2007 (A)

Time : 3 Hrs.

D₁G

Engg.Chem.

Full Marks : 80
Pass Marks : 26

Answer from all groups as per direction given in each case.

lHkh xqziksa l siR;sd xqj eafn;sx;sfun?k ds vuqlkj ç'uksa dsmÙkj nA

The figures in right hand margin indicate full marks.

ik'oZ ds vad iw.kkad ds lipd gA

GROUP-A

1. Write down the correct answer for the following questions out of the four alternatives given :-   **1x20=20**

fuEukfidr iz'uksa dsfy, fn;sx;spkj fodYiksa l gh mÙkj pqudj fy[ka%&

(i) The specific heat of an element is 0.32. It approximate atomic wt. will be :

   (a)   20   (b) 10   (c) 40   (d) 60

P.T.O.

;fn fdl h rRo dk foŒ rki 0.32 g\} rksml dk yxHkx ijek.kqHkkj gksxk %

    (a)   20   (b) 10   (c) 40   (d) 60

(ii)   The vapour density of a gas 'A' is half that of gas 'B'. If molecular wt. of 'B' is 'M', the molecular wt. of 'A' will be :

    (a)   M   (b)   2 M

    (c)   4 M   (d)   M / 2

,d xS\} 'A' dk ok"i ?kuRo xS\} 'B' dk vk/kk g\A ;fn 'B' dk v.kqHkkj 'M' g\} rks 'A' dk v.kqHkkj gksxk %

    (a)   M   (b)   2 M

    (c)   4 M   (d)   M / 2

(iii)   The value of m for $l = 0$ will be :

    (a)   0   (b)   1

    (c)   2   (d)   3

$l = 0$ ds fy, m dk eku gksxk %

    (a)   0   (b)   1

    (c)   2   (d)   3

(iv)   One mole of NaCl is equal to :

    (a)   5.85 gm NaCl

    (b)   58.5 gm NaCl

    (c)   23 gm NaCl

    (d)   35.5 gm NaCl.

,d eksy NaCl cjkcj gksrk g\S %
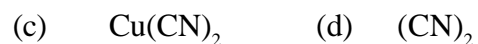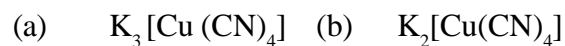
    (a)   5.85 gm NaCl   (b)   58.5 gm NaCl

    (c)   23 gm NaCl   (d)   35.5 gm NaCl

(v)   Copper sulphate solution reacts with KCN solution to give :

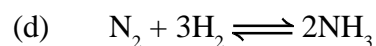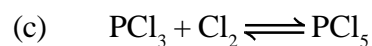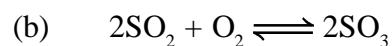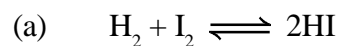   (a) $K_3[Cu(CN)_4]$ (b) $K_2[Cu(CN)_4]$

    (c) $Cu(CN)_2$ (d) $(CN)_2$

P.T.O.

rkez l YQ.V dk ?kksy KCN ds ?kksy l s ifrfØ;k dj

cukrk gS%

(a) $K_3[Cu(CN)_4]$ (b) $K_2[Cu(CN)_4]$

(c) $Cu(CN)_2$ (d) $(CN)_2$

(vi)   In which reaction, $K_P = K_C$?

(a) $H_2 + I_2 \rightleftharpoons 2HI$

(b) $2SO_2 + O_2 \rightleftharpoons 2SO_3$

(c) $PCl_3 + Cl_2 \rightleftharpoons PCl_5$

(d) $N_2 + 3H_2 \rightleftharpoons 2NH_3$

fdl ifrfØ;k ej $K_P = K_C$ ds cjkcj gS ?

(a) $H_2 + I_2 \rightleftharpoons 2HI$

(b) $2SO_2 + O_2 \rightleftharpoons 2SO_3$

(c) $PCl_3 + Cl_2 \rightleftharpoons PCl_5$

(d) $N_2 + 3H_2 \rightleftharpoons 2NH_3$
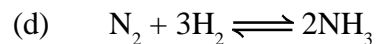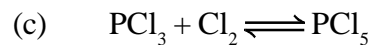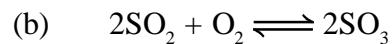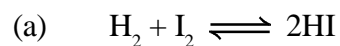
(vii)   Brass contains following metals :

(a)   Cu, Zn   (b)   Al, Mg

(c)   Cu, Ni   (d)   None of these.

ihry esa fuEufyf[kr /kkrqorZeku gS%

(a)   Cu, Zn   (b)   Al, Mg

(c)   Cu, Ni   (d)   buesa l s dksbZ ughaA

(viii)   The ionic product of water at 25° C is found to be:

(a)   1   (b)   7

(c) 1.0×10^{-14} (d)   None of these.

25°C ij ty dk vk;fud xqkuQy gksrk gS%

(a)   1   (b)   7

(c) 1.0×10^{-14} (d)   buesa l s dksbZ ughaA

(ix)   The best quality of Coal is :

(a)   lignite   (b)   bituminous

(c)   anthracite   (d)   None of these.

I cl smPpre jñd dk dks; yk gS%

   (a)   fyXukbV   (b)   fcVfjeul

   (c)   ,UFkkI kbV   (d)   bueal s dkb/ughA

(x)   One electron volt is equal to :

   (a)   1 K Cals   (b)   23.06 K Cals

   (c)   10 K Cals   (d)   None of these.

,d byDVksu oksYV cjkcj gksrk gS%

   (a)   1 K Cals   (b)   23.06 K Cals

   (c)   10 K Cals   (d)   bueal s dkb/ughA

(xi)   Which one is electron deficient compound ?

   (a) CO_2 (b) SF_6

   (c) H_2O (d) $AlCl_3$

bueal s byDVksu foiUu ;kSfxd dkSu&l k gS\

   (a) CO_2 (b) SF_6

   (c) H_2O (d) $AlCl_3$

(xii)   The equivalent weight of a bivalent metal (M) is 12. Molecular weight of its oxide is :

   (a)   24   (b)   28

   (c)   40   (d)   None of these.

f}la ksth /kkrq (M) dk l ern; Hkkj 12 gS rks blds vkDlkbM dk v.kqHkkj gksxk %

   (a)   24   (b)   28

   (c)   40   (d)   bueal s dkb/ughA

(xiii)   Ring test is done for the detection of :

   (a)   Nitrate   (b)   Carbonate

   (c)   Sulphate   (d)   Chloride.

oy; tkp fdl dh igpku dsfy, dh tkrh gS\

   (a)   ukbVªsV   (b)   dkckusV

   (c)   l YQsV   (d)   DyksjkbMA

P.T.O.

(xiv) Which one is the electronic configuration of Fe^{+2} ion ?

(a) $1s^2\ 2s^2\ 2P^6\ 3s^2\ 3p^6\ 3d^6$

(b) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^4\ 4s^2$

(c) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^1\ 3d^5$

(d) None of these.

buesa l sFe^{+2} dk byDVkfud foU;kl gksxk %

(a) $1s^2\ 2s^2\ 2P^6\ 3s^2\ 3p^6\ 3d^6$

(b) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 3d^4\ 4s^2$

(c) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^1\ 3d^5$

(d) buesa l sdksbZ ughaA

(xv) The hardness of 7° clark is equal to :

(a) 7 p.p.m.   (b) 70 p.p.m.

(c) 100 p.p.m.   (d) None of these.

7° clark dh dBkjrk cjkcj gksxh &

(a) 7 p.p.m.   (b) 70 p.p.m.

(c) 100 p.p.m.   (d) buesa l sdksbZ ughaA

(xvi) The knocking property of petrol when mixed with T.E.L. :

(a) Decreases   (b) Increases

(c) remains same   (d) None of these.

VsVhbFkkby yM feykus ij isVªksy dk ukWfdax xq.k %

(a) ?kVrk gS   (b) c<+rk gS

(c) l eku jgrk gS   (d) buesa l sdksbZ ughaA

(xvii) L.P.G. gas is a mixture of :

(a) $CO + N_2$ (b) $C_3H_8 + C_4H_{10}$

(c) $CH_4 + H_2O$ (d) None of these.

,y-ih-th- xS feJ.k gS%

(a) $CO + N_2$ (b) $C_3H_8 + C_4H_{10}$

(c) $CH_4 + H_2O$ (d)   bueal sfdll h dk ughA

(xviii)   The octane number of iso-octane is :

(a)   0   (b)   50

(c)   100   (d)   None of these.

vkblks vkWDVsu dh vkWDVsu la[;k gksrh gS&

(a)   0   (b)   50

(c)   100   (d)   bueal s dkbZ ughA

(xix)   Calgon is a trade name of :

(a)   Sodium silicate

(b)   Calcium phosphate

(c)   Sodium hexametaphosphate

(d)   Sodium zeolite.

dsyxku fuEukfdr dk 0;kolkf;d uke gS%

(a)   lkfM;e flfydsV

(b)   dSfY'k;e QkWLQsV

(c)   lkfM;e gSDlkesVk&QkWLQsV

(d)   lkfM;e ft;ksykbVA

(xx)   Which of the following is used as moderator ?

(a) U^{235}

(b) U^{238}

(c)   Heavy water

(d)   None of these.

bueal sfdll dk ekWMjsVj ds: i eaiz;kx fd;k tkrk gS\

(a) U^{235}

(b) U^{238}

(c)   Hkkjh ty

(d)   bueal s dkbZ ughA

P.T.O.

GROUP-B

Answer any *five* of the following questions :   **4x5=20**

fuEufyf[kr esa ls fdUgha *ikp* iz'uksa ds mÙkj nsa :

2. Establish relation between atomic weight, equivalent weight and valancy.

ijek.kqHkkj] lerqY; Hkkj rFkk la;kstdrk ealca/k LFkkfir djsaA

3. Show that pH value of 1 x 10^{-8} M HCl slightly less than 7.

fn[kk,¡ fd 1 x 10^{-8} M HCl dk pH eku 7 ls FkksM+k de gksrk gSA

4. Determine the number of atoms present in 4 gm of Calcium.

                                                  (Ca = 40 amu)

4 xzke dSY'k;e esa mifLFkr ijek.kqvksa dh la[;k fudkysaA

                                                  (Ca = 40 amu)

5. Discuss four factors causing Pollution of air.

gok dks inf"kr djusokys pkj dkjdksa dh 0;k[;k djsaA

6. What are the advantages of liquid fuel ?

nzo b±/ku ds D;k ykHkHk gSa\

7. Discuss in brief, the importance of chemistry for Engineers and its application in industries.

vfHk;Urkvksa ds fy, jlk;u'kkL= ds egÙo rFkk blds vuqiz;kx dh 0;k[;k la{ksi esa djsaA

8. What are the differences between paint and varnish ?

isaV vkSj okfuZk esa D;k vUrj gSa\

GROUP-C

Answer any *five* of the following questions :   **8x5=40**

fuEufyf[kr esa ls fdUgha *ikp* iz'uksa ds mÙkj nsa :

9. What is Dulong and Pettit's law ? How atomic weight of an element is determined by use of this law ?

                                                       P.T.O.

M-;wyksa vkSj ifVVV fu;e D;k gS\ bl fu;e dh lgk;rk ls fdl h

rRo dk ijek.kqHkkj dSls Kkr fd;k tkrk gS\

10. Write down the names and formulae of different important ore of Iron. How is iron extracted from its ore ? Write any one method.

ykgk dsmeZ; v;Ldksadsuke rFkk l w=dksfy[ksaykgk dk mlds

v;Ldksalsfdl idkj fu"d"kZ.k fd;k tkrk gS\ dksbZ ,d fof/k

fy[ksaA

11. Write notes on *any two* of the following :-

fuEughanks ij fVIi.kh fy[ksa %

(a) Common ion effect

½dkWeu vk;u iHkko½

(b) Ionisation potential

½vk;uhdj.k foHko½

(c) Alloys

½feJ /kkrq½

12. Define lubricants. Write down the main function and characteristic of a good lubricant.

Lusgd dksifjHkkf"kr djsA ,d vPNs Lusgd ds eq[; dk;Z rFkk

fo'ks"krkvksadk mYys[k djsA

13. What do you mean by degree of hardness of water ? Describe the determination of total hardness of water by E.D.T.A. method.

ty dh dBksjrk dh fMxzh ls D;k le>rsgS\ ty dh dy dBksjrk

Kkr djusdh bZMhVhÃ, fof/k dk o.kZu djsA

14. Calculate the volume of oxygen and air at 27°C and 2 atmospheric pressure required for complete combustion of 1 kg of a fuel having following composition :

$CH_4 = 35\%$, $C_2H_4 = 2\%$, $H = 40\%$,

$CO = 10\%$, $N_2 = 10\%$, $CO_2 = 3\%$

P.T.O.

,d fdykxxte bÄku dks27°C vkSj 2 ok;q e.Myh; nkc ij iwkZngu

dsfy, vko';d vko";d vkWlIhtu ,oaok;qdsvk;ru dk ifjdyu djsa

tcfd bÄku dk IaxBu fuEufyf[kr gS%

CH$_4$ = 35%,   C$_2$H$_4$ = 2%,   H = 40%,

CO = 10%,   N$_2$ = 10%,   CO$_2$=3%

15.   Write notes on *any two* of the following :

fuEukidir eaIs *fdUgha nks* ij fVIi.kh fy[ka%

(a)   Green house effect

       ½gfjr x`g iHkko½

(b)   Oil gas

       ½rsy xSl½

(c)   Octane number

       ½vkWDVsu la[;k½

❋ ❋ ❋