SECTION II: MORE THAN ONE OPTION CORRECT

461. Three centre-two electron bonds exist in –
(A) B_2H_6 (B) $Al_2(CH_3)_6$ (C) $BeH_2(s)$ (D) $BeCl_2$ (s)

462. Adding electron to neutral gaseous atom usually leads to
(A) Liberation of energy (B) Formation of ion
(C) Proton/electron ratio decreases (D) Stabilizing the species

463. Sodium nitrate decomposes above ~ 800ºC to give
(A) N_2 (B) O_2 (C) NO_2 (D) Na_2O

464. Select correct statement(s):
(A) Borax is used as a buffer
(B) 1 M borax solution reacts with equal volumes of 2 M HCl solution
(C) Titration of borax can be made using methyl orange as the indicator
(D) Coloured bead obtained in borax-bead test contains metaborate

465. Select correct statement about B_2H_6
(A) Bridging groups are electron-deficient with 12 valence electrons
(B) It has 2c - 2e B–H bonds
(C) It has 3c - 2e B–H–B bonds
(D) All of above are correct statements

466. Which one of the following process(es) will produce temporary hard water?
(A) Addition of Na_2SO_4 to water. (B) Saturation of water with $CaCO_3$
(C) Saturation of water with $MgCO_3$ (D) Saturation of water with $CaSO_4$

467. The reagent(s) that can't be used to determine hardness of water titrimetrically is/are :
(A) oxalic acid (B) disodium salt of EDTA
(C) sodium citrate (D) sodium thiosulphate

468. In context with the industrial preparation of hydrogen from water gas (CO + H_2), which of the following is/are the incorrect statement(s)?
(A) CO is oxidised to CO_2 with steam in the presence of a catalyst followed by absorption of CO_2 in alkali.
(B) CO and H_2 are fractionally separated using differences in their densities.
(C) CO is removed by absorption in aqueous Cu_2Cl_2 solution.
(D) H_2 is removed through occlusion with Pd.

469. Hydrogen peroxide is
(A) A stronger acid than water (B) A weaker acid than water
(C) An oxidising agent (D) A reducing agent

470. Hydrogen can be obtained from water by

(A) Reaction with metal oxides (B) Reaction with non-metal oxides

(C) Reaction with metals (D) Reaction with metal hydrides

471. Which of the following is/are hard water(*s*)

(A) Water containing some potash alum (B) Water containing a few drops of *HCl*

(C) Water containing common salt (D) Water containing calcium nitrate

472. Pick the incorrect statement(s):

(A) Sodium borohydride reacts very slowly with cold water

(B) Sodium borohydride reacts very violently with cold water to produce H_2

(C) Solubility of sodium borohydride in water at 25°*C* is 10.05 *g*/*mL*

(D) Melting point of sodium borohydride is 500°*C*

473. Hydrogen can be obtained from water, by the action of water on

(A) Calcium carbide (B) Calcium hydride (C) Calcium oxide (D) Calcium

474. What is true about ice

(A) Its density is more than water (B) It is a good conductor of heat

(C) It is a thermal insulator (D) Its density is less than water

475. Which of the following order is wrong:

(A) $NH_3 < PH_3 < AsH_3$ – Acidic (B) $Li < Be < B < C$ – IE_1

(C) $Al_2O_3 < MgO < Na_2O < K_2O$ – Basic (D) $Li^+ < Na^+ < K^+ < Cs^+$ – Ionic radius

476. True statement(s) for periodic classification of elements is

(A) The properties of the elements are periodic function of their atomic numbers

(B) No. of nonmetallic elements is less than the no. of metallic elements

(C) First ionization energy of elements does not change continuously with increasing of atomic no. in a period .

(D) d-subshell is filled by directional electron with increasing atomic no. of transition elements.

477. Which of the following is / are correct for group 14 elements?

(A) The stability of dihalides are in the order $CX_2 < SiX_2 < GeX_2 < SnX_2 < PbX_2$

(B) The ability to form $p\pi$–$p\pi$ multiple bonds among themselves increases down the group

(C) The tendency for catenation decreases down the group

(D) They all form oxides with the formula MO_2.

478. The incorrect statement(s) among the following is/are:

(A) The first ionisatioin potential of Al is less than the first ionisation potential of Mg

(B) The second ionisation potential of Mg is greater than the second ionisation potential of Na

(C) The first ionisation potential of Na is less than the first ionisation potential of Mg

(D) The third ionisation potential of Mg is greater than the third ionisation potential of Al

479. The correct statement(s) related to allotropes of carbon is/are

(A) graphite is the most stable allotropes of carbon and having a two dimensional sheet like structure of hexagonal rings of carbon (sp^2)

(B) diamond is the hardest allotrope of carbon and having a three dimensional network structure of C(sp^3)

(C) fullerene (C_{60}) is recently discovered non-crystalline allotrope of carbon having a football-like structure.

(D) Vander Waal's force of attraction acts between the layers of graphite 6.14 Å away from each other

480. The hydrolytic constants are expressed as K_{hydr}. At 25ºC, pK_{hydr} of the following calions are as given:

Cations

	Mg^{2+}	Ca^{2+}	Al^{3+}	Fe^{2+}
pK_{hydr}	*11.4*	*12.6*	*5.1*	*9.5*

(A) Smaller the value of ionisation constant of base, greater is the extent of hydrolysis

(B) Greater the polarisation power of the cation stronger the hydrolysis

(C) pK_{hydr} for Fe^{3+} is expected to be lesser than 9.5

(D) pK_{hydr} for Ba^{2+} is expected to be greater than 12.6

481. When an inorganic compound (X) having 3c-2e as well as 2c-2e bonds reacts with ammonia gas at a certain temperature, gives a compound (Y) iso-structural with benzene. Compound (X) with ammonia at a high temperature, produces a hard substance (Z). Then

(A) (X) is B_2H_6 (B) (Z) is known as inorganic graphite

(C) (Z) having structure similar to graphite (D) (Z) having structure similar to (X)

482. Which of the following statements is/are correct regarding B_2H_6?

(A) banana bonds are longer but stronger than normal B–H bonds

(B) B_2H_6 is also known as 3c–2e compound

(C) the hybrid state of B in B_2H_6 is sp^3 while that of sp^2 in BH_3

(D) it cannot be prepared by reacting BF_3 with $LiBH_3$ in the presence of dry ether

483. Select correct statements -

(A) $Ca_3(PO_4)_2$ is part of bones and $3Ca_3(PO_4)_2.CaF_2$ is part of enamel in teeth

(B) Ca^{2+} ions are important in blood clotting

(C) BeH_2 and MgH_2 are covalent and polymeric while CaH_2 , SrH_2 and BaH_2 are ionic

(D) BeH_2 contain three-centre two-electron bonds

484. Which of the following cannot be used as primary standard base -

(A) NaOH (B) $Ca(OH)_2$ (C) $Na_2B_4O_7$, $10H_2O$ (D) $Na_2C_2O_4$

485. Which of the following is correct among the following?

(A) Increasing polarising power : $Na^+ < Ca^{+2} < Mg^{+2} < Al^{+3}$

(B) Increasing covalent character : LiF < LiCl < LiBr < LiI

(C) Ionic character: $MCl < MCl_2 < MCl_3$

(D) Increasing polarisibility : $F^- < Cl^- < Br^- < I^-$

486. Which of the following carbides are methanides?

(A) CaC_2 (B) Mg_2C_3 (C) Al_4C_3 (D) Be_2C

487. Which of the following statements about alkaline earth metals are correct ?
(A) Hydration energy of Sr^{2+} is greater than that of Be^{2+}
(B) $CaCO_3$ decomposes at a higher temperature than $BaCO_3$
(C) $Ba(OH)_2$ is stronger base than $Mg(OH)_2$
(D) $SrSO_4$ is less soluble in water than $CaSO_4$

488. Which of the following pairs of elements will give superoxides and peroxides respectively when heated in excess of air
(A) K, Ba (B) Na,Rb (C) K,Rb (D) Na, Ba

489. Which one of the following statement (s) is (are) correct?
(A) The electronic configuration of Cr is [Ar] $3d^5\ 4s^1$.(Atomic No. of Cr = 24)
(B) The magnetic quantum number may have a negative value
(C) In silver atom, 23 electrons have a spin of one type and 24 of the opposite type. (Atomic No. of Ag = 47)
(D) The oxidation state of nitrogen in HN_3 is –3.

490. In Alkali metal family cesium is
(A) Used in photoelectric cells (B) Lightest of all
(C) Less electropositive than francium (D) Soft and has low melting and boiling points.

491. Alkali metals are characterised by
(A) Good conductor of heat and electricity (B) high oxidation potentials
(C) High melting points (D) Solubility in liquid ammonia.

492. Which of the following superoxides are orange coloured
(A) RbO_2 (B) CsO_2 (C) KO_2 (D) None of these

493. All the following substances react with water, in which of the cases same gaseous product is obtained?
(A) Na (B) Na_2O_2 (C) KO_2 (D) NaH

494. Solutions of equal strength of XOH and QOH are prepared. The Ionisation Potential of X and Q are 5.1 and 13.0eV respectively, whereas their Electronegativity are 0.9 and 3.2 respectively. Using the information, spot the correct conclusion(s)

(A) Reaction of XOH and NH_4Cl will produce NH_3

(B) Solution of QOH will give effervescence with $NaHCO_3$

(C) Phenolphthalein will give pink colour with XOH solutions

(D) The pH of QOH solution will be more than 7

495. Which of the following statement/s is/are correct?
(A) The structure of carborundum is as same that of diamond
(B) Carbogen is a mixture of O_2 and CO_2 (5–10%) which is used for artificial respiration in pneumonia patients
(C) $SnCl_2$ is a strong oxidizing agent.
(D) PbO a yellow coloured powder is known as litharge.

Answer Key

Qs.	Ans.	Qs.
461	AB	511
462	ABC	512
463	ABD	513
464	ABCD	514
465	BC	515
466	ABC	516
467	ACD	517
468	BCD	518
469	ACD	519
470	CD	520
471	ABC	521
472	B	522
473	BD	523
474	CD	524
475	ACD	525
476	ABD	526
477	ACD	527
478	B	528
479	AB	529
480	ABCD	530
481	ABC	531
482	ABC	532
483	ABCD	533
484	ABD	534
485	ABD	535
486	CD	536
487	CD	537
488	CD	538
489	ABC	539
490	ACD	540
491	ABD	541
492	BC	542
493	AD	543
494	ABC	544
495	AB	545