CSDAV PUBLIC SCHOOL

KOTWA ROAD, BANKAT, MOTIHARI, EAST CHAMPARAN(BIHAR)-845401

PRE-BOARD- (2017-18)

CLASS- XII **CHEMISTRY** **FM- 70**

General Instructions:

(i) **All** *questions are compulsory.*

(ii) *Questions number 1 to* **5** *are very short answer questions* **and** *carry 1 mark each.*

(iii) *Questions number 6 to 10 are short answer questions and carry 2 marks each.*

(iv) *Questions number 11 to 22 are also short answer questions and carry 3 marks each.*

(v) *Question number 23 is a value based question and carry 4 marks.*

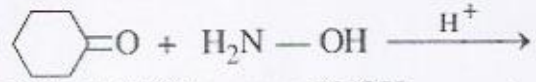
(vi) *Questions number 24 to 26 are long answer questions and carry* **5** *marks each.*

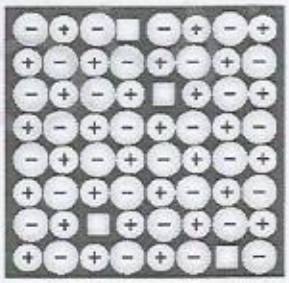
(vii) *Use log tables, if necessary. Use of calculators is not allowed*

1.	$(CH_3)_3C—CHO$ does not undergo aldol condensation. Comment.	1
2.	In the process of wine making, ripened grapes are crushed so that sugar and enzyme should come in contact with each other and fermentation should start. What will happen if anaerobic conditions are not maintained during this process?	1
3.	A coordination compound with molecular formula $CrCl_3.4H_2O$ precipitates one mole of AgCl with $AgNO_3$ solution. Its molar conductivity is found to be equivalent to two ions. What is the structural formula and name of the compound?	1
4.	How is Brownian movement responsible for the stability of sols?	1
5.	In the Arrhenius equation, what does the factor $e^{-E_a/RT}$ corresponds to?	1
6.	(i) Allyl cholride can be distinguished from Vinyl chloride by NaOH and silver nitrate test. Comment. (ii) Alkyl halide reacts with Lithium aluminium hydride to give alkane. Name the attacking reagent which will bring out this change.	2
7.	Which of the following solutions has higher freezing point? 0.05 M $Al_2(SO_4)_3$, 0.1 M $K_3[Fe(CN)_6]$ Justify.	2
8.	Calculate the emf of the following cell at 298 K : Cr(s) / Cr^{3+} (0.1M) // Fe^{2+} (0.01M) / Fe(s) [Given : E^0_{Cell} = + 0.30 V] OR The conductivity of 10^{-3} mol /L acetic acid at 25^0C is 4.1 x 10^{-5} S cm^{-1}. Calculate its degree of dissociation, if $\wedge^0_m$ for acetic acid at 25^0C is 390.5 S cm^2 mol^{-1}.	2
9.	What happens when:	2

	(i) Orthophosphorus acid is heated? (ii) XeF_6 undergoes complete hydrolysis?	
10.	Identify the following: (i) Oxoanion of chromium which is stable in acidic medium. (ii) The lanthanoid element that exhibits +4 oxidation state. (iii)	2
11.	Give the IUPAC name of the product formed when: (i) 2-Methyl-1-bromopropane is treated with sodium in the presence of dry ether. (ii) 1- Methyl cyclohexene is treated with HI. (iii) Chloroethane is treated with silver nitrite.	3
12.	The freezing point of benzene decreases by 2.12 K when 2.5 g of benzoic acid (C_6H_5COOH) is dissolved in 25 g of benzene. If benzoic acid forms a dimer in benzene, calculate the van't Hoff factor and the percentage association of benzoic acid. (K_f for benzene = 5.12 K kg mol^{-1})	3
13.	Explain the following behaviours: (i) Alcohols are more soluble in water than the hydrocarbons of comparable molecular masses. (ii) Ortho-nitrophenol is more acidic than ortho-methoxyphenol. (iii) Cumene is a better starting material for the preparation of phenol.	3
14.	The rate constant for a first order reaction is 60 s^{-1}. How much time will it take to reduce 1g of the reactant to 0.0625 g?	3
15.	(i) Solutions of two electrolytes 'A' and 'B' are diluted. The limiting molar conductivity of 'B' increases 1.5 times while that of 'A' increases 25times. Which of the two is a strong electrolyte? Justify your answer. (ii) The products of electrolysis of aqueous NaCl at the respective electrodes are : Cathode : H_2 Anode : Cl_2 and not O_2. Explain.	3
16.	(i) Write the expression for Freundlich's equation to describe the behaviour of adsorption from solution. (ii) What causes charge on sol particles? (iii) Name the promoter used in the Haber's process for the manufacture of ammonia.	3
17.	An organic aromatic compound 'A' with the molecular formula C_6H_7N is sparingly soluble in water. 'A' on treatment with dil HCl gives a water soluble compound 'B'. 'A' also reacts with chloroform in presence of alcoholic KOH to form an obnoxious smelling compound 'C'. 'A' reacts with benzene sulphonyl chloride to form an alkali soluble compound 'D'.'A' reacts with	3

	$NaNO_2$ and HCl to form a compound 'E' which on reaction with phenol forms an orange red dye 'F'. Elucidate the structures of the organic compounds from 'A' to 'F'.	
18.	(i) Which vitamin deficiency causes rickets? (ii) Name the base that is found in nucleotide of RNA only. (iii) Glucose on reaction with acetic acid gives glucose penta acetate. What does it suggest about the structure of glucose?	3
19.	Name the type of reaction involved in the formation of the following polymers from their respective monomers (i) PVC. (ii) Nylon6. (iii) PHBV.	3
20.	Describe the role of (i) NaCN in the extraction of gold from its ore. (ii) Cryolite in the extraction of aluminium from pure alumina. (iii) CO in the purification of Nickel	3
21.	A metal ion M^{n+} having d^4 valence electronic configuration combines with three bidentate ligands to form a complex compound. Assuming $\Delta_o > P$: (i) Write the electronic configuration of d^4 ion. (ii) What type of hybridisation will M^{n+} ion has? (iii) Name the type of isomerism exhibited by this complex.	3
22.	The magnetic moments of few transition metal ions are given below: **Metal ion** **Magnetic moment(BM)** Sc^{3+} 0.00 Cr^{2+} 4.90 Ni^{2+} 2.84 Ti^{3+} 1.73 (at no. Sc = 21, Ti =22, Cr = 24, Ni = 28) Which of the given metal ions : (i) has the maximum number of unpaired electrons? (ii) forms colourless aqueous solution? (iii) exhibits the most stable +3 oxidation state? **OR** Consider the standard electrode potential values (M^{2+} / M) of the elements of the first transition series. Ti V Cr Mn Fe Co Ni Cu Zn -1.63 -1.18 -0.90 -1.18 -0.44 -0.28 -0.25 +0.34 -0.76 Explain: (i) E° value for copper is positive. (ii) E° value of Mn is more negative as expected from the trend.	3

	(iii) Cr^{2+} is a stronger reducing agent than Fe^{2+}.	
23.	Ashwin observed that his friend Shubham was staying aloof, not playing with friends and becoming easily irritable for some weeks. Ashwin told his teacher about this, who, in turn, called Shubham's parents and advised them to consult a doctor. Doctor after examining Shubham prescribed antidepressant drugs for him. After reading the above passage, answer the following questions: i) Name two antidepressant drugs. ii) Mention the values shown by Ashwin. iii) How should Shubham's family help him other than providing medicine? iv) What is the scientific explanation for the feeling of depression?	4
24.	(a) Arrange the following in the order of property indicated against each set: (i) F_2, Cl_2, Br_2, I_2 (increasing bond dissociation enthalpy) (ii) H_2O, H_2S, H_2Se, H_2Te (increasing acidic character) (b) A colourless gas 'A' with a pungent odour is highly soluble in water and its aqueous solution is weakly basic. As a weak base it precipitates the hydroxides of many metals from their salt solution. Gas 'A' finds application in detection of metal ions. It gives a deep blue colouration with copper ions. Identify the gas 'A' and write the chemical equations involved in the following: (i) Gas 'A' with copper ions (ii) Solution of gas 'A' with $ZnSO_4$ solution. **OR** **Answer the following questions** (a) Write the formula of the neutral molecule which is isoelectronic with ClO^-. (b) Draw the shape of $H_2S_2O_7$. (c) Nitric acid forms an oxide of nitrogen on reaction with P_4.Write the formula of the stable molecule formed when this oxide undergoes dimerisation. (d) Bleaching action of chlorine is permanent. Justify. (e) Write the disproportionation reaction of that oxoacid of nitrogen in which nitrogen is in +3 oxidation state.	5
25.	Write the products of the following reactions: (i)  (ii) $2C_6H_5CHO + \text{conc. } NaOH \longrightarrow$ (iii) $CH_3COOH \xrightarrow{Cl_2/P}$ (b) Give simple chemical tests to distinguish between the following pairs of	5

	compounds: (*i*) Benzaldehyde and Benzoic acid (*ii*) Propanal and Propanone OR (*a*) Account for the following: (*i*) CH_3CHO is more reactive than CH_3COCH_3 towards reaction with HCN. (*ii*) 2-Fluorobutanoic acid is a stronger acid than 3-Fluorobutanoic acid. (*b*) Write the chemical equations to illustrate the following name reactions: (*i*) Etard reaction. (ii) Rosenmund's reaction. (c) Give the mechanism of cyanohydrin formation when carbonyl compounds react with HCN in the presence of alkali.	
26.	(i) Following is the schematic alignment of magnetic moments:  Identify the type of magnetism. What happens when these substances are heated? (ii) If the radius of the octahedral void is 'r' and radius of the atoms in close packing is 'R'. What is the relation between 'r' and 'R'? (iii) Tungsten crystallizes in body centred cubic unit cell. If the edge of the unit cell is 316.5 pm. What is the radius of tungsten atom? **OR** **(i)** Identify the type of defect shown in the following figure:  What type of substances show this defect? (ii) A metal crystallizes in a body centred cubic structure. If 'a' is the edge length of its unit cell, 'r' is the radius of the sphere. What is the relationship between 'r' and 'a'? (iii) An element with molar mass 63 g / mol forms a cubic unit cell with edge length of 360.8 pm. If its density is 8.92 g/ cm^3. What is the nature of the cubic unit cell?	5

C.S. DAV PUBLIC SCHOOL

Pre Board Exam- 2017-2018

Class XII

Subject: Mathematics

Time : 3 hours **Max. Marks :** 100

General Instructions

- All questions are compulsory.
- This question paper contains 29 questions.
- Question 1-4 in Section A are very short answer type questions carrying 1 mark each.
- Question 5-12 in Section B are short answer type questions carrying 2 marks each.
- Question 13-23 in Section C are long answer I type questions carrying 4 marks each.
- Question 24-29 in Section D are long answer II type questions carrying 6 marks each.

SECTION A

1. State the reason why the relation $R = \{(a, b): a \le b^2\}$ on the set R of real numbers is not reflexive?

2. If A is a square matrix of order 3 and $|2A| = k|A|$, find the value of k.

3. If $\vec{a}$ and $\vec{b}$ are two non-zero vectors such that $\left|\vec{a} \times \vec{b}\right| = \vec{a} \cdot \vec{b}$, find the angle between $\vec{a}$ and $\vec{b}$.

4. If '$*$' is a binary operation on the set R of real numbers defined by $a * b = a + b - 2$, find the identity element for the binary operation '$*$'.

SECTION B

5. Simplify $\cot^{-1}\dfrac{1}{\sqrt{x^2-1}}$, for $x < -1$.

6. Prove that the diagonal elements of a skew-symmetric matrix are all zeroes.

7. If $y = \tan^{-1}\dfrac{5x}{1-6x^2}$, $-\dfrac{1}{\sqrt{6}} < x < \dfrac{1}{\sqrt{6}}$, prove that $\dfrac{dy}{dx} = \dfrac{2}{1+4x^2} + \dfrac{3}{1+9x^2}$.

8. If x changes from 4 to 4.01, find the approximate change in $\log_e x$.

9. Find $\int \left(\dfrac{1-x}{1+x^2}\right)^2 e^x dx$.

10. Obtain the differential equation of the family of circles passing through the points $(a, 0)$ and $(-a, 0)$.

11. If $\left|\vec{a}+\vec{b}\right|=60$, $\left|\vec{a}-\vec{b}\right|=40$ and $\left|\vec{a}\right|=22$, find $\left|\vec{b}\right|$.

12. If $P(A)=\frac{2}{5}$, $P(B)=\frac{1}{3}$, $P(A\cap B)=\frac{1}{5}$, find $P(\bar{A}/\bar{B})$.

SECTION C

13. If $A=\begin{bmatrix}1 & -2\\ 2 & 1\end{bmatrix}$, using A^{-1}, solve the following system of equations. $x-2y=-1$, $2x+y=2$

14. Discuss the differentiability of the function

$$f(x)=\begin{cases}2x-1, & x<\frac{1}{2}\\ 3-6x, & x\geq\frac{1}{2}\end{cases} \text{ at } x=\frac{1}{2}.$$

Or

For what value of k is the following function continuous at $x=-\frac{\pi}{6}$?

$$f(x)=\begin{cases}\dfrac{\sqrt{3}\sin x+\cos x}{x+\frac{\pi}{6}}, & x\neq-\frac{\pi}{6}\\ k, & x=-\frac{\pi}{6}\end{cases}$$

15. If $x=a\sin pt$, $y=b\cos pt$, show that

$$(a^2-x^2)y\frac{d^2y}{dx^2}+b^2=0.$$

16. Find the equation of the normal to the curve $2y=x^2$, which passes through the point $(2, 1)$.

Or

Separate the interval $\left[0, \frac{\pi}{2}\right]$ into subintervals in which the function $f(x)=\sin^4 x+\cos^4 x$ is strictly increasing or strictly decreasing.

17. A magazine seller has 500 subscribers and collects annual subscription charges of ₹ 300 per subscriber. She proposes to increase the annual subscription charges and it is believed that for every increase of ₹ 1, one subscriber will discontinue. What increase will bring maximum income to her? Make appropriate assumptions in order to apply derivatives to reach the solution. Write one important role of magazines in our lives.

18. Find $\int\frac{\sin x}{(\cos^2 x+1)(\cos^2 x+4)}dx$.

19. Find the general solution of the differential equation $(1+\tan y)(dx-dy)+2xdy=0$.

Or

Solve the following differential equation,

$$\left(1+e^{\frac{x}{y}}\right)dx+e^{\frac{x}{y}}\left(1-\frac{x}{y}\right)dx=0.$$

20. Prove that

$$\vec{a}\cdot\{(\vec{b}+\vec{c})\times(\vec{a}+2\vec{b}+3\vec{c})\}=[\vec{a}\ \vec{b}\ \vec{c}].$$

21. Find the values of a so that the following lines are skew.

$$\frac{x-1}{2}=\frac{y-2}{3}=\frac{z-a}{4}$$

$$\frac{x-4}{5}=\frac{y-1}{2}=z$$

22. A bag contains 4 green and 6 white balls. Two balls are drawn one by one without replacement. If the second ball drawn is white, what is the probability that the first ball drawn is also white?

23. Two cards are drawn successively with replacement from a well-shuffled pack of 52 cards. Find the probability distribution of the number of diamond cards drawn. Also, find the mean and the variance of the distribution.

SECTION D

24. Let $f:[0,\infty)\to R$ be a function defined by $f(x)=9x^2+6x-5$. Prove that f is not invertible. Modify, only the codomain of f to make f invertible and then find its inverse.

Or

Let '$*$' be a binary operation defined on $Q\times Q$ by $(a,b)*(c,d)=(ac,b+ad)$, where Q is the set of rational numbers. Determine, whether '$*$' is commutative and associative. Find the identity element for '$*$' and the invertible elements of $Q\times Q$.

25. Using properties of determinants, prove that

$$\begin{vmatrix} \frac{(a+b)^2}{c} & c & c \\ a & \frac{(b+c)^2}{a} & a \\ b & b & \frac{(c+a)^2}{b} \end{vmatrix} = 2(a+b+c)^3.$$

Or

If $p\neq 0, q\neq 0$ and

$$\begin{vmatrix} p & q & p\alpha+q \\ q & r & q\alpha+r \\ p\alpha+q & q\alpha+r & 0 \end{vmatrix} = 0,$$ using properties of determinants, prove that atleast one of the following statements is true. (a) p, q, r are in GP, (b) α is a root of the equation $px^2+2qx+r=0$.

26. Using integration, find the area of the region bounded by the curves $y=\sqrt{5-x^2}$ and $y=|x-1|$.

27. Evaluate the following.

$$\int_0^{\pi/2} \frac{x\sin x\cos x}{\sin^4 x+\cos^4 x}\,dx$$

Or

Evaluate $\int_0^4 (x+e^{2x})\,dx$ as the limit of a sum.

28. Find the equation of the plane through the point $(4,-3,2)$ and perpendicular to the line of intersection of the planes $x-y+2z-3=0$ and $2x-y-3z=0$. Find the point of intersection of the line $\mathbf{r}=\hat{\mathbf{i}}+2\hat{\mathbf{j}}-\hat{\mathbf{k}}+\lambda(\hat{\mathbf{i}}+3\hat{\mathbf{j}}-9\hat{\mathbf{k}})$ and the plane obtained above.

29. In a mid-day meal programme, an NGO wants to provide vitamin rich diet to the students of an MCD school. The dietician of the NGO wishes to mix two types of food in such a way that vitamin contents of the mixture contains at least 8 units of vitamin A and 10 units of vitamin C. Food 1 contains 2 units per kg of vitamin A and 1 unit per kg of vitamin C. Food 2 contains 1 unit per kg of vitamin A and 2 units per kg vitamin C. It costs ₹50 per kg to purchase Food 1 and ₹70 kg to purchase Food 2. Formulate the problem as LPP and solve it graphically for the minimum cost of such a mixture?

C.S DAV PUBLIC SCHOOL, MOTIHARI

(2017-18)

Sub – Biology
Class – XII

F.M. 70
Time- 3 Hours

SECTION A (1 marks)

Ques01. What is metastasis?
Ques02. Give two examples of Genetic diversity
Ques03. Expand H_2L_2

SECTION B (2 marks)

Ques04. What is the function of Haemozoin?
Ques05. Differentiate between Template strand & Coding strand
Ques06. What are hallucinogens? Give two examples.
Ques07. What is Eutrophication?
Ques08. What is plasmid?
Ques09. What is an importance of sporopllenin in the case of pollengrains?

SECTION C (3 marks)

Ques10. What is Decompostion? & explain its different steps
Ques11. What is Bagging technique? &explain its importance
Ques12. What is anatropous ovule? & draw its diagram.
Ques13. What is chromosomal disorders? &explain its two examples
Ques14. What is Standing crop? & explain 10% law of energy
Ques15. What is PAR? & differentiate between sedimentary cycle & gaseous cycle
Ques16.Explain adaptive radiation with the help of two examples
Ques17.What is an importance of (a) Enzymes (b) Vector (c) Host in the field of Biotechnology
Ques18. What is Oogenesis? & explain its different steps
Ques19. Explain Prokaryotic transcription with the help of diagram
Ques20. Explain importance of Electrostatic precipitation in the case of Air pollution

SECTION D (4 marks)

Ques21.What is Sewage? & explain its Primary & Secondary treatment

SECTION E (5 marks)

Ques22. What is the function of ropes? & explain RNA interference

OR

What is DNA replication? & explain Semiconsevative type of DNA replication

Ques23. Draw a diagram of Sperm & explain Menstrual cycle

OR

Ques24. What is SCP? & explain importance of micro-propagation

OR

What is Co-dominance? & draw a diagram of Eukaryotic transcription

(HAPPY NEW YEAR 2018)

C.S DAV PUBLIC SCHOOL, MOTIHARI

(2017-18)

Sub – Biology
Class – XII

F.M. 70
Time- 3 Hours

SECTION A (1 marks)

Ques01. What is Standing mass ?
Ques02. Give two examples of Ecological diversity
Ques03. Expand PEN

SECTION B (2 marks)

Ques04. What is the function of Rhino virus ?
Ques05. Differentiate between Prokaryotic transcription & Eukaryotic transcription
Ques06. What is drugs ? Give two examples.
Ques07. What is Biomagnification ?
Ques08. What is Vector?
Ques09. What is Seminal plasma?

SECTION C (3 marks)

Ques10. What is Biogeochemical cycle? & explain Phosphorous cycle
Ques11. What is **Outbreedind device**? &explain its process
Ques12. What is microsporangium ? & draw its diagram.
Ques13. What is Mendelian disorders? &explain its two examples
Ques14. What is Secondary productivity? & explain Unidirectional flow of energy in ecosystem
Ques15. What is GFC? & differentiate between food chain & food web
Ques16.Explain Industrial melanisims
Ques17.What is an importance of (a) Exonuclease (b) Endonuclease (c) Ligase in the field of Biotechnology
Ques18. What is Spermatogenesis? & explain its different steps
Ques19. Explain Hershy & Chase Experiment
Ques20. What is green house effect? & Global warming

SECTION D (4 marks)

Ques21.What is Antibiotics? & explain importance of micro-organisims

SECTION E (5 marks)

Ques22. What is the function of Insulin? & explain ADA dficiency

OR

What is Centrl dogma? & calculate the length of DNA

Ques23. Draw a diagram of female reproductive system & explain process of fertilization

OR

Ques24. What is Millets? & explain importance of biofortification

OR

Explain Pedigree analysis

(HAPPY NEW YEAR 2018)