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Winter Break Homework

Class-XI(A)

Sub: Chemistry

Redox Reactions

1)Explain why oxidation and reduction cannot occur independently of each other.

2)Assign oxidation numbers to all atoms in $K_2Cr_2O_7$ and justify each step.

3)In the reaction

$2Cu^{+} \rightarrow Cu^{2+} + Cu$

Identify the species undergoing oxidation and reduction. Name the type of reaction.

4)Balance the following redox reaction in acidic medium using ion–electron method:

$Cr_2O_7^{2-} + SO_2 \rightarrow Cr^{3+} + SO_4^{2-}$

5)Balance the following redox reaction in basic medium:

$MnO_4^{-} + I^{-} \rightarrow MnO_2 + I_2$

6)Explain why fluorine always shows oxidation number –1, whereas other halogens show variable oxidation states.

7)A reaction is said to be a redox reaction even if no electrons appear explicitly. Explain with an example.

B. Equilibrium

8)Explain why equilibrium can be established only in a closed system.

For the reaction:

$N_2 + 3H_2 \rightleftharpoons 2NH_3$

predict the effect on equilibrium when:

(a) volume is decreased

(b) temperature is increased

9)Explain why addition of a catalyst does not change the equilibrium constant.

10)The value of Kc for a reaction is very large. What does this indicate about the extent of reaction?

11)How does equilibrium constant change with temperature for an exothermic reaction? Explain.

For the equilibrium:

$2NO_2 \rightleftharpoons N_2O_4$

explain the effect of increase in pressure and decrease in temperature.

12)Can equilibrium exist in irreversible reactions? Justify your answer.

C**. Organic Chemistry – Some Basic Principles and Techniques**

13)Explain why carbon forms a large number of compounds compared to other elements.

14)Why do compounds of a homologous series show similar chemical properties but different physical properties?

15)Differentiate between empirical formula and molecular formula with suitable examples.

16)Explain why organic compounds generally have low

17)Explain why carbon forms stable covalent bonds instead of ionic bonds.

18)Why are organic compounds generally insoluble in water but soluble in organic solvents? and boiling points.

19)Why are covalent bonds directional in nature?

20)Write IUPAC names of all structural isomers of C_4H_{10}.

21)Write IUPAC names of all possible isomers of C_2H_6O and identify their functional groups.

Sub: Physics

Holiday Homework Class 11 th

CHAPTER 1: Units and Measurements

Derivation Questions

Derive the dimensional formula of force, pressure and energy.

Derive the expression for percentage error in: (a) product of two quantities

(b) quotient of two quantities

Explain the principle of dimensional homogeneity.

Numerical Questions

The radius of a sphere is measured as (2.1 ± 0.01) cm. Find the percentage error in the calculation of its volume.

Convert 1 N into dyne using dimensional analysis.

If the time period of a pendulum depends on length and gravity, derive the formula using dimensions.

CHAPTER 2: Motion in a Straight Line

Derivation Questions

Derive the three equations of motion for uniformly accelerated motion using calculus.

Obtain the relation between velocity and displacement.

Numerical Questions

A car starts from rest and accelerates uniformly at 2 m/s^2. Find the distance covered in 10 s.

A body is dropped from a height of 45 m. Find the time taken to reach the ground.

Find the distance travelled by a body in the 5th second of its motion.

CHAPTER 3: Motion in a Plane

Derivation Questions

Derive the expression for time of flight of a projectile.

Derive the expression for maximum height of a projectile.

Derive the expression for horizontal range of a projectile.

Numerical Questions

A projectile is thrown with a velocity of 20 m/s at an angle of 30°. Calculate its range.

A boat crosses a river of width 500 m flowing at 3 m/s. If the boat’s speed is 5 m/s, find the time taken.

CHAPTER 4: Laws of Motion

Derivation Questions

State and derive Newton’s Second Law of Motion.

Derive the relation between force and momentum.

Derive the expression for angle of repose.

Numerical Questions

Two bodies of masses 2 kg and 3 kg are connected by a string over a frictionless pulley. Find acceleration and tension.

A block of mass 5 kg is placed on a rough horizontal surface ($\mu = 0.2$). Find the force required to move it.

CHAPTER 5: Work, Energy and Power

Derivation Questions

Derive the Work–Energy Theorem.

Obtain the expression for kinetic energy of a moving body.

Derive the expression for gravitational potential energy near Earth’s surface.

Numerical Questions

A body of mass 2 kg is moving with a velocity of 10 m/s. Find its kinetic energy.

A pump lifts 100 kg of water to a height of 10 m in 5 s. Find the power of the pump.

CHAPTER 6: System of Particles & Rotational Motion

Derivation Questions

Derive the expression for torque acting on a particle.

Derive the moment of inertia of a uniform rod about its centre.

State and prove the parallel axis theorem.

Numerical Questions

Find the moment of inertia of a disc of mass 2 kg and radius 0.2 m about its diameter.

A flywheel rotates with angular velocity 10 rad/s. Find its rotational kinetic energy if I = 5 kg m^2.

CHAPTER 7: Gravitation

Derivation Questions

Derive the expression for acceleration due to gravity on Earth’s surface.

Derive the expression for escape velocity.

Derive the expression for orbital velocity of a satellite.

Numerical Questions

Find the escape velocity of an object from Earth’s surface.

Calculate the value of g at a height equal to the radius of Earth.

Find the gravitational force between two masses of 5 kg and 10 kg placed 2 m apart.

CHAPTER 8: Mechanical Properties of Solids

Derivation Questions

Define stress and strain and derive Hooke’s Law.

Derive the expression for Young's modulus.

Derive the expression for elastic potential energy stored in a stretched wire.

Explain stress–strain curve for a ductile material.

Numerical Questions

A wire of length 2 m and area 1 mm² is stretched by 1 mm. Find Young's modulus.

Calculate the elastic energy stored in a wire stretched by 2 mm under a load of 50 N.

CHAPTER 9: Mechanical Properties of Fluids

Derivation Questions

Derive the expression for pressure at a depth in a liquid.

State and derive Bernoulli's Theorem.

Derive the expression for terminal velocity of a sphere falling in a viscous fluid.

Derive the formula for excess pressure in a soap bubble.

Numerical Questions

Find the pressure at a depth of 10 m in water.

A steel ball of radius 1 mm falls through glycerine. Find its terminal velocity.

Water rises to a height of 4 cm in a capillary tube. Find the radius of the tube.

Maths

1	Find the value of $(1+i)(1+i^2)(1+i^3)(1+i^4)$?
2	List all subsets of the set {-1,0,1}
3	Write the set A={x:x is an integer and $-3< \boldsymbol{x} < \mathbf{7}$} in roster form.
4	Find the domain and range of the function $\boldsymbol{f(x)} = \sqrt{\mathbf{9} - \boldsymbol{x^2}}$.
5	If A={-1,0,1} and B = {3,5} , find A× $\boldsymbol{B}$.
6	If $\tan\theta = 3$ and θ lies in third quadrant, then find the value of $sin\ \theta$?
7	Find the value of $\boldsymbol{cosec}(-\mathbf{1410}°)$
8	Prove that: $\frac{\boldsymbol{cos4x+cos3x+cos2x}}{\boldsymbol{sin4x+sin3x+sin2x}} = \boldsymbol{cot3x}$
9	Find the multiplicative inverse of $\sqrt{\mathbf{5}} + \mathbf{3}\boldsymbol{i}$.
10	Solve: $\frac{\boldsymbol{x}}{\mathbf{4}} < \frac{\mathbf{5}\boldsymbol{x}-\mathbf{2}}{\mathbf{3}} - \frac{\mathbf{7}\boldsymbol{x}-\mathbf{3}}{\mathbf{5}}$.
11	Find the domain of the function f(x) = $\frac{x^2+2x+1}{x^2-8x+12}$
12	Solve the system of inequalities: 3x – 7 < 5 + x

	$11 - 5x \leq 1$ and represent the solutions on the number line.
13	Let A = {1, 2, 3, 4} and B = {5, 7, 9}. Determine (i) Is A × B = B × A ? (ii) Is n (A × B) = n (B × A) ?
14	If $\left(\frac{1+i}{1-i}\right)^m = 1$,then find the least positive integral value of m.
15	A committee of 7 has to be formed from 9 boys and 4 girls. In how many ways the committee consisting at most 3 girls can be formed?
16	Find the sum to n terms of the sequence, 8, 88, 888, 8888… .
17	The ratio of the A.M. and G.M. of two positive numbers a and b, is m : n. Show that $a: b = \left(m + \sqrt{m^2 - n^2}\right) : \left(m - \sqrt{m^2 - n^2}\right)$
18	Find the mean deviation about the mean.

x_i	10	30	50	70	90
f_i	4	24	28	16	8

19 Find the mean and standard deviation of the following data.

Class Interval	0-10	10-20	20-30	30-40	40-50
Frequencies	5	8	15	16	6

20	For what values of $\boldsymbol{x}$,the numbers $\frac{-2}{7}, \boldsymbol{x}, \frac{-7}{2}$ are in G. P.?
21	A solution of 8% boric acid is to be diluted by adding a 2% boric acid solution to it. The resulting mixture is to be more than 4% but less than 6% boric acid. If we have 640 litres of the 8% solution, how many litres of the 2% solution will have to be added?
22	Find the octant in which the points $(-3, 1, 2)$ and$(-3,1,\boldsymbol{-2})$ lie.
23	Find the distance between (-2,4,7) and (3, -5,8).
24	Find the equation of a line that cuts off equal intercepts on the coordinate axes and passes through the point (2,3).
25	Find the distance of the point (-1,1) from the line $\boldsymbol{12(x+6) = 5(y-2)}$.
26	***If E and F are two events such that P(E) = 1/4 and P(F)= 1/2 and P(E∩F)=1/8 find P(E or F).***

Sub-Biology

12 -Chapter– Respiration in plants

Exercise–

Que no – 1 3,4,5,6,and 11

13- Chapter– Plants growth and development

Exercise

Que no – 1,3,4,5,8,9,and 10

14- Chapter–Breathing and exchange of gasses

Exercise–

Que no – 1,3,4,5,6,8,9,11,13,and 14

15–Chapter –Body fluid and circulation

Exercise–,

Que no –1,2,3,4,5,and 6

— Draw the diagram of fig no

12.1,12.2,12.3,13.5,14.1,14.3 and 14.4

Subject- English

1. Complete your English Project file and revise for Internal Assessment.

2. Complete your English Notebook for Internal Assessment.

3. Revise the syllabus for PT-2 Exam.

The Adventure

Childhood

Birth

Writing Section

Tenses

4. Write 50 words with their 3 antonyms and 3 synonyms.

5. Write and learn 25 idioms and 25 Proverbs with meaning and use in sentences.

Note: Do q. no. 4 and 5 in your English notebook

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Sub:- Computer Science

1. Predict the output of the following:-
    a. text = "PYTHONPROGRAM"
       text=text.replace('PY','#')
       print(text)
    b. country='International'
       print(country.split("n"))

c. message= "World Peace"
print(message[-2::-2])

d. import random
a="Wisdom"
b=random.randint(1,6)
for i in range(0,b,2):
print(a[i],end='#')

e. str= "Soft Skills"
print(str[-3::-3])

f. for k in range(7,40,6):
print (k + '-')

g. print(10-3**2**2+144/12)

h. import random
L=[10,30,50,70]
Lower=random.randint(2,2)
Upper=random.randint(2,3)
for K in range(Lower, Upper+1):
print(L[K], end="@")

i. line=[4,9,12,6,20]
for I in line:
for j in range(1,I%5):
print(j,'#',end="")
print()

2. If L1=[1,2,3,2,1,2,4,2, . . .], and L2=[10,20,30, . . .], then (Answer using built-in functions only)
   a. Write a statement to count the occurrences of 4 in L1.
   b. Write a statement to sort the elements of list L1 in ascending order.
   c. Write a statement to insert all the elements of L2 at the end of L1.
   d. Write a statement to reverse the elements of list L2.