

APPLIED CHEMISTRY

Time Allowed: 2 Hours

Full Marks: 35

Answer to Question No.1 is compulsory and to be answered first.**This answer is to be made in separate loose script(s) provided for the purpose.****Maximum time allowed is 30 minutes, after which the loose answer scripts will be collected and fresh answer scripts for answering the remaining part of the question will be provided.****On early submission of answer scripts of Question No.1,
a student will get the remaining script earlier.****Answer any five questions from Group-A, B & C, taking at least one from each group.**

1. Choose the correct answer from the given alternatives (any ten): 10x1
- i) Raw materials to prepare Bakelite is – (a) phenol + acetic acid, (b) phenol + formaldehyde, (c) salicylic acid + HNO_3 , (d) benzoic acid + formaldehyde.
 - ii) Carborandum is – (a) silicon carbide, (b) boron carbide, (c) sodium silicate, (d) sodium borate.
 - iii) Cement concrete is a mixture of – (a) cement, sand, water, (b) gypsum, cement, water, (c) cement, stone chips, water, (d) cement, sand, stone chips, water.
 - iv) Which doesn't produce acid rain? – (a) NO_2 , (b) SO_3 , (c) CO , (d) CO_2 .
 - v) Composition of LPG is – (a) n-heptane, isooctane, propane, (b) n-butane, n-pentane, n-hexane, (c) isobutene, isooctane, ethane, (d) propane, isobutene, n-butane.
 - vi) Natural rubber contains – (a) isoprene, (b) butadiene, (c) styrene, (d) 2-chlorobutadiene.
 - vii) Proximate analysis of coal involves the estimation of % of – (a) carbon, hydrogen, ash, (b) moisture content, volatile matter, ash, free carbon, (c) moisture content, carbon, ash, (d) volatile matter, free carbon.
 - viii) Reagent for iodoform test is – (a) I_2 , CH_3Cl , (b) HI , HCl , (c) I_2 , NaOH , (d) $\text{H}_2\text{SO}_4 + \text{I}_2$.
 - ix) Knocking property is least for – (a) isooctane, (b) n-octane, (c) n-heptane, (d) n-decane.
 - x) Which doesn't belong aerosol? – (a) smoke, (b) fog, (c) mist, (d) milk.
 - xi) Plaster of Paris is prepared from – (a) gypsum, (b) cement, (c) porcelain, (d) glass.
 - xii) Whitest pigment is – (a) ZnO , (b) TiO_2 , (c) $\text{PbCO}_3 \cdot \text{Pb(OH)}_2$, (d) BaSO_4 .
 - xiii) Lithium based grease is used for – (a) axle, (b) pump, (c) aeroplane, (d) ball-bearing.

Group-A

2.
 - a) What are the changes and reaction involved during setting and hardening of cement?
 - b) Write the composition of cement.
 - c) Write the role of gypsum, used in cement.3+1+1
3.
 - a) How is ethyl acetate prepared? Give reaction.
 - b) How is benzene chlorinated?
 - c) Write the structure of product: alkaline phenol: $\text{C}_6\text{H}_5\text{N}_2^+\text{Cl}^-$.2+1½+1½

4. a) Write the principle including reactions to prepare water gas.
b) Mention source, composition and use of – (i) natural gas, and (ii) bio gas. 2+3
5. a) Define 'fire point' and flash point of a lubricant.
b) Briefly describe, how calorific value of coal is determined by BOMB CALORIMETER. 2+3

Group-B

6. a) What is 'plasticiser' in paint? Give example.
b) Write the composition of SNOWCEM.
c) Mention two composition of varnish. 2+2+1
7. a) How is corrosion prevented by – (i) metal plating, and (ii) alloy formation? Explain with example.
b) What is cathodic protection? Give example. 3+2
8. a) What are meant by – (i) addition, and (ii) condensation polymerisation?
b) Write the name and formula of raw materials to prepare – (i) SARON, (ii) PVC. 2+3

Group-C

9. a) How is carbon monoxide and carbon dioxide increased in air?
b) How do the above two gases harm the environment? 3+2
10. a) What is meant by DISSOLVED OXYGEN? What is its role?
b) To which compound FREONS has been changed to less harmful one?
c) How is carbon particle is smoke removed? 2+1+2