe corrosion due to 'differential oxygen concentration'.
- (e) Outline a method to determine 'volatile matter' in coal.
- (f) Why is rubber 'vulcanised' ? Name two vulcanising agents used. Where is vulcanised rubber used ?

3. Answer any FOUR :**4 × 4 = 16**

- (a) Describe 'mechanism' of electrolysis.
- (b) Define 'hard water'. Explain its effects on steam generation.
- (c) (i) State effects of alloying elements Ni – Si – on steel.
(ii) Define 'Stainless steel'. State its uses.
- (d) Describe with a diagram 'hydrodynamic lubricant'.
- (e) Compare, based on the properties : solid fuel and liquid fuel.
- (f) Define 'deforestation'. State its 'consequences'.

4. Answer any FOUR :**4 × 4 = 16**

- (a) Define :
 - (i) Isobar
 - (ii) Mass defect
 - (iii) Neutron
 - (iv) Variable valency
- (b) Define :
 - (i) Clerk's degree of hardness ($^{\circ}Cl$)
 - (ii) French degree of hardness ($^{\circ}Fr$).Write relation between them and p.p.m.
- (c) (i) Write 'impurities' in natural water.
(ii) Explain 'anomalous behaviour' of water.

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- (d) Compare : brushing and spraying.
- (e) Write typical composition and applications of :
 - (i) Water gas
 - (ii) Producer gas
- (f) Define 'plasticiser'. Write their requirements. Give two examples.

5. Answer any FOUR :

4 × 4 = 16

- (a) Describe with an example, 'electrorefining process'.
- (b) Describe 'hot lime-soda' process, with a diagram.
- (c) Describe a method to prepare an 'alloy'.
- (d) Draw a labelled diagram of a Bomb's calorimeter.
- (e) Write composition of 'Portland cement'. State functions of its ingredients.
- (f) Explain air pollution, caused by :
 - (i) Nitrogen dioxide
 - (ii) Sulphur trioxide

6. Answer any FOUR :

4 × 4 = 16

- (a) Explain formation of bonds in any **two** :
 - (i) Aluminium trichloride
 - (ii) Ammonia
 - (iii) Ethylene
- (b) Describe with an example 'common ion effect'.
- (c) Define :
 - (i) Ore
 - (ii) Pig iron
 - (iii) Tempering
 - (iv) Calcination
- (d) Describe process of 'tinning'.

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- (e) Explain the terms :
- (i) Cloud-and pour-point
 - (ii) Emulsification
- (f) Define :
- (i) Petroleum
 - (ii) Net calorific value
 - (iii) Coalification
 - (iv) Ignition temperature
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