KENDRIYA VIDYALAYA HIMMATNAGAR (23-24)

Class-XI Holiday homework

COMPUTER SCIENCE

1. Write a statement to create a list of first 10 even numbers

2. Write a statement to create an empty list

3. What will the following code display?

```
numbers = list(range(1, 10, 2))
print(numbers)
```
4. What will the following code display?

```
numbers = [3] * 3
print(numbers)
```
5. What will the following code display?

```
numbers = [10, 20, 30, 40]
print(numbers[-4])
```
6. Write the output of following code.

```
numbers = [10, 20, 30, 40, 50]
x = numbers[1:3]
print(x)
y = numbers[1:]
print(y)
z = numbers[:1]
print(z)
```
7. Write the output of following code.

```
a = ["hello", 2.0, 5, [10, 20]]
print(a[2])
print(a[3])
print(a[3][1])
```
8. Write a statement to delete last element of following list.

```
numbers = [10,20,30,40]
```
9. Write a statement to add 'mango' in following list at the end.

```
fruits =['apple', 'banana']
```

10. Write the output of following code segments.

```
t1 = ['a', 'b', 'c']
t2 = ['d', 'e']
t1.append(t2)
print(t1)
```

11. Write the output of following code segments.

```
t1 = ['a', 'b', 'c']
t2 = ['d', 'e']
t1.extend(t2)
print(t1)
```

12. Write the output of following code segments.

```
colors = ['red', 'green', 'blue', 'orange', 'black']
colors.sort()
color = colors.pop()
print(color)
print(colors)
```

13. Write the output of following code segments.

```
s ='Just Do It'
w = s.split()
c = list(w[0]+w[1]+w[2])
print(w)
print(c)
```

14. Write the output of following code segments.

```
a = "Guido Van Rossum"
a = a.split()
b = a[0][0]+". "+a[1][0]+". "+a[2]
print (b)
```

15. Write the output of following code segments.

```
List = ["P",20,"R",10,"S",30]
Times = 0
Alpha = ""
Sum = 0
for I in range(1,6,2):
    Times = Times + I
    Alpha = Alpha + List[I-1]+"#"
    Sum = Sum + List[I]
print(Times,Sum,Alpha)
```

16. How many times will 'Hello World' be printed in the following program?

```
count = 1
while count <= 10:
    print('Hello World')
    count = count + 3
```

Physics

1. A bullet of mass 0.02 kg is moving with a speed of 10m/s. It can penetrate 10 cm of a wooden block. and comes to rest. If the thickness of the target would be 6 cm only find the KE of the bullet when comes out

2. A ball bounces is 80% of its original height Calculate the mechanical energy lost in each bounce

3. A pendulum bob of mass 0.1 kg is suspended by a string of 1 m long. The bob is displaced so that the string becomes horizontal and released. Find its kinetic energy when the string makes an angle of (0) 0° and 30 ° with the vertical

4. Prove that the rate of change of angular momentum of a system of particles about a reference point is equal to the net torque acting on the system

5. Derive a relation between angular momentum moment of inertia and angular velocity of a rigid body.

6. Three masses 3 kg, 4 kg and 5 kg are located at the corners of an equilateral triangle of side 1m. Locate the center of mass of the system.

7. The angular speed of a motor wheel is increased from 1200 rpm to 3120 rpm in 16 seconds (i) What is its angular acceleration (assume the acceleration to be uniform) (ii) How many revolutions does the wheel make during this time?

8. A mene stick is balanced on a knife edge at its center. When two coins, each of mass 5 g are put one on top of the other at the 120 cm mark the stick is found to be balanced at 45.0 cm. What is the mass of the meter stick?

9. An automobile moves on a road with a speed of 54 km/h. The radius of its wheels is 0.35 m. What is the average negative torque transmitted by its brakes to a wheel if the vehicle is brought to rest in 1567 The moment of inertia of the wheel about the axis of rotation is 3 km

10. Two bodies of masses and 2 kg are located at (1.2) and (-1, 3) respectively. Calculate the coordinates to the center of mass.

11. What is the analogue of mass in rotational motion? Derive the expression for the kinetic energy of a rotating body

12. Derive the relation between linear velocity and angular velocity? Explain the examples of law of conservation of momentum.

शरदकालीन अवकाश गृहकार्य - 2023-24

कक्षा - ग्यारहवीं

प्रश्न 1. दस दिनों की डायरी लिखकर लाएँ।

प्रश्न २. किसी घटना /स्थिति के आधार पर दृश्य लेखन लिखिए -

प्रश्न 3. जनसंचार के प्रमुख माध्यमों (विभिन्न माध्यमों के लिए लेखन पाठ पर आधारित) पर आधारित बीस बहुविकल्पीय प्रश्न तैयार करिए -

प्रश्न 4. स्ववृत्त लिखकर लाएँ।

प्रश्न 5. अप्रत्याशित विषय पर रचनात्मक लेख :–

*भारत की वैज्ञानिक उन्नति

* खेलों में बढ़ता वर्चस्व भारत का

प्रश्न 6. विद्यालय - पत्रिका प्रकाशन के लिए आप अपनी लिखी कोई कविता / कहानी/लेख/ पहेलियाँ/खेलकूद/सामान्य ज्ञान- विज्ञान/कोरोना के अनुभव आदि विद्यालय खुलते ही जमा करेंगे।

प्रश्न 7. परियोजना कार्य तैयार करें।

Holiday Homework

[class- XI Maths]

① Solve examples of all chapters.

② If the lines $y = 3x + 1$ and $2y = x + 3$ are equally inclined to the line $y = mx + 4$, find the value of m.

③ Find the equation of lines through the point $(3, 2)$ which make an angle of $45°$ with the line $x - 2y = 3$.

④ Find the distance of the line $4x + 7y + 5 = 0$ from the point $(1, 2)$ along the line $2x - y = 0$.

⑤ Find equations of the lines through the point of intersection of the lines $x - y + 1 = 0$ and $2x - 3y + 5 = 0$ and whose distance from the point $(3, 2)$ is $7/5$.

⑥ Find equation of circle with centre $(-a, -a)$ and radius $\sqrt{2}a$.

⑦ Find value of k, for which equation $9x^2 + y^2 = k \cdot (x^2 - y^2 - 2x)$ represent the equation of a circle

⑧ Find ecentricity of hyperbola, $3x^2 - 2y^2 = 1$.

⑨ Find vertex and focus of the parabola $2y^2 + 3y - 4x - 3 = 0$

⑩ Find radius of a circle passing through foci of $9x^2 + 16$ $= 144$ and having centre co

Subject: Chemistry

केंद्रीय विद्यालय संगठन, अहमदाबाद संभाग

KENDRIYA VIDYALAYA SANGATHAN, AHMEDABAD REGION

अर्धवार्षिक परीक्षा 2022-23

HALF YEARLY EXAMINATION 2022-23

SUBJECT: CHEMISTRY
CLASS: XI

M.M.: 70
TIME: 3 Hours

GENERAL INSTRUCTIONS:

1. There are **35** questions in this question paper with internal choice.
2. SECTION A consists of 18 multiple-choice questions carrying 1 mark each.
3. SECTION B consists of 7 very short answer questions carrying 2 marks each.
4. SECTION C consists of 5 short answer questions carrying 3 marks each.
5. SECTION D consists of 2 case- based questions carrying 4 marks each.
6. SECTION E consists of 3 long answer questions carrying 5 marks each.
7. All questions are compulsory.
8. Use of log tables and calculators is not allowed

SECTION-A

1. The total number of ions present in 111 g of $CaCl_2$ is   1

    A   One Mole

    B   Two Mole

    C   Three Mole

    D   Four Mole

2. An organic compound contains carbon, hydrogen and oxygen. Its elemental   1
   analysis gave C=38.71% and H=9.67%. The empirical formula of the
   compound would be

    A   CHO

    B CH_4O

    C CH_4O CH_3O ✓

    D CH_2O

3. The magnetic quantum number specifies   1

    A   Size of orbitals

    B   Shape of orbitals

    C   Orientation of orbitals

    D   Nuclear Stability

4   Which of the following statements is correct for multi electron species?

A   3s orbital is higher in energy than 3p orbital

B   4s orbital is lower in energy than 3d orbital

C   3s and 3p orbitals are similar in energy

D   3s, 3p and 3d orbitals all have the same energy

5   Which one of the following sets of ions represents isoelectronic species?

A K^+, Ca^{2+}, Sc^{3+}, Cl^-

B Na^+, Ca^{2+}, Sc^{3+}, F^-

C K^+, Cl^-, Mg^{2+}, Sc^{3+}

D Na^+, Mg^{2+}, Al^{3+}, Cl^-

6   The element with atomic number 35 belongs to

A   d – Block

B   s – Block

C   p – Block

D   f – Block

7   The correct order of first ionization enthalpy among the following elements - Be, B, C, N and O is

A   B < Be < C < O < N

B   B < Be < C < N < O

C   Be < B < C < N < O

D   Be < B < C < O < N

8   Which of the following is a linear molecule?

A ClO_2

B CO_2

C NO_2

D SO_2

9   The Hybridisation of central atom in SF_4

A Sp^3

B Sp^3d

C Sp^3d^2

D Sp^2

1

10. The enthalpy of vaporisation of a substance is 8400 J mol^{-1} and its boiling point is −173°C. The entropy change for vaporisation is: 1

A   21 J $mol^{-1}K^{-1}$

B   84 J $mol^{-1}K^{-1}$

C   49 J $mol^{-1}K^{-1}$

D   12 J $mol^{-1}K^{-1}$

11. In a reversible process the system absorbs 600 kJ heat and performs 250 kJ work on the surroundings. What is the increase in the internal energy of the system?   1

A   850 kJ

B   600 kJ

C   350 kJ

D   250 kJ

12. In which of the following process, a maximum increase in entropy is observed?   1

A   Dissolution of Salt in Water

B   Condensation of Water

C   Sublimation of Naphthalene

D   Melting of Ice

13. Which of the following is not a general characteristic of equilibria involving physical processes?   1

A   Equilibrium is possible only in a closed system at a given temperature.

B   All measurable properties of the system remain constant.

C   All the physical processes stop at equilibrium.

D   The opposing processes occur at the same rate and there is dynamic but stable condition.

In a reversible chemical reaction at equilibrium, if the concentration of any one of the reactants is doubled, then the equilibrium constant will

A   Also, be Doubled

B   Be Halved

C   Remain the Same

D   Become One-Fourth

Assertion (A) and Re

(R) Select the most appropriate answer from the options given below:

A   Both A and R are true and R is the correct explanation of A.

B   Both A and R are true but R is not the correct explanation of A.

C   A is true but R is false.

D   A is false but R is true.

15   **Assertion (A):** Electron gain enthalpy does not always become less   1
negative as we go down a group in Modern periodic table.
Reason (R): Size of the atom increases on going down the group in Modern
periodic table and added electron would be farther from the nucleus.

16   **Assertion (A):** Though the central atom of both NH_3 and H_2O molecules are   1
sp^3 hybridised, yet H−N−H bond angle is greater than that of H−O−H.
Reason (R): This is because nitrogen atom in NH_3 has one lone pair and
oxygen atom in H_2O has two lone pairs.

17   **Assertion (A):** Entropy of system increases for a spontaneous reaction.   1

Reason (R): Enthalpy of reaction always increases for spontaneous
reaction.

18   **Assertion (A):** As pressure increases the dissociation of PCl_5 into PCl_3 and   1
Cl_2 increases.

Reason (R): An equilibrium is subjected to change in pressure, it will shift
in that direction to undo the effect of change.

SECTION − B

9   Define molarity. How is it affected by a change in temperature?

)   Write the name and symbol of element which are indicated by the following   2
electronic configurations: 2
(a) $1s^2, 2s^2, 2p^6, 3s^2, 3p^5$. (b) [Ar] $4s^1, 3d^{10}$

OR

Write the electronic configuration of : (a) Cr   (b) Fe^{3+}

Calculate (a) wavenumber and (b) frequency of yellow radiation having
wavelength 5800 Å.   2

OR   2

A 100 watt bulb emits monochromatic light of wavelength 400 nm. Calculate
the number of photons emitted per second by the bulb.

Define the following: -

22 (a) Pauli Exclusion Principle (b) Hund's Rule of Maximum Multiplicity   2

23 Using the Periodic Table, predict the formulas of compounds which might be formed by the following pairs of elements; (a) silicon and bromine (b) aluminium and sulphur   2

24 Show by a chemical reaction with water that Na_2O is a basic oxide and Cl_2O, is an acidic oxide.   2

25 If water vapour is assumed to be a perfect gas, molar enthalpy change for vapourisation of 1 mol of water at 1bar and 100°C is 41kJ mol^{-1}. Calculate the internal energy change, when1 mol of water is vapourised at 1 bar pressure and 100°C.   2

SECTION - C

26 A compound contains 4.07% hydrogen, 24.27% carbon and 71.65% chlorine. Its molar mass is 98.96 g. What are its empirical and molecular formulas?   3

27 (a) Define molarity.   3

(b) The density of 3 M solution of NaCl is 1.25 g mL^{-1}. Calculate the molality of the solution.

28 (a) Define modern periodic law.

(b) Which of the following pairs of elements would have a more negative electron gain enthalpy and why? F or Cl

(c) Would you expect the second electron gain enthalpy of O as positive, more negative or less negative than the first? Justify your answer.

29 The combustion of one mole of benzene takes place at 298 K and 1 atm.   3
After combustion, $CO_2(g)$ and H_2O (l) are produced and 3267.0 kJ of heat is liberated. Calculate the standard enthalpy of formation, ΔH_f^0 of benzene. Standard enthalpies of formation of $CO_2(g)$ and $H_2O(l)$ are –393.5 kJ mol^{-1} and – 285.83 kJ mol^{-1} respectively.   3

30 (a) Define law of mass action.

(b) Write the expression for the equilibrium constant, Kc for each of the following reactions:

(i) $2NOCl (g) \rightleftharpoons 2NO (g) + Cl_2 (g)$

(ii) $2Cu(NO_3)_2 (s) \rightleftharpoons 2CuO (s) + 4NO_2 (g) + O_2 (g)$

OR

(a) Find out the value of K_c for each of the following equilibria from the value of K_p as given below for the reaction:

2NOCl (g) $\rightleftharpoons$ 2NO (g) + Cl$_2$ (g); K_p= 1.8 × 10^{-2} at 500 K

(b) Derive the relationship between K_p and K_c

SECTION – D (CASE BASED)

Question no. 31 and 32 are case-based questions and carries 4 (1+1+2) marks each. Read the passage carefully and answer the questions that follow.

31   **"POLARITY OF BONDS & THE VALENCE SHELL ELECTRON PAIR REPULSION (VSEPR) THEORY"**

In case of a heteronuclear molecule like HF, the shared electron pair between the two atoms gets displaced more towards fluorine since the electronegativity of fluorine is far greater than that of hydrogen. The resultant covalent bond is a polar covalent bond. As a result of polarisation, the molecule possesses the dipole moment (depicted below) which can be defined as the product of the magnitude of the charge and the distance between the centres of positive and negative charge.

The shape of a molecule depends upon the number of valence shell electron pairs (bonded or nonbonded) around the central atom. Pairs of electrons in the valence shell repel one another since their electron clouds are negatively charged. These pairs of electrons tend to occupy such positions in space that minimise repulsion and thus maximise distance between them. The valence shell is taken as a sphere with the electron pairs localising on the spherical surface at maximum distance from one another. The repulsive interaction of electron pairs decreases in the order:

Lone pair (lp) – Lone pair (lp) > Lone pair (lp)– Bond pair (bp) > Bond pair (bp)–Bond pair (bp)

(a) Compare the bond angle of CH$_4$ and NH$_3$ with explanation.   1

(b) What is the shape of ClF$_3$. Also draw the shape.   1

(c) Which out of NH$_3$ and NF$_3$ has higher dipole moment and why?   2

OR

) Write the unit of dipole moment and explain why BeH$_2$ molecule has a   2
ero-dipole moment although the Be–H bonds are polar.

"Factors affecting equilibria"

One of the principal goals of chemical synthesis is to maximise the conversion of the reactants to products while minimizing the expenditure of energy. This implies maximum yield of products at mild temperature and pressure conditions. If it does not happen, then the experimental conditions need to be adjusted. For example, in the Haber process for the synthesis of ammonia from N_2 and H_2, the choice of experimental conditions is of real economic importance. Annual world production of ammonia is about hundred million tones, primarily for use as fertilizers. Equilibrium constant, Kc is independent of initial concentrations. But if a system at equilibrium is subjected to a change in the concentration of one or more of the reacting substances, then the system is no longer at equilibrium; and net reaction takes place in some direction until the system returns to equilibrium once again. Similarly, a change in temperature or pressure of the system may also alter the equilibrium. In order to decide what course, the reaction adopts and make a qualitative prediction about the effect of a change in conditions on equilibrium we use Le Chatelier's principle. It states that a change in any of the factors that determine the equilibrium conditions of a system will cause the system to change in such a manner so as to reduce or to counteract the effect of the change. This is applicable to all physical and chemical equilibria.

(a) What will be the effect on equilibrium if temp is increased in the below given equation?   1

$2NO_2(g) \rightleftharpoons N_2O_4(g)$; $\Delta H = -57.2$ kJ mol^{-1}

(b) What will be the effect on equilibrium if pressure is decreased in the below given equation?   1

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$; $\Delta H = -92.38$ kJ mol^{-1}

(c) Describe the effect of : (i) addition of H_2 (ii) removal of CH_3OH on the equilibrium of the reaction: $2H_2(g) + CO \rightleftharpoons (g)$ CH_3OH (g)   2

OR

(c) What will be the effect on equilibrium if inert gas is added at (i) Constant Pressure (ii) Constant Volume for the given equation: 2

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$; $\Delta H = -92.38$ kJ mol^{-1}

SECTION – E

33 (a) Write the postulates of Bohr's modal of an atom.(Any two)

(b) Calculate the energy associated with the first orbit of He^+. What is the radius of this orbit?

(c) Find out the number of angular nodes in 3d orbital

OR

(a) Define Heisenberg's Uncertainty Principle and write its Significance

(b) A golf ball has a mass of 40g and a speed of 45 m/s. If the speed can be measured within accuracy of 2%, calculate the uncertainty in the position.

(c) Write the values of all four quantum numbers for $4dz^2$ orbital

4 (a) Briefly explain molecular orbital theory

(b) Explain the magnetic behaviour of O_2 by MOT. Also draw energy level diagram and calculate bond order in O_2

OR

(a) Define hybridisation and write the Important conditions for hybridisation.

(b) Find out the hybridisation and shape of the following molecules

(i) $BeCl_2$ (ii) BF_3 (iii) H_2O

(a) Define Third law of thermodynamics.

(b) Calculate the standard enthalpy of formation of $CH_3OH(l)$ from the following data:

(i) $CH_3OH\ (l) + 3/2\ O_2(g) \rightarrow CO_2\ (g) + 2H_2O(l)$; $\Delta H_r^0 = -726$ kJ mol^{-1}

(ii) $C(graphite) + O_2(g) \rightarrow CO_2(g)$; $\Delta H_c^0 = -393$ kJ mol^{-1}

(iii) $H_2(g) + 1/2\ O_2(g) \rightarrow H_2O(l)$; $\Delta H_f^0 = -286$ kJ mol^{-1}.

(c) For the reaction $2\ A(g) + B(g) \rightarrow 2D(g)$ $\Delta U^0 = -10.5$ kJ and $\Delta S^0 = -44.1$ JK^{-1}. Calculate ΔG^0 for the reaction, and predict whether the reaction may occur spontaneously.(R=8.314 J/mol K)