June 2018

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 <u>any five</u> questions from Group-A, B & C, taking <u>at least one</u> from each group.

1. Choose the correct answer from the given alternatives (any ten): 1x10

i) Thermosetting plastic is – (a) Teflon, (b) Bakelite, (c) PVC, (d) Polyethylene.
ii) Natural rubber is the polymer of – (a) isoprene, (b) butadiene, (c) chloroprene, (d) styrene.
iii) Varnish doesn't contain – (a) pigment, (b) thinner, (c) resin, (d) solvent.
iv) The BOD value (in ppm) of average sewage water is – (a) 40-50, (b) 100-150, (c) 500, (d) 400.
v) Mostly used metal for electroplating purpose is – (a) tungsten, (b) chromium, (c) vanadium, (d) nickel.
vi) Lithium based grease is used in – (a) ball-bearing, (b) aeroplane, (c) axle, (d) pump.
vii) Catalyst used for cracking is – (a) Na_2SiO_2, (b) MnO_2, (c) Al_2O_3-SiO_2, (d) NiO.
viii) pH range of drinking water should be – (a) 6.5 – 8.5, (b) 11 – 13, (c) 3 – 5, (d) 5 – 7.
ix) Highest variety of carbon is present in – (a) peat, (b) anthracite, (c) bituminous, (d) lignite.
x) Chief ingredient for natural gas is – (a) acetylene, (b) ethylene, (c) ethane, (d) methane.
xi) Benzene is nitrated using – (a) concentrated HNO_3, (b) concentrated nitrous acid, (c) concentrated HNO_3 and concentrated H_2SO_4, (d) $NaNO_3$.
xii) Formula for gypsum is – (a) $CaSO_4$+$CaCO_3$, (b) $CaSO_4.½\ H_2O$, (c) $2CaSO_4.H_2O$, (d) $CaSO_4.2H_2O$.

<u>Group-A</u>

2. a) What is "Proof Spirit"?
b) How can you identify ethanol?
c) How is aniline prepared? Write necessary reaction. 1+2+2

<u>OR</u>

a) What is vinegar?
b) Write the catalyst, reagent for Friedel craft reaction. Mention reactant and product. 2+3

3. a) Briefly describe the preparation for cement.
b) What are "Lime Mortar" and "Surki"? 3+2

<u>OR</u>

a) Mention the changes that occur during setting and hardening of cement.
b) Write the differences between cement concrete and reinforced cement concrete. 3+2

4. a) How is % of 'S' & 'N' determined in coal?
b) What is knocking property and anti-knock compounds? 3+2

<u>OR</u>

a) How is % of 'C' & 'H' are determined in coal?
b) Define octane number. 3+2

5. a) Write composition and use of – (i) coal gas, (ii) water gas.
b) How is moisture content in coal determined? 3+2

Group-B

6. a) Define cloud point and pour point of lubricant.
   b) Write raw materials of – (i) glass and (ii) ceramics. 3+2

7. a) Write three characteristics of a good paint.
   b) What is the role of filler and drier of a paint? 3+2

8. Write the raw materials (name & formula) to prepare (i) Orlon, (ii) Buna-S, (iii) Buna-N. 3+2

   OR

   a) Mention the use of carborandum and boron carbide.
   b) Explain chemical corrosion with different examples. 2+3

Group-C

9. a) What is SMOG? Briefly describe two types of SMOG.
   b) Mention briefly different sources for water pollution. 3+2

10. a) How is carbon particle removed from smoke?
    b) How does carbon monoxide and freons cause air pollution? 2+3