

## DPP No.# A1 (JEE-MAIN)

Total Marks: 45

Max. Time: 33 min.

Single choice Objective ('-1' negative marking) Q.1 to Q.12

(3 marks, 2 min.)

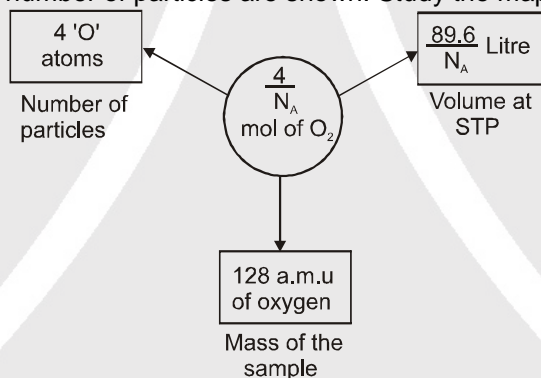
[36, 24]

Numerical Value Questions ('0' negative marking) Q.13 to Q.15

(3 marks, 3 min.)

[09, 09]

1. In which of the following options, the molecules are correctly matched with their atomicity :
- (1) P<sub>4</sub> (p) 7  
 (2) HNO<sub>3</sub> (q) 6  
 (3) C<sub>2</sub>H<sub>4</sub> (r) 5  
 (4) H<sub>2</sub>SO<sub>4</sub> (s) 4  
 (A) (1 - s), (2 - r), (3 - p), (4 - q) (B) (1 - q), (2 - s), (3 - p), (4 - r)  
 (C) (1 - q), (2 - s), (3 - r), (4 - p) (D) (1 - s), (2 - r), (3 - q), (4 - p)
2. 39.4 kg of gold was recovered from a smuggler. The number of atoms of gold recovered are :
- (A) 200 (B)  $1.2044 \times 10^{25}$  (C)  $6.022 \times 10^{25}$  (D)  $1.2044 \times 10^{26}$
3. 124 g of P<sub>4</sub> will contain which of the following :
- (1) 4 atoms of Phosphorus (2) 4N<sub>A</sub> atoms of Phosphorus  
 (3) N<sub>A</sub> molecules of Phosphorus (4) 1 molecule of Phosphorus  
 (A) (1) and (4) (B) (2) and 3 (C) (1) and (3) (D) (2) and (4)
4.  $1.5 \times 10^{22}$  atoms of an element weigh about 0.9 g. The atomic mass of the element (in amu) is :
- (A) 36 (B) 18 (C) 54 (D) 72
5. Sulphur exist in different allotropic forms like S<sub>2</sub>, S<sub>6</sub> and S<sub>8</sub> etc. If equal moles of these three forms are taken in separate containers, then the ratio of number of atoms present in them respectively is :
- (A) 1 : 3 : 4 (B) 1 : 1 : 1 (C) 12 : 4 : 3 (D) 4 : 3 : 1
6. A sample of oxygen containing  $\frac{4}{N_A}$  mol of oxygen is represented on a Y-map where its volume at NTP, mass of the sample and number of particles are shown. Study the map & choose the correct option.



- (A) Y-map is correct (B) mass of sample is wrong  
 (C) Number of 'O' atoms is wrong (D) Volume of oxygen is wrong
7. The charge on 1 gram of Al<sup>3+</sup> ions is : (N<sub>A</sub> = 6.02 × 10<sup>23</sup>, e = electronic charge)
- (A)  $\frac{1}{27}$  N<sub>A</sub>e coulomb (B)  $\frac{1}{3}$  N<sub>A</sub>e coulomb (C)  $\frac{1}{9}$  N<sub>A</sub>e coulomb (D) 3 N<sub>A</sub>e coulomb
8. Total number of neutrons present in 4g of heavy water (D<sub>2</sub>O) is : (Where N<sub>A</sub> represents Avogadro's number)
- (A) 2N<sub>A</sub> (B) 4N<sub>A</sub> (C) 1.2N<sub>A</sub> (D) 2.4N<sub>A</sub>
9. An element is found in nature in two isotopic forms with mass numbers (A-1) and (A+3). If the average atomic mass of the element is found to be A, then the relative abundance of the heavier isotope in the nature will be :
- (A) 60% (B) 75% (C) 25% (D) 40%
10. The minimum molar mass of a compound containing 3.2% oxygen by mass is :
- (A) 1000 g (B) 500 g (C) 2000 g (D) Cannot be determined
11. Find the empirical formula of a compound containing Fe, S and O in mass ratio 7 : 6 : 12 :
- (A) FeSO<sub>4</sub> (B) Fe<sub>2</sub>S<sub>2</sub>O<sub>3</sub> (C) Fe<sub>2</sub>S<sub>2</sub>O<sub>7</sub> (D) Fe<sub>2</sub>S<sub>3</sub>O<sub>12</sub>

12. The density of a liquid is 1.2 g/mL. There are 35 drops in 2 mL. The number of molecules in one drop (molar mass of liquid = 70 g/mol) is :
- (A)  $\left(\frac{1.2}{35}\right) N_A$       (B)  $\frac{1}{1.2} \left(\frac{1}{35}\right)^2 N_A$       (C)  $\frac{1.2}{(35)^2} N_A$       (D)  $1.2 N_A$
13. An organic compound contains 44.44% carbon by mass. If each molecule of the compound weighs  $2.25 \times 10^{-22}$  g, find the number of C-atoms present in one molecule of organic compound.
14. An element exist in three isotopic form :  $^{40}\text{X}$ ,  $^{41}\text{X}$  and  $^{42}\text{X}$ .  
Relative abundance of  $^{40}\text{X}$  = 30% by mole.  
If average atomic mass of 'X' is 41.25 u, find out the ratio of % abundance (by mole) of  $^{40}\text{X}$  to % abundance (by mole) of  $^{41}\text{X}$ .
15. Find the mass of  $\text{Cu}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}$  produced by dissolving 10g of copper in nitric acid and then evaporating the solution.

### DPP No.# A2 (JEE-ADVANCED)

**Total Marks: 40**

**Max. Time: 28 min.**

<b>Multiple choice objective ('-1' negative marking) Q.1 to Q.5</b>	<b>(4 marks, 2 min.)</b>	<b>[20, 10]</b>
<b>Numerical Value Questions ('0' negative marking) Q.6 to Q.9</b>	<b>(3 marks, 3 min.)</b>	<b>[12, 12]</b>
<b>Match the Following (no negative marking) Q.10</b>	<b>(8 marks, 6 min.)</b>	<b>[08, 06]</b>

1. Select the correct statements for  $(\text{NH}_4)_3\text{PO}_4$  :
- (A) Ratio of number of oxygen atoms to number of hydrogen atoms is 1 : 3  
 (B) Ratio of number of cations to number of anions is 3 : 1  
 (C) Ratio of number of nitrogen atoms to number of oxygen atoms is 3 : 4  
 (D) Total number of atoms in one mole of  $(\text{NH}_4)_3\text{PO}_4$  is 20
2. For the reaction  $2\text{P} + \text{Q} \longrightarrow 3\text{R} + 4\text{S}$ , 12 mole of P and 5 mole of Q will produce :
- (A) 18 mole of R      (B) 15 mole of R      (C) 24 mole of S      (D) 20 mole of S
3. Which of the following can show disproportionation reaction :
- (A)  $\text{ClO}_4^-$       (B)  $\text{Cl}^-$       (C)  $\text{ClO}_2^-$       (D)  $\text{ClO}_3^-$
4. Which of the following molarity of ions in an aqueous solution containing 5.85 % w/v NaCl, 5.55% w/v  $\text{CaCl}_2$  and 6% w/v NaOH is/are correct :
- (A)  $[\text{Cl}^-] = 2 \text{ M}$       (B)  $[\text{Na}^+] = 1 \text{ M}$       (C)  $[\text{Ca}^{2+}] = 0.5 \text{ M}$       (D)  $[\text{OH}^-] = 1.5 \text{ M}$
5. Dissolving 120 g of urea (molar mass 60) in 990 g of water gave a solution of density 1.11 g/ml. Select the correct statement(s):
- (A) Molarity of solution is 2 M.      (B) Molality of solution is 2.02 m.  
 (C) Molarity of solution is 1.78 M      (D) Mole fraction of urea is 0.035.
6. Caffeine has a molecular weight of 175. If it contain 32 % by mass of Nitrogen, find the number of atoms of nitrogen in one molecule of caffeine.
7.  $\text{KO}_2 + \text{H}_2\text{O} \longrightarrow \text{KOH} + \text{H}_2\text{O}_2 + \text{O}_2$   
 28.4g  $\text{KO}_2$ , when treated with excess  $\text{H}_2\text{O}$ , gives only 0.34g  $\text{H}_2\text{O}_2$  according to the above reaction. Determine the % yield of  $\text{H}_2\text{O}_2$ .
8.  $\text{Zn} + \text{NO}_3^- \longrightarrow \text{Zn}^{2+} + \text{NH}_4^+ + \text{H}_2\text{O}$   
 How many moles of electrons, per mole of  $\text{NO}_3^-$  ion, are gained in the above reaction?
9. 100 mL of sulphuric acid solution (sp. gr. = 1.84) contains 98% by weight of pure acid. Calculate the volume of 0.46 M NaOH solution (in L) required to just neutralize the above acid solution.

10. Match the following :

	Column I		Column II
(A)	1 M glucose solution	(p)	1 mole solute per litre solution
(B)	3 M urea solution	(q)	180 g solute per litre solution
(C)	3 M $\text{CH}_3\text{COOH}$ solution	(r)	% w/v = 18% (solution)
(D)	1 M $\text{H}_2\text{SO}_4$ solution	(s)	% w/v = 9.8% (solution)

## DPP No.# A3 (JEE-MAIN)

Total Marks: 45

Max. Time: 33 min.

Single choice Objective ('-1' negative marking) Q.1 to Q.12

(3 marks, 2 min.)

[36, 24]

Numerical Value Questions ('0' negative marking) Q.13 to Q.15

(3 marks, 3 min.)

[09, 09]

1. Which of the following orbital is non-directional ?  
(A) s (B) p (C) d (D) All
2. The orbital angular momentum corresponding to  $n = 4$  and  $m = +3$  is :  
(A) 0 (B)  $\frac{h}{\sqrt{2\pi}}$  (C)  $\frac{\sqrt{6} h}{2 \pi}$  (D)  $\frac{\sqrt{3} h}{\pi}$
3. The maximum number of electrons that can be accommodated in s, p and d-subshells respectively are :  
(A) 2 in each (B) 1, 3 and 5 (C) 2, 6 and 10 (D) 2, 6 and 14
4. Consider the following statements and arrange in the order of true/false.  
**S<sub>1</sub>** : For an electron, the given set of quantum numbers is not possible :  $n = 4, \ell = 1, m = 0, s = +\frac{1}{2}$   
**S<sub>2</sub>** : The total number of orbitals in a subshell is  $2\ell + 1$ , where  $\ell =$  Azimuthal quantum number.  
(A) T T (B) T F (C) F T (D) F F
5. Which of the following sets of quantum numbers can be correct for an electron in 4f-orbital :  
(A)  $n = 4, \ell = 3, m = -2, s = 0$  (B)  $n = 4, \ell = 3, m = +4, s = -\frac{1}{2}$   
(C)  $n = 4, \ell = 3, m = +1, s = +\frac{1}{2}$  (D)  $n = 4, \ell = 2, m = -4, s = +\frac{1}{2}$
6. Orbital angular momentum of an electron is  $\sqrt{3} \frac{h}{\pi}$ . Then, the number of orientations of this orbital in space are :  
(A) 3 (B) 5 (C) 7 (D) 9
7. In the electronic configuration of Mn ( $Z = 25$ ) is :  
(A) the number of electrons having  $n + \ell = 4$  is 5  
(B) the number of electrons having  $m = 0$  is 13  
(C) the magnetic moment is 1.73 BM  
(D) Mn belongs to IIIrd period and d-Block in periodic table.
8. If the electronic configuration of N-atom is represented as :  

↑↓	↑↓	↑↑	↑	
1s	2s	2p		

, then which of the following rules have been violated :  
(A) Aufbau's Principle (B) Pauli's exclusion principle  
(C) Hund's rule (D) Both (B) and (C)
9. The first ionisation enthalpies of Na, Mg, Al and Si are in the order :  
(A)  $\text{Na} < \text{Mg} > \text{Al} < \text{Si}$  (B)  $\text{Na} > \text{Mg} > \text{Al} > \text{Si}$  (C)  $\text{Na} < \text{Mg} < \text{Al} < \text{Si}$  (D)  $\text{Na} > \text{Mg} > \text{Al} < \text{Si}$
10. An atom with which of the following electronic configuration has the lowest first ionisation enthalpy among the following :  
(A)  $1s^2 2s^2 2p^5$  (B)  $1s^2 2s^2 2p^3$  (C)  $1s^2 2s^2 2p^6 3s^1$  (D)  $1s^2 2s^2 2p^6$
11. The correct sequence of the ionic radius of the following is :  
(A)  $\text{Br}^- > \text{Cl}^- > \text{S}^{2-} > \text{O}^{2-} > \text{F}^-$  (B)  $\text{Br}^- > \text{S}^{2-} > \text{Cl}^- > \text{O}^{2-} > \text{F}^-$   
(C)  $\text{Br}^- > \text{S}^{2-} > \text{Cl}^- > \text{F}^- > \text{O}^{2-}$  (D)  $\text{S}^{2-} > \text{Br}^- > \text{Cl}^- > \text{O}^{2-} > \text{F}^-$
12. Which one of the following statements is incorrect ?  
(A) Greater is the nuclear charge, greater is the electron gain enthalpy.  
(B) Nitrogen has almost zero electron gain enthalpy.  
(C) Electron gain enthalpy decreases from fluorine to iodine in the group.

- (D) Chlorine has highest electron gain enthalpy.
13. If the Azimuthal quantum number ' $\ell$ ' would have the range from zero to  $n$  for principal quantum number  $n$ , then find the total number of elements in 2nd period.
14. The number of electrons in  ${}_{24}\text{Cr}$  for which  $\ell + m = 2$
15. Find the atomic number of the element just below the element 'X' of 3d series. It is given that  $X^{3+}$  has magnetic moment of  $\sqrt{35}$  B.M.

### DPP No.# A4 (JEE-ADVANCED)

Total Marks: 40

Max. Time: 28 min.

Multiple choice objective ('-1' negative marking) Q.1 to Q.5	(4 marks, 2 min.)	[20, 10]
Numerical Value Questions ('0' negative marking) Q.6 to Q.9	(3 marks, 3 min.)	[12, 12]
Match the Following (no negative marking) Q.10	(8 marks, 6 min.)	[08, 06]

1. An organic compound was analysed to give following percentage composition by mass :  
 $\text{C} = 40\%$ ,  $\text{H} = 6.67\%$ ,  $\text{O} = 53.33\%$   
 Which molecular formula of compound could be possible for this composition.  
 (A)  $\text{C}_6\text{H}_{12}\text{O}_6$  (B)  $\text{CH}_3\text{COOH}$  (C)  $\text{CH}_3\text{CHO}$  (D)  $\text{C}_2\text{H}_5\text{OH}$
2. Which of the following sample(s) must have average molar mass greater than that of a mixture of  $\text{N}_2$  and  $\text{CO}_2$ ?  
 (A) Pure  $\text{O}_3$  (B) Pure Ne  
 (C) Mixture of  $\text{SO}_2$  and  $\text{SO}_3$  (D) Mixture of  $\text{CH}_4$  &  $\text{SO}_3$
3. A compound contains 2% Ca, 2.4% Mg and 12.8% S by mass. What can be the possible molecular mass of compound ?  
 (A) 1000 amu (B) 2000 amu (C) 4000 amu (D) 500 amu
4. Which of the following(s) is/are a redox reaction :  
 (A)  $\text{Mg} + \text{N}_2 \longrightarrow \text{Mg}_3\text{N}_2$  (B)  $\text{MnO}_4^- + \text{C}_2\text{O}_4^{2-} \longrightarrow \text{Mn}^{2+} + \text{CO}_2$   
 (C)  $\text{CuSO}_4 + \text{KI} \longrightarrow 2\text{CuI} + \text{I}_2 + \text{K}_2\text{SO}_4$  (D)  $\text{AgCl} + \text{NH}_3 \longrightarrow [\text{Ag}(\text{NH}_3)_2]\text{Cl}$
5. Select the correct statement(s) :  
 (A) The value of spin only magnetic moment of  $\text{Co}^{3+}$  ion (in BM) =  $\sqrt{24}$   
 (B) The number of radial nodes in a 3p-orbital = 1  
 (C) The number of electrons with ( $m = 0$ ) in  $\text{Mn}^{2+}$  ion = 11  
 (D) The orbital angular momentum for the unpaired electron in  $\text{V}^{4+} = \frac{\sqrt{6}h}{4\pi}$
6. How many of the following contain peroxide species?  
 (i)  $\text{CO}_2$  (ii)  $\text{NO}_2$  (iii)  $\text{BaO}_2$  (iv)  $\text{PbO}_2$  (v)  $\text{KO}_2$  (vi)  $\text{Na}_2\text{O}_2$   
 (viii)  $\text{MnO}_2$  (viii)  $\text{CrO}_5$
7. The periodic table consists of 18 groups. An isotope of Zn, on bombardment with neutron, undergoes a nuclear reaction yielding element X as shown below. To which group, element X belongs in the periodic table ?  

$${}_{30}^{64}\text{Zn} + {}_0^1\text{n} \rightarrow \text{X} + 2\alpha + {}_1^1\text{H}$$
8. The density of water at  $4^\circ\text{C}$  is  $1.0 \times 10^3 \text{ kg m}^{-3}$ . The volume occupied by one molecule of water is  $A \times 10^{-23} \text{ mL}$  approximately then value of A is (Given  $N_A = 6 \times 10^{23} \text{ mL}$ )
9. The number of orbitals amongs the following having zero probability of finding electron along z axis are:  
 (a)  $3p_z$  (b)  $2p_x$  (c)  $3d_{xy}$  (d)  $4d_{yz}$  (e)  $4s$  (f)  $5d_{x^2-y^2}$   
 (g)  $3d_{xz}$  (h)  $4p_y$
10. A mixture of methane and ethylene in the ratio of a : b by volume occupies 30 ml. On complete combustion, the mixture yield 40 ml of  $\text{CO}_2$ . What volume of  $\text{CO}_2$  (in ml) would have been obtained if the ratio would have been b : a?

## DPP No.# A5 (JEE-MAIN)

Total Marks: 45

Max. Time: 33 min.

Single choice Objective ('-1' negative marking) Q.1 to Q.12

(3 marks, 2 min.)

[36, 24]

Numerical Value Questions ('0' negative marking) Q.13 to Q.15

(3 marks, 3 min.)

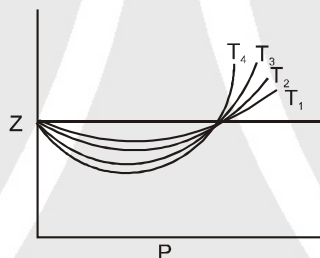
[09, 09]

1. Consider the ground state of Cr atom ( $Z = 24$ ). The numbers of electrons with the azimuthal quantum numbers,  $\ell = 1$  and 2 are, respectively :  
 (A) 16 and 5 (B) 12 and 5 (C) 16 and 4 (D) 12 and 4
2. Which of the following orbitals have no angular node?  
 (A) 4s (B) 4p (C) 4d (D) 4f
3. A 4 : 1 molar ratio mixture of helium and methane is contained in a vessel at 10 bar pressure. Due to a hole in the vessel, the gas mixture leaks out. The molar ratio composition of the mixture effusing out initially is :  
 (A) 8 : 1 (B) 16 : 1 (C) 32 : 1 (D) 6 : 1

4.  $O_2$  and  $SO_2$  is filled in two different containers 'A' and 'B' respectively at same T and P. 'A' has circular orifice while 'B' has square orifice of edge length equal to the diameter of the orifice of vessel 'A', then ratio of rate of diffusion of the gases from vessel A to that from vessel B will be :

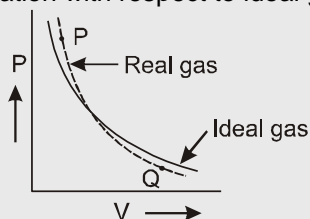
- (A)  $\pi : 2\sqrt{2}$  (B)  $\frac{4}{\sqrt{2}} : \pi$  (C)  $\sqrt{2} \pi : 1$  (D)  $\pi : 2$

5. Which of the following is correct order of temperature shown in the above graph Z Vs P for the same gas :



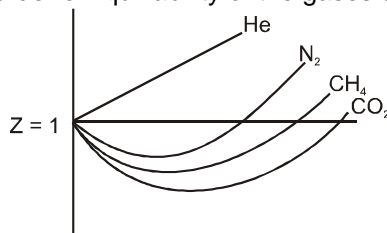
- (A)  $T_4 < T_3 < T_2 < T_1$  (B)  $T_1 < T_2 < T_3 < T_4$  (C)  $T_1 < T_2 < T_4 < T_3$  (D)  $T_3 < T_4 < T_2 < T_1$

6. At point P and Q, the real gas deviation with respect to ideal gas is respectively :



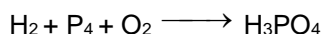
- (A) Positive, negative (B) Positive, positive (C) Negative, positive (D) Negative, negative

7. What is the correct increasing order of liquifiability of the gases shown as in above graph :



- (A)  $He < N_2 < CH_4 < CO_2$  (B)  $CO_2 < CH_4 < N_2 < He$   
 (C)  $He < CH_4 < N_2 < CO_2$  (D)  $CH_4 < He < N_2 < CO_2$

8. The number of moles of Phosphoric acid ( $H_3PO_4$ ) that can be produced, by allowing 0.8 moles of  $H_2$ , 0.9 moles of  $P_4$  and 1 mole of  $O_2$  to combine according to the given unbalanced reaction is :



9. At the critical point for  $\text{H}_2$  gas, value of  $Z = 3/8$ . Then, the value of  $Z$  for the similar conditions of  $\text{CO}_2$ ,  $\text{O}_2$ ,  $\text{SO}_2$  at their respective critical points will be :  
 (A) 0.533 mole (B) 3.6 mole (C) 0.5 mole (D) 1.2 mole  
 (A) greater than  $3/8$  (B) smaller than  $3/8$  (C) equal to  $3/8$  (D) nothing can be said
10. In the balanced chemical reaction,  $\text{IO}_3^- + \text{aI}^- + \text{bH}^+ \longrightarrow \text{cH}_2\text{O} + \text{dI}_2$  a, b, c and d respectively correspond to :  
 (A) 5, 6, 3, 3 (B) 5, 3, 6, 3 (C) 3, 5, 3, 6 (D) 5, 6, 5, 5
11. A bottle of 1 litre capacity is labelled as 1 molar  $\text{Al}_2(\text{SO}_4)_3(\text{aq})$ . If the bottle is half filled and density of solution is 1.342 g/mL, then molality of  $\text{Al}^{3+}(\text{aq})$  in this solution will be :  
 (A) 1 (B) 2 (C) 3 (D) 4
12. The virial equation for 1 mole of a real gas is written as :  

$$PV = RT \left[ 1 + \frac{A}{V} + \frac{B}{V^2} + \frac{C}{V^3} + \dots \text{to higher power of } n \right]$$
 Where A, B and C are known as virial coefficients. If Vander waal's equation is written in virial form, then what will be the value of B:  
 (A)  $a - \frac{b}{RT}$  (B)  $b^3$  (C)  $b - \frac{a}{RT}$  (D)  $b^2$
13. A sample of  $\text{H}_2\text{SO}_4$  (density 1.8 g mL<sup>-1</sup>) is labelled as 74.66% by weight. What is molarity of acid ? (Give answer in rounded digits)
14. Calculate the molecular weight of a gas which diffuses four times as fast as another gas Y, which in turn diffuses twice as fast as another gas Z. Molecular weight of Z is 128.
15. The element represented by the symbol Une belong to p<sup>th</sup> group of modern periodic table. Also the element having highest value of electron gain enthalpy (released energy) has atomic number q. Find the value of (q - p).

### DPP No.# A6 (JEE-ADVANCED)

Total Marks: 41

Max. Time: 27 min.

Multiple choice objective ('-1' negative marking) Q.1 to Q.6	(4 marks, 2 min.)	[24, 12]
Numerical Value Questions ('0' negative marking) Q.7 to Q.9	(3 marks, 3 min.)	[09, 09]
Match the Following (no negative marking) Q.10	(8 marks, 6 min.)	[08, 06]

1. There is/are difference between a 2p and a 3p orbital regarding -  
 (A) shape (B) size (C) energy (D) value of n
2. Which of the following quantum number has been derived from Schrodinger wave equation :  
 (A) Principal quantum number (n) (B) Subsidiary quantum number ( $\ell$ )  
 (C) Magnetic quantum number (m) (D) Spin quantum number (s)
3. Select the correct statement(s) :  
 (A) Both diamond and graphite are diamagnetic in nature.  
 (B) Electrical conductivity in graphite decreases along a layer on increasing temperature.  
 (C) Silica ( $\text{SiO}_2$ ) has a gaint covalent network-like structure with each Si atom bonded with 4 O-atoms.  
 (D) A molecule of Buckminster fullerene ( $\text{C}_{60}$ ) consists of 20 pentagonal rings and 12 hexagonal rings.
4. Which of the following specie(s) is/are obey octet rule :  
 (A)  $\text{SiF}_4$  (B)  $\text{PCl}_5$  (C)  $\text{ICl}$  (D)  $\text{BF}_4^-$
5. Hypervalent compound is(are) :

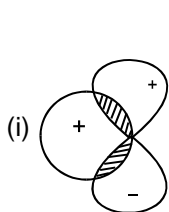


(A)  $\text{SO}_3^{2-}$ 

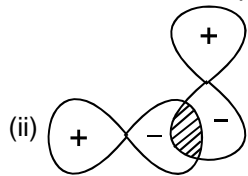
(B) IF

(C)  $\text{SO}_4^{2-}$ (D)  $\text{CO}_2$ 

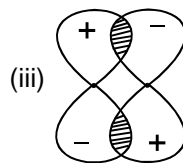
6. Which of the following atomic orbitals overlapping is/are not allowed (According to VBT)



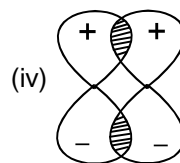
(A) (i)



(B) (ii)



(C) (iii)



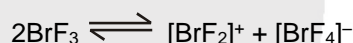
(D) (iv)

7. In how many of the following species the central atoms have two lone pairs of electrons ?

XeF<sub>4</sub>ClF<sub>3</sub>F<sub>2</sub>SeO<sub>2</sub>XeF<sub>3</sub><sup>+</sup>NH<sub>2</sub><sup>-</sup>ClOF<sub>3</sub>ICl<sub>4</sub><sup>-</sup>SCl<sub>2</sub>XeOF<sub>2</sub>

8. In SOF<sub>4</sub> how many maximum atoms are in the same plane.

9. BrF<sub>3</sub> is a liquid which considerably undergoes self ionization to form cationic and anionic species. Based on VSEPR theory, number of 90 degree F–Br–F bond angles is ..... in anionic species.



10. Match the species in column (I) with their geometry in column (II)

Column-I		Column-II	
(A)	BH <sub>4</sub> <sup>-</sup>	(p)	2 bond pair and 3 lone pair
(B)	ICl <sub>2</sub> <sup>+</sup>	(q)	4 bond pair and no lone pair
(C)	ICl <sub>2</sub> <sup>-</sup>	(r)	3 bond pair and 1 lone pair
(D)	ICl <sub>4</sub> <sup>-</sup>	(s)	2 bond pair and 2 lone pair
		(t)	4 bond pair and 2 lone pair

### DPP No.# A7 (JEE-MAIN)

Total Marks: 45

Max. Time: 33 min.

Single choice Objective ('-1' negative marking) Q.1 to Q.12

(3 marks, 2 min.)

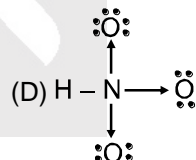
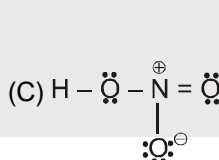
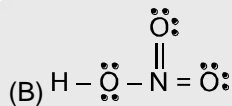
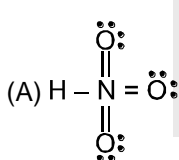
[36, 24]

Numerical Value Questions ('0' negative marking) Q.13 to Q.15

(3 marks, 3 min.)

[09, 09]

1. The correct representation of Lewis dot structure of HNO<sub>3</sub> is :



2. Species not obeying octet rule is :

(A)  $\text{CO}_3^{2-}$ (B) BF<sub>3</sub>(C)  $\text{NO}_2^-$ (D) PCl<sub>3</sub>

3. Which of the following set of quantum numbers is not valid :

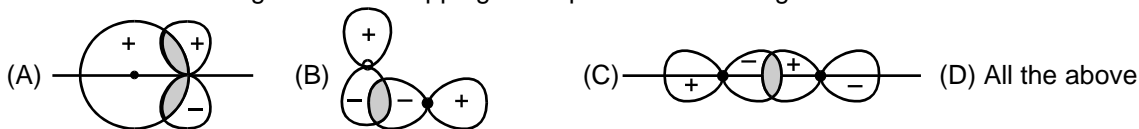
(A)  $n = 3, l = 2, m = 2, s = +\frac{1}{2}$ (B)  $n = 2, l = 0, m = 0, s = -\frac{1}{2}$ (C)  $n = 4, l = 2, m = -1, s = +\frac{1}{2}$ (D)  $n = 4, l = 3, m = 4, s = -\frac{1}{2}$ 

4. A sigma bond may be formed by the overlap of two atomic orbitals of atoms A and B. If the bond is formed along the x-axis, which of the following overlaps is acceptable ?

(A) s orbital of A and p<sub>z</sub> orbital of B(B) p<sub>x</sub> orbital of A and p<sub>y</sub> orbital of B

(C)  $p_z$  orbital of A and  $p_x$  orbital of B(D)  $p_x$  orbital of A and s orbital of B

5. Which of the following orbital overlapping is not possible according to VBT.



6. In which of the following molecules, bonding is not taking place in excited state :

(A)  $\text{CH}_4$  (B)  $\text{BF}_3$  (C)  $\text{IF}_7$  (D)  $\text{PCl}_3$ 7. An ion  $\text{Mn}^{a+}$  has spin magnetic moment equal to 4.9 BM. The value of a is :

(A) 3 (B) 4 (C) 2 (D) 5

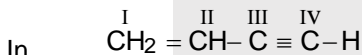
8. Resonating structures have different :

(A) Atomic arrangements (B) Electronic arrangements  
(C) Functional groups (D) Sigma bond

9. Resonance hybrid of nitrate ion is :

10. According to VSEPR theory in  $[\text{IO}_2\text{F}_2]^-$  ion the  $\text{F}\hat{\text{I}}\text{F}$  bond angle will be nearly(A)  $120^\circ$  (B)  $90^\circ$  (C)  $109^\circ-28'$  (D)  $180^\circ$ 

11. Consider the following statements :



- There are 6  $\sigma$  and 3  $\pi$  bonds.
- Carbon I & II are  $sp^2$  hybridised.
- Carbon III & IV are  $sp$  hybridised.

The above statements 1, 2, 3 respectively are (T = True, F = False) :

(A) T T T (B) F T T (C) F T F (D) T F T

12. The hybridization of atomic orbitals of nitrogen in  $\text{NO}_2^+$ ,  $\text{NO}_3^-$  and  $\text{NH}_4^+$  are :(A)  $sp$ ,  $sp^3$  and  $sp^2$  respectively (B)  $sp$ ,  $sp^2$  and  $sp^3$  respectively  
(C)  $sp^2$ ,  $sp$  and  $sp^3$  respectively (D)  $sp^2$ ,  $sp^3$  and  $sp$  respectively13. How many P-P single bonds are present in white phosphorus ( $\text{P}_4$ ) molecule ?14. The density of a gas filled in an electric lamp is  $0.75 \text{ kg/m}^3$ . When lamp is switched on, the pressure in it increases from 4 Pa to 25 Pa, then what is increase in  $u_{\text{rms}}$  in m/sec.

15. What volume of water is required to make 0.20 M solution from 16 mL of 0.5 M solution ?