## R.M PUBLIC SCHOOL

(CBSE AFFILIATION NO.730072)

## SESSION-2023-24 <br> Winter Holidays Homework <br> Class: TWELFTH

Circular No. : 930
Date : 28-12-2023

## Dear Parents / Students

## Greetings from RMPS Fraternity!



Books become permanent companions. Sometimes, they are born before us; they guide us during our life journey and continue for many generations.
$\qquad$
As we embark on the final stretch of our academic journey, it's time to channel our inner champions and conquer the upcoming challenges. The school has curated a powerful arsenal for your success - the Question Bank!

This treasure trove is not just a compilation of questions; it's a roadmap to excellence.

Seize this opportunity, unleash your potential, and let the Question Bank be your trusted ally in this academic battle.

As you delve into this treasure trove, keep in mind that each question you conquer is a victory, and each challenge you overcome is a step closer to triumph.

May your pens be swift, your minds sharp, and your spirits unwavering. Let's conquer this together!

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## SESSION-2023-24 <br> Class: $\mathbf{- 1 2}^{\text {th }}$ <br> English Project ASL

Q: On the basis of your understanding of 'The Last Lesson' throw light on the linguistic chavinism and how German language was imposed on France.
On the basis of your research elucidate

- Importance of Language.
- concept of freedom of speech and information.
- Relation between language and culture.
- Historical events when freedom of speech and expression were threatened.


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## SESSION-2023-24 <br> Class: $-12^{\text {th }}$ <br> BIOLOGY QUESTION BANK

READ THE FOLLOWING PARAGRAPH CAREFULLY AND ANSWER THE FOLOWING WUESTIONS:

Case Study : Villagers in a place near Chamber started planning to make a power supply for agricultural purposes from cow dung. They have started a biogas plant for this purpose. Study the flow chart for biogas production given below and answer the following questions.

1.Biogas is composed of majorly
(a) methane, $\mathrm{CO}_{2}$ and $\mathrm{O}_{2}$
(b) $\mathrm{CO}_{2}, \mathrm{H}_{2} \mathrm{~S}$ and $\mathrm{H}_{2} \mathrm{O}$
(c) methane, $\mathrm{CO}_{2}$ and $\mathrm{H}_{2} \mathrm{~S}$
(d) $\mathrm{H}_{2} \mathrm{~S}, \mathrm{H}$ and $\mathrm{O}_{2}$.

## 2.In the given flow chart, ' $A$ ' denotes

(a) aerobic bacteria
(b) methanogenic bacteria
(c) cellulose-degrading bacteria
(d) yeast and protozoa
3. What is represented by ' $B$ ' in the flow chart?
(a) Carbohydrates
(b) Protein polymers
(c) Organic acids
(d) Fat globules
4. $\mathbf{C}^{\boldsymbol{\prime}}$ in the given flow chart causes
(a) aerobic breakdown of complex organic compounds
(b) anaerobic digestion of complex organic compounds
(c) fermentation of organic compounds
(d) fermentation of monomers

## 5.If ' $A$ ' is not added in the procedure

(a) methane will not be formed
(b) CO 2 will not be formed
(c) organic compounds will not be converted to H 2 S
(d) O 2 will not be formed.
6. Which of the following, in your opinion, accounts for the majority of biodiversity loss among the four primary factors, which are, over-exploitation, habitat loss and fragmentation, alien species invasion and co-extinction? Justify your answer.
7.Mention any two approaches for ex-situ conservation and in-situ conservation as a plan of action for biodiversity conservation.
Q. 9 Fertilization is essential for production of seeds.why?
10. What is meant by the invasion of an alien species? List two foreign species of plant and animal that are a threat to indigenous Indian species.

11 Sperms have a tail whereas eggs do not. Why so?
12. Mention the function of trophoblast in human embryo.
13. Name of embryonic stage that gets implanted in the uterine wall of a human female.

14 What stimulates pituitary to release the hormone responsible for parturition? Name the hormone.
15. List the changes the primary oocyte undergoes in the tertiary follicular stage in the human ovary.
16.Construct and label a transcription unit from which the RNA segment given below has been transcribed. Write the complete name of the enzyme that transcribed this RNA.

17. When do the oogenesis and spermatogenesis initiate in human females and males respectively?

18 Mention the difference between spermiogenesis and spermiation.
19. Where is acrosome present in humans? Write its functions.
20. Mention any two events that are inhibited by the intake of oral contraceptive pills to
prevent pregnancy in humans.
21 Why is tubectomy considered a contraceptive method?
22. A mother of one year old daughter wanted to space her second child. Her doctor suggested $\mathrm{Cu}-\mathrm{T}$. Explain its contraceptive actions.

23Study the diagram given below and answer the following questions.

(i) Why have DNA fragments in band D moved farther away in comparison to those in band C?
(ii) Identify the anode end in the diagram.
(iii) How are these DNA fragments visualised?
24. Explain any two methods of Assisted Reproductive Technology (ART) that has helped childless couples to bear children.
25.How does Cu T act as an effective contraceptive for human females?26. Name the hormonal composition of oral contraception used by human females.
26.Explain how does it act as contraceptive?
27.Why do some women use " Saheli" pills?
28. How are assisted reproductive technologies helpful to humans? Explain the role(s) of the following in biotechnology
(i) Restriction endonuclease
(ii) Gel-electrophoresis
(iii) Selectable markers in pBR32229.
. 29.Name the organism in which the vector shown is inserted to get the copies of the desired gene.
(ii) Mention the area labelled in the vector responsible for controlling the copy number of the inserted gene.
(iii) Name and explain the role of a selectable marker in the vector shown. (All India 2010)


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30. Name any two copper releasing intra-uterine devices (IUDs). List two reasons that make them effective contraceptives.
31. Mention two functions of codon AUG.
32. Name the enzyme involved in the continuous replication of DNA strand. Mention the polarity of template strand.
33. Mention the role of the codons AUG and UGA during protein synthesis?


Fig-1


Fig-2
34.In the given figure of a dicot embryo, label the parts and give their function.
35. The length of a DNA molecule in a typical mammalian cell is calculated to be approximately 2.2 meters. How is the packaging of this long molecule done to accommodate it within the nucleus of the cell.
36. Name the blank spaces $\mathbf{a}, \mathbf{b}$, $\mathbf{c}$, and $\mathbf{d}$ in the table given below: Item What it represents in the plant.

| Part | What it Represents in the Plant |
| :--- | :--- |
| (i) Pericarp | a |
| (ii) b | Cotyledon in seeds of grass family. |
| (iii) Embryonal axis | C |
| (iv) d | Remains of nucellus in a seed |

37. (a) Draw the structure of the initiator tRNA adaptor molecule.
(b) Why is tRNA called an adaptor molecule?
38. Given below is part of the template strand of a structural gene: TAC CAT TAG GAT
(a) Write its transcribed mRNA strand with its polarity.
(b) Explain the mechanism involved in initiation of transcription of this strand.

39Given below is an incomplete flow chart showing the formation of gamete in angiosperm plants. Observe the flow chart carefully and fill in the blank A, B, C, and D.


40 Explain the dual function of AUG codon. give the sequence of bases it is transcribed from and its 41Draw a diagram of L.S. of an anatropous ovule of an Angiosperm \& label the following parts:-
(i) Nucellus
(ii) Integument
(iii) Antipodal cells
(iv) Secondary Nucleus
42. What are satellite DNAs in a genome? Explain their role in DNA finger printing.
43. (a) Draw a schematic representation of a transcription unit and show the following in it.
(i) Direction in which the transcription occurs (ii) Polarity of the two strands involved (iii) Template strand (iv) Terminator
(b) Mention the function of promoter in transcription. (C.B.S.E.2009)
44. (a) In human genome which one of the chromosomes has the most genes and which one has the fewest?
(b) Scientists have identified about 1.4 million single nucleotide polymorphs in human genome. How is the information of their existence going to help the scientists.
45. Name the category of codons UGA belongs to. Mention another codon of the same category. Explain their role in protein synthesis.
46. Differentiate between a template strand and a coding strand of DNA.
47. Describe the initiation process of transcription in bacteria.
48. Describe the elongation process of transcription in bacteria.
49. Describe the termination process of transcription in bacteria. (C.B.S.E. 2010)
50. Mention the role of ribosomes in peptide bond formation. How does ATP facilitate My me

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## MATHEMATICS

## SECTION-A

Q1. Minimum value $\sin x+\cos x$ is ?
Q2. Direction cosines of the vector $i+j+k$ are?
Q3. What are continuous functions.
Q4. Write any relation which is reflexive, symmetric but not transitive.
Q5. $\sin ^{-1}(\sin 7 \pi / 6)=$ ?
Q6. The number of all possible matrices of order $2 \times 3$ with each entry 0 or 1 are ?
Q7. What are injective functions?
Q8. If $A$ and $B$ are two diagonal matrices of same order then $A B=B A(T / F)$
Q9. What are independent events .
Q10. $\int \sec x d x$
Q11. Define optimal solution?
Q12. If two Vectors are perpendicular then their cross product is zero. (T/F)
Q13. Integrate logx .
Q14. $\int v\left(a^{2}+x^{2}\right) d x=$
Q15. $\int 1 /(x+1) d x=$
Q16. $\int \operatorname{Sin} x^{0} d x=$
SECTION-B
Q17. If $(x+y) d y / d x=1$ then
(i) Integrating factor Is
(a) $e^{-x}$
(b) $\mathrm{e}^{\mathrm{x}}$
(c) 1
(d) none of these
(ii) value of $p$ is
(a) 1 (b) -1 (c) $x$ (d) none of these
(iii) Value of $Q$ is
(a) 1 (b) $y(c) x(d)$ none of these
(iv) General solution is
(a) $x+y=1$ (b) $x=1+y+c e^{x}$ (c) $x=y+e^{-x}$ (d) none of these

Q18. If $f(x)=\cos x$, then (i) $\quad f^{\prime}(0)=$ ?
(a)1 (b)
(c) -1
(d) 0
(ii) fis st.inc. in
(a) $(0, \pi)$ (b) $(0, \pi / 2)(c)[0, \pi]$ (d) none of these
(iii) fis st.dec. in
(a) $(0, \pi)(b)(0, \pi / 2)(c)[0, \pi](d)$ none of these
(iv) Minimum value of $f(x)-f^{\prime}(x)$ from $x=0$ to $x=2 \pi$ is
(a)1 (b) -1 (c) 0 (d) none of these

## SECTION-C

Q19. $\int 1 /\left(1-e^{x}\right) d x$
Q20. Find the equation of a curve passing through the point $(0,0)$ and whose differential equation is $y^{\prime}=e^{x} \sin x$.
Q21. Discuss continuity of tangent function.
Q22. Maximise $Z=x+y$, subject to $x-y \leq-1,-x+y \leq 0, x, y \geq 0$.
Q23. A die is tossed thrice. Find the probability of getting an odd number at least once.
Q24. If $A$ and $B$ are symmetric matrices, prove that $A B-B A$ is a skew symmetric matrix.
Q25. Differentiate cosxw.r.t.sinx.
Q26. Find direction cosines of a line which makes equal angle with coordinate axis.
Q27. Using the method of integration find the area bounded by the curve $|x|+|y|=1$.
Q28. For what values of a the function $f$ given by $f(x)=x^{2}+a x+1$ is increasing on [1, 2]?

## SECTION-D

Q29. A card from a pack of 52 cards is lost. From the remaining cards of the pack, two cards are drawn and are found to be both diamonds. Find the probability of the lost card being a diamond.
Q30. What is the probability of 2 SUNDAYS in a leap year.
Q31. Solve $(x+y) d y / d x=1$
Q32. Prove that the curves $x=y^{2}$ and $x y=k$ cut at right angles if $8 k^{2}=1$.
Q33. Find kif
is continuous at indicated point.

$$
f(x)=\left\{\begin{array}{ll}
\frac{k \cos x}{\pi-2 x}, & \text { if } x \neq \frac{\pi}{2} \\
3, & \text { if } x=\frac{\pi}{2}
\end{array} \quad \text { at } x=\frac{\pi}{2}\right.
$$

Q34. Discuss continuity of sine function.
Q35. Integrate:

## $\sin ^{8}-\cos ^{8} x$ <br> $1-2 \sin ^{2} x \cos ^{2} x$

Q36. Evaluate
Q37. Show that $(i+j+k)$ is equally inclined to $O X, O Y, O Z$ axis .
$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{\sin x+\cos x}{\sqrt{\sin 2 x}} d x$
Q38.
INTIGRATE
Q39. Diff. w.r.t.x
$\int_{0}^{\frac{\pi}{2}} \log \sin x d x$

Q40.

## $\left(\ln \boldsymbol{\sigma} \mathbf{r}^{x}+\mathbf{r}^{\log x}\right.$

If $\cos y=x \cos (a+y)$, with $\cos a \neq \pm 1$, prove that $\frac{d y}{d x}=\frac{\cos ^{2}(a+y)}{\sin a}$
Q41. Find the maximum and minimum values of $x+\sin 2 x$ on $[0,2 \pi]$.
Q42. Show that of all the rectangles inscribed in a given fixed circle, the square hasthe maximum area.

Q43. Find general solution of $(x+y)(d y / d x)=1$.
Q44. INTIGRATE. $|x+2|$ from -5 to 5.
Q45. Find area under sine curve form 0 to $\pi$.
Q46. INTIGRATE $\log (1+\cos x)$ from 0 to $\pi$.
Q47. INTIGRATE $e^{2 x}$. $\operatorname{Sin} x$.
Q48. Find area enclosed by ellipse

$$
X^{2} / 16+Y^{2} / 25=1
$$

Q49. Find area enclosed under $|x|$ from $x=-2$ to $x=2$.
Q50. The volume of a spherical balloon being inflated changes at a constant rate. If initially its radius is 3 units and after 3 seconds it is 6 units. Find the radius of the balloon after $t$ seconds.

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## PHYSICAL EDUCATION

Q1 is sports day celebrated?
A. 30 August
B. 29 August
C. 28 August
D. 27 August

Q2In which year did Deaf Olympics start?
a) 1924
b) 1960
c) 1947
d) 2001

Q3 speech therapist helps a child in:
a) Grooming
b) Communication
c) in hancing mobility
d) playing

Q4Activity related to fine motor development:
a) Speaking
b) Running
c) Hopping
d) Swimming

Q5 is not a symptom of food intolerance:
A. Fatigue
B. Diarrhea
C. Nausea
D. Night Blindness

Q6What is the formula to determine number of matches in League fixture for even number of teams?
A.N+1/2
B.N-1/2
C.N(N-1)/2
D. $\mathrm{N}(\mathrm{N}+1) / 2$

Q7The objective of planning is:
A.To Improve Sports Performance
B.Hormony
C.Awerness
D.Fitness

Q8Which one is the fourth element of Ashtanga yoga:
A. Pranayam
B. Pratyahara
C. Dharna
D. Samadhi

Q9Yoga word is derived from:
A. Sanskrit Language
B. Latin Language
C. Greek Language
D. French Language

Q10Which one is the fourth element of Ashtanga yoga:
A. Pranayam
B. Pratyahara
C. Dharna
D. Samadhi

Q11The formula to find the number of matches in a knockout tournament.
A. $\mathrm{N}-1$
B. $\mathrm{N}-2$
C. $\mathrm{N}+1$
D. None Of Above

Q12 Sanjeev is a footballer. During lockdown he wanted to improve his endurance as well as his adventurous ability. What training method Sanjeev should go for.
1 a Fartlek Training method b interval training method c circuit training. d continuous training method
Q13What is reaction ability?
Q14What is the difference between active and passive flexibility?
Q15 What are coordinative abilities in sports?
Q16Briefly explain any two methods for improving speed write down the factors determining speed?
Q17Briefly explain the types of Endurance
Q18explain the merits and demerits of round robin tournaments.
Q 19.Mentionthe eating disorders.
Q20What is the procedure of performing kapalbhati?
Q21.Write three differences between paralympics and special Olympics.
Q22.Describe the meaning and give four functions of balanced diet.
Q23How lordosis can be cured through exercises?
Q24Mention four points to show the importance of yoga?
Q.25Write note on Deaflympics.
Q.26Explain the advantages of physical activities for CWSN.

Q27.What do you mean by sports management? Explain the parts of sports managements.

Q28Describe female Athlete Traid.Explain the symptoms and causes of anyone. Q29.How yoga can benefit the Asthma and hypertension patient? Explain. Q30List the deficiency discussed caused by vitamins.
Q31Make a league fixture of a teams .state the merits and demerits of league round.
Q32Explain the role of macronutrients in our diet. mention their sources.
Q33 what are the dimensions of Big five personality Theory?
Q34Define Aggression.what are the types of Aggression?
Q 35How Jung classified the personality?
Q 36 How would you provide First aid to fracture and Dislocation injury?
Q37 Describe the management of strain and sprain injury.
Q38 Explain the effects of exercise on Muscular system?
Q 39 Discuss the physiological factors which determine the components of physical fitness.
Q 40Explain the procedure of Harvard step test in detail.
Q41 what is the formula of composition basal metabolic rate?
Q42 what is the purpose of back sctratch test?
Q43 how we can conduct Chair sitand reach test for senior citizen?
Q44 by which test we can measure the aerobic fitness of senior citizen?
Q45 describe the meaning of balanced diet what is the importance of balanced diet?
Q46 list the deficiency discussed caused by vitamins.
Q47 Draw a league fixture of 21 teams.
Q48 write in brief the pre works of the following : a Technical committee b convener.
Q 49 write the formula for calculating the number of matches in
a Matches in knockout tournament b Robin tournament
Q 50 During the progress of opening ceremony of volleyball Tournament in outdoor, heavy rain comes. What will be your decision as an organising secretary?.

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## PHYSICS

Q1. A surface $S=10 j$ is kept in an electric Field $E=2 \hat{i}+4]+7 k$. How much Electric flux will come out through this Surface?
a) 40 unit
b) 30 unit
c) 50 unit
d) 20 unit

Q2. The work done to move a charge along An equipotential from $A$ to $B$,
a) Cannot be defined as -j"E. dl
b) Must be defined as-L E. dl
c) is zero
d) Can have a non-zero value

Q4. The ground state energy of hydrogen atom is -13.6 eV . What is the potential Energy of the electron in this state?
(a) 0 eV
(b) 1 eV
(c) -27.2 eV
(d) 2 eV

Q5. A bar magnet of magnetic moment $M$ is Placed in a magnetic field of induction $B$. The torque exerted on it is (a) $M x B(b)-B \cdot M(c) M \cdot B(d) M+B$. If a charged spherical conductor of
radius 10 cm has potential V at a point distant 5 cm from its centre, then the potential at a point distant 15 cm from the centre will be $\qquad$ ? The transformation ratio in the step-up Transformer is
(a) 1
(b) greater than one
(c) less than one
(d) The ratio greater or less than one depends on the other factor.

Q6.The radi of curvature of the surfaces of a double convex lens are 20 cm and 40 cm respectively. The focal length of this lens is 20 cm . What is the refractive index of the material of the lens?

Which of the following relation is correct?
/eoEo=V $\mu \mathrm{oBo}(\mathrm{b}) \mathrm{Vmoeo=Bo}$
(C) $\mathrm{Eo}=\mathrm{V}$ poeoBo

VpoEo=VepBo

In a circuit with a coil of resistance $20 h m$,

The magnetic flux charges from 2.0 Wb to 10.0 Wb in 0.2 s . The charge that flows in the coil during this time is
(a)5.0c
(d) 1.0 C
(b) 4.0 C
(d) 0.8 C

Assuming an ideal diode, draw the output

Waveform for the circuit given in the

Figure. Explain the waveform.

Q10 The photoelectric current at distances r

And r2 of light source from

Photoelectric cell are I and I2,

Respectively. Find the value of $I 1 / I 2$

Q11 If the frequency of incident radiation is

Equal to the threshold frequency, what

Will be the value of stopping potential?

Q12 A ray of light suffers minimum deviation,

While passing through a prism of refractive

Index 1.5 and refracting angle $60^{\circ}$. Calculate the angle of deviation and angle of incidence.
[Given, $\sin -1(0.75)=48.69]$

Q13 Describe how the resistivity of the

Conductor depends upon.

Q14 Show that spherical mirror formula is

Applicable to a plane mirror.

Q15 An infinitely long rod lies along the axis of concave mirror of focal length f. The near end of the rod is at a distance $x>f$ from the mirror $f$, then

What will be the length of the image of the rod?

Q16 (i) minimum kinetic energy? (ii) maximum kinetic energy and why? In what way has the wave nature of electron beam exploited in electron microscope?

Q17. Ten identical cells each of emf 2 V and internal resistance 12 are connected in series with two cells wrongly connected.A resistor of 102 is connected to the combination. Find the value of current through resistor.

Q18. A metallic rod of length $I$ is moved perpendicular to its length with velocity $v$

In a magnetic field $B$ acting perpendicular to the plane in which rod moves. Derive the expression for the induced emf.

Q19 A light bulb is rated 100 W for 220 V AC supply of 50 Hz . Calculate (i) resistance of the bulb. (ii) the rms current through the bulb
20. (i) What do you mean by threshold wavelength? (ii) A 60 W source emits monochromatic light of wavelength 662.5 nm . Find the value of number of photons emitted per second.
21. Read the following paragraph and answer

The questions that follows. Mirror formula is a relation between focal length, distance of object and distance of image from the mirror. The mirror formula is given by $1 / V+1 / U=1 / f$

Where, $u$ is the distance of object $v$ is the distance of image and $f$ is the focal length

Focal length of the mirror, $f=R / 2$

A convex lens is formed from a

Spherical surface of radius 20 cm . The

Power of lens is

10D. (c)5D
(b)-10D. (d)-5D.

Power of concave lens is

Positive. (c)1

Negative. (d) -1

A point object is placed at a distance of 30 cm from a convex mirror of focal length 30 cm . The image will form at

Infinity
© focus

Pole

15 cm behind the mirror

Q22(iv) An object is placed 40 cm from a concave mirror of focal length 20 cm . The image formed is

Real, inverted and same size

Real, inverted and smaller in size(c) virtual, erect and larger in size(d) virtual, erect and smaller in size

Q23)what are equipotential surfaces and write their properties.

Q24) Find the expression for the electric field intensity on the equatorial line of dipole.

Q25)A parallel plate capacitor has capacity $17.7 \mu \mathrm{~F}$ when its plates are separated by layer of air Imm thick. Calculate the area of its plates?

Q26 An ebonite plate ( $\mathrm{K}=3$ ) and 6 mm thick is introduced between the parallel plates of a capacitor of plate area $2 \times 10^{\prime} \mathrm{m}^{2}$ \& plate separation 0.01 m . Find the capacitance?

Q27 Eight small drops each of radius'r'and having same charge ' $q$ ' are combined to form a big drop. The ratio between the potentials to the bigger drop and the smaller drop is
(A)8:1 (B). 2:1 (C)4:1 (D) 1:8
28. An clectric flux of $-6 \times 10^{\circ} \mathrm{Nm} / \mathrm{C}$ passes through a spherical gaussian surface of radius 10 cm duc to point charge placed at the centre

What is the charge enclosed by the gaussian surface?

If the radius of the gaussian surface is doubled, how much flux would pass through

The surface.
29. A parallel plate capacitor of capacitance $C$ is charged to a potential V . It is then

Connected to another uncharged capacitor having the same capacitance. Find out the ratio Of the energy stored in the combined system to that stored initially in the single capacitor.
30.What is name given to the curves, the tangent to which at any point gives the direction of

Electric field at that point? Write down any five of its properties.
31.A solenoidal coil has 50 turns per cm along its length and a cross sectional area of 4 cm ? 200 turns of another wire is wounded around the first solenoid coaxially. The two coils are electrically insulated from each other. Calculate the mutual inductance between the two coils.
32. How is forward biasing different from reverse biasing in a p-n junction diode?
33. Derive the condition of balance for a Wheatstone bridge.
34.What is clectrostatic potential at a point. Derive the expression for potential due to point charge.
35. State Biot-Savart's law and write its mathematical expression.

Use this law to derive an expression for the magnetic field due to a circular coil carrying current at a point along its axis.

36 The magnetic field in a EM wave is given by $B y=\left(2 \times 10^{-7}\right) T$ sine $\left(0.5 \times 10^{3} x+1.5 \times 10^{\prime \prime} t\right)$

What is the wavelength and fiequency of the wave
Write an expression for electric field

37 In hydrogen atom, electron excites fiom ground state to higher energy state and its orbieal velocity is reduced to [1/3]" of its initial value. The radius of the orbit in the ground state is R. Find the radius of the orbit in that higher energy state.
38. In a nuclear reactor, Fission is produced in $\operatorname{Ig}$ for U23;(235.0439u) in 24 hours by slow

Neutrons (1.0087u). Assume than $3 s \mathrm{Kr}^{\circ}(91.89734)$ and $s o \mathrm{Ba}^{\prime} 4^{\prime}(140.9139 \mathrm{u})$ are produced In all and no energy is last.

Write the complete reaction.

Calculate the total energy produced in kilowatt hour.
39. 10 mA current can pass through a galvanometer of resistancc 252. What resistance in

Series should be connected through it. So that it is converted into voltmeter of 100 V ?
40. There are 3 voltmeter $A, B, C$ having the same range but their resistances are 15,0009 ,

10,00002 and 5,0000 respectively. The best voltmeter amongst them is the one whose resistance will be?
41.If in core, angle of incidence is equal to critical angle, then angle of refraction will be 42.If the value of critical angle is $30^{\circ}$ for total internal reflection from given optical fibre, Then speed of light in that fibre is
43. State the two Kirchhoff's law. Explain briefly how these rules are justified.

The current is drawn from a cell of emf $E$ and internal resistancer is connected to the

Network of resistors each of resistance $r$ as shown in the figure. Obtain the expression for

The current drawn from the cell (b) the power consumed in the network.
44.(a) Define linear magnification of a lens
(b)A real image of an object is formed at a distance of 20 cm from a lens. On putting another lens in contact with it, the image is shifted 10cm towards the combination.Determine the power of second lens.
45.(i) Distinguish between n-type and p-type semiconductor on the basis of energy band Diagrams.

Name the important processes that occur during the formation of $p-n$ junction.
Explain briefly with the help of suitable diagram, how a p-n junction is formed.
46. What is rectifier? Explain the working of full wave rectifier with the help of diagrams.
47. A small negligible current is passed through a wire of length 15 metre and area of cross - section $6.0 \times 10^{\prime} \mathrm{m}$ and its resistance is measured to be 5.0 ohm . What is the resistivity of the material of wire?
48. A radio can tune to any station in the 7.5 MHz to 12 MHz band. What is the corresponding wavelength band?
49. Obtain approximately the ratio of nuclear radii of Fe and $u$.
50. Light waves from two coherent sources of intensity ratio 81:1 produce interference.Calculate the ratio of the maxima and minima in the interference pattern?

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## C.SWORKSHEET FOR WINTER HOLIDAYS

1) What is a python variable? Identify the variables that are invalid and state the reason
a. Class, do, while, 4d, a+
2) What is None?
3) How strings are represented in Python?
4) What are the various mutable and immutable data types in Python?
5) What is the use of indentation in Python. Explain.
6) Predict the output
a. for $i$ in range $(1,10,3)$ :
b. print(i)
7) Rewrite the code after correcting errors:
a. if $\mathrm{N}=>0$
b. print(odd)
c. else
d. Print("even")
8) What problem occurs with the following code
a. $X=40$
b. While $\mathrm{X}<50$ :
c. $\operatorname{print}(X)$
9) Write a program to find average of three numbers
10) Write a program to check if a number is odd or even.
11) Write a program to print numbers from 1 to 10 and 10 to 1
12) What is a string slice? How is it useful?
13) How are list different from strings when both are sequences?
14) What will be the output of the following code snippet?
a. values $=[$ ]
b. for $i$ in range $(1,4)$ :
c. values.apend(i)
d. print(values)
15) Find the error in following code. State the reason of the error.
e. $a L s t=\left\{‘ a ': 1, ’ b^{\prime}: 2,{ }^{\prime} c^{\prime}: 3\right\}$
f. $\operatorname{print}\left(a L s t\left[{ }^{\prime} a^{\prime}, ' b '\right]\right)$ numbers and find their product.
16) Write a python function that takes two numbers and print the smaller number. Also write how to call this function.
17) How many values a python function can return? Explain how?
18) Rewrite the correct code after removing the errors: -
g. $\operatorname{def} \operatorname{SI}(\mathrm{p}, \mathrm{t}=2, \mathrm{r})$ :
h. return $\left(p^{*} \mathrm{r}^{*} \mathrm{t}\right) / 100$
19) Write a small python function that receive two numbers and return their sum, product, difference and multiplication and modulo division.
20) What is scope of a variable?
21) Explain two types of variable scope with example.
22) Consider the following function headers. Identify the correct statement: -
23) $\operatorname{def} \operatorname{correct}(\mathrm{a}=1, \mathrm{~b}=2, \mathrm{c})$ : 2$)$ def $\operatorname{correct}(\mathrm{a}=1, \mathrm{~b}, \mathrm{c}=3)$ :
c) $\operatorname{def} \operatorname{correct}(a=1, b=2, c=3)$ : 4) def $\operatorname{correct}(a=1, b, c)$ :
24) What is Libraries in Python and How many types of main library use in Python?
25) Give the basic structure of user defined function.
26) Create a function in Python to calculate and return Area of rectangle when user enters length and bredth.
27) Create a package Arithmetic Operations(named AO) contain sum, product and difference of two numbers and use it in your main programme.
28) Differentiate between a text file and a binary file.
29) What is the significance of a file object or a file handle?
30) What is the use of flush( )?
31) Name the methods used for reading and writing data from text file.
32) What are the various file opening modes?
33) What is the significance of close( )?
34) Write a python code to write some text to a file Lines.txt.
35) Define - Stack, Queue, Tree.
36) Name some operations commonly performed on data structures?
37) What is traversing? Write python code to traverse a list.
38) Name the methods used for inserting and deleting elements from a list
39) Predict the output with respect to the list $\mathrm{L}=[40,20,30,10,50$ ]
(a) $\operatorname{print}(\mathrm{L})$
(b) print(len(L)
(c) L.pop() ; print(L)
i. (d L.append(70); print(L)
j. (e) L.sort(); print(L)
40) what is a stack ? what basic operation can be performed on them?
41) Differentiate between Client and Server
42) Differentiate between LAN and WAN?
43) Explain the use of the following terms: NIC, MAC address, WiFi Card, Hub, switch, bridge, router, gateway, access point
44) What is IoT?
45) State two advantages of using Databases.
46) Name some popular relational database management systems.
47) Define - Relation, Tuple, Degree, Cardinality
48) Name some data types in MySQL
49) What are the various Integrity Constraints?

## R.M PUBLC SCHOOL

(CBSE AFFILIATION NO. 730072)
SESSION - 2023-24

## CHEMISTRY

Qno1. a. Radioactive decay follows first - order kinetics. The initial amount of two radioactive elements $X$ and $Y$ is $1 \mathbf{g m}$ each. What will be the ratio of $X$ and $Y$ after two days if their half-lives are 12 hours and 16 hours respectively?
b. The hypothetical reaction $P+Q R$ is half order w.r.t ' $P$ ' and zero order w.r.t ' $Q$ '. What is the unit of rate constant for this reaction?
Qno2. A 5\% solution of $\mathrm{Na} 2 \mathrm{SO} .10 \mathrm{H} 2 \mathrm{O}(\mathrm{MW}=322)$ is isotonic with $2 \%$ solution of non- electrolytic, non-volatile substance $X$. Find out the molecular weight of $X$.
Qno3. (a) Arrange the isomeric dichlorobenzene in the increasing order of their boiling point and melting Points.
(b) Explain why the electrophilic substitution reactions in haloarenes occur slowly and require more drastic conditions as compared to those in benzene.
Qno4. (a) Out of p-tolualdehyde and p-nitrobenzaldehyde, which one is more reactive towards nucleophilic addition reactions, why?
(b) Write the structure of the product formed when acetone reacts with 2,4 DNP reagent.

Qno5. Convert the following:
(a) Benzene to m-nitrobenzaldehyde
(b) Bromobenzene to benzoic acid

Qno6. (a) DNA fingerprinting is used to determine paternity of an individual. Which property of DNA helps in the procedure?
(b) What structural change will occur when a native protein is subjected to change in $\mathbf{p H}$ ?

Qno7. (a) Write the formula for the following coordination compound
Bis(ethane-1,2-diamine) dihydroxidochromium(III) chloride
Qno8. Does ionization isomer for the following compound exist? Justify your answer.
$\mathrm{Hg}[\mathrm{Co}(\mathrm{SCN}) 4]$
Qno9. Is the central metal atom in coordination complexes a Lewis acid or a Lewis base? Explain.
Qno10. Can we construct an electrochemical cell with two half-cells composed of ZnSO 4 solution and zinc electrodes? Explain your answer.
Qno11. Calculate the $\lambda 0 \mathrm{~m}$ for Cl - ion from the data given below:
$\Lambda 0 \mathrm{~m} \mathrm{MgCl} 2=258.6 \mathrm{Scm} 2 \mathrm{~mol}-1$ and $\lambda 0 \mathrm{~m} \mathrm{Mg} 2+=106 \mathrm{Scm} 2 \mathrm{~mol}-1$
Qno12. The cell constant of a conductivity cell is $0.146 \mathrm{~cm}-1$. What is the conductivity of 0.01 M solution of an electrolyte at 298 K , if the resistance of the cell is 1000 ohm ?
Qno13. Write the name of the reaction, structure and IUPAC name of the product formed when
(a) phenol reacts with CHCl 3 in the presence of NaOH followed by hydrolysis.
(b) $\mathbf{C H} 3 \mathrm{CH} 2 \mathrm{CH}(\mathrm{CH} 3) \mathrm{CH}(\mathrm{CH} 3) \mathrm{ONa}$ reacts with C 2 H 5 Br
C) $\mathbf{C H} 3 \mathrm{CH} 2 \mathrm{CN}$ reacts with stannous chloride in the presence of hydrochloric acid followed by hydrolysis
Qno14. You are given four organic compounds " $A$ ", " $B$ ", " $C$ " and " $D$ ". The compounds " $A$ ", " $B$ " and "C" form an orange- red precipitate with $2,4 \mathrm{DNP}$ reagent. Compounds " $A$ " and " $B$ " reduce Tollen's reagent while compounds " $C$ " and " $D$ " do not. Both " $B$ " and " $C$ " give a yellow precipitate when heated with iodine in the presence of NaOH . Compound " D " gives brisk effervescence with sodiumbicarbonate solution. Identify "A", "B", "C" and "D" given the number of carbon atoms in three of these carbon compounds is three while one has two carbon atoms. Give an explanation for your answer.
Qno15. a) What is the specific name given to sucrose based on hydrolysis.
b) One of the products formed during the hydrolysis of sucrose is a glucose, that reacts with hydroxylamine to give compound $A$. Identify compound $A$.
Qno16. An organic compound A with the molecular formula (+)C 4 H 9 Br undergoes hydrolysis to form
$(+) \mathbf{C 4 H 9 O H}$. Give the structure of A and write the mechanism of the reaction.
Qno17. The rate constants of a reaction at 200 K and 500 K are $0.02 \mathrm{~s}-1$ and $0.20 \mathrm{~s}-1$ respectively. Calculate the value of $\mathbf{E a}$ (Given 2.303R $=19.15 \mathrm{JK}-1 \mathrm{~mol}-1$ )
Qno18. The lead-acid battery represents the oldest rechargeable battery technology. Lead acid batteries can be found in a wide variety of applications including small-scale power storage such as UPS systems, ignition power sources for automobiles, along with large, grid-scale power systems. The spongy lead act as the anode and lead dioxide as the cathode. Aqueous sulphuric acid is used as an electrolyte.
There is no safe way of disposal and these batteries end - up in landfills. Lead and sulphuric acid are extremely hazardous and pollute soil, water as well as air. Irrespective of the environmental challenges it poses, lead-acid batteries have remained an important source of energy. Designing green and sustainable battery systems as alternatives to conventional means remains relevant. Fuel cells are seen as the future source of energy. Hydrogen is considered a green fuel. Problem with fuel cells at present is the storage of hydrogen. Currently, ammonia and methanol are being used as a source of hydrogen for fuel cell. These are obtained industrially, so add to the environmental issues. If the problem of storage of hydrogen is overcome, is it still a "green fuel?" Despite being the most abundant element in the Universe, hydrogen does not exist on its own so needs to be extracted from the water using electrolysis or separated from carbon fossil fuels. Both of these processes require a significant amount of energy which is currently more than that gained from the hydrogen itself. In addition, this extraction typically requires the use of fossil fuels. More research is being conducted in this field to solve these problems. Despite the problem of no good means to extract Hydrogen, it is a uniquely abundant and renewable source of energy, perfect for our future zero-carbon needs. Answer the following questions:
(a) How many coulombs have been transferred from anode to cathode in order to consume one mole of sulphuric acid during the discharging of lead storage cell?
(b) How much work can be extracted by using lead storage cell if each cell delivers about 2.0 V of voltage? ( $1 \mathrm{~F}=96500 \mathrm{C}$ )
Qno19. Attempt any five of the following:
(a) Which of the following ions will have a magnetic moment value of 1.73 BM .

Sc3+, Ti3+, Ti2+, Cu2+, Zn2+
(b) In order to protect iron from corrosion, which one will you prefer as a sacrificial electrode, Ni
or $\mathbf{Z n}$ ? Why? (Given standard electrode potentials of $\mathrm{Ni}, \mathrm{Fe}$ and Zn are $-\mathbf{0 . 2 5} \mathbf{V},-\mathbf{0 . 4 4} \mathrm{V}$ and 0.76 V respectively.)
(c) The second ionization enthalpies of chromium and manganese are 1592 and $1509 \mathrm{~kJ} / \mathrm{mol}$ respectively. Explain the lower value of $\mathbf{M n}$.
(d) Give two similarities in the properties of Sc and Zn .

Qno20. What is actinoid contraction? What causes actinoid contraction?
Qno21. What is the oxidation state of chromium in chromate ion and dichromate ion?
Qno22. Write the ionic equation for reaction of KI with acidified KMnO 4.
Qno23. (a) What is the effect of temperature on the solubility of glucose in water?
Qno24. Ibrahim collected a 10 mL each of fresh water and ocean water. He observed that one sample labelled " P " froze at 0 oC while the other " Q " at $\mathbf{- 1 . 3 0 C}$. Ibrahim forgot which of the two, " P " or " Q " was ocean water. Help him identify which container contains ocean water, giving rationalization for your answer.
Qno25. Calculate Van't Hoff factor for an aqueous solution of $\mathrm{K} 3[\mathrm{Fe}(\mathbf{C N}) 6]$ if the degree of dissociation $(\alpha)$ is 0.852 . What will be boiling point of this solution if its concentration is 1 molal? ( $\mathbf{K b}=\mathbf{0 . 5 2} \mathbf{~ K K g} / \mathrm{mol}$ )
Qno26. What type of deviation from Roult's Law is expected when phenol and aniline are mixed with each other? What change in the net volume of the mixture is expected? Graphically represent the deviation.
Qno27. The vapour pressure of pure water at a certain temperature is $\mathbf{2 3 . 8 0} \mathbf{~ m m ~ H g}$. If 1 mole of a nonvolatile non- electrolytic solute is dissolved in 100 g water, Calculate the resultant vapour pressure of the solution.
Qno28. An organic compound with molecular formula C7H7NO2 exists in three isomeric forms, the isomer ' $A$ ' has the highest melting point of the three. ' $A$ ' on reduction gives compound ' $B$ ' with molecular formula C7H9N. ' B ' on treatment with $\mathrm{NaNO} / \mathbf{H C l}$ at $0-50 \mathrm{C}$ to form compound ' C '. On treating C with H3PO2, it gets converted to $D$ with formula $\mathrm{C} 7 \mathrm{H8}$, which on further reaction with $\mathbf{C r O 2 C l 2}$ followed by hydrolysis forms ' $E$ ' $\mathbf{C} 7 \mathrm{H} 6 \mathrm{O}$. Write the structure of compounds A to E . Write the chemical equations involved.
Qno29. Account for the following:
(i) $\mathbf{N}$-ethylbenzenesulphonyl amide is soluble in alkali .
(ii) Reduction of nitrobenzene using Fe and HCl is preferred over Sn and HCl .

Qno30. Arrange the following in:
(i) decreasing order of $\mathbf{p K b}$ values

C6H5NH2, C6H5NHCH3, C6H5CH2NH2, CH3NH2, NH3
(ii) increasing order of solubility in water

C2H5Cl, C2H5NH2, C2H5OH
(iii) decreasing boiling point

CH3COOH, C2H5OH, CH3NH2, CH3OCH3
Qno. 31: Give plausible explanation for each of the following:

| (i) | Cyclohexanone forms cyanohydrin in good yield but 2,2,6-trimethylcyclohexanone <br> does <br> not. <br> There are two-NH2 groups in semicarbazide. However, only one is involved in the <br> formation of semicarbazones. |
| :--- | :--- |
| During the preparation of esters from a carboxylic acid and an alcohol in the <br> presence of <br> an acid catalyst, the water or the ester should be removed as soon as it is formed. |  |
| (ii) |  |
| (iii) |  |

Qno32: An organic compound contains $\mathbf{6 9 . 7 7 \%}$ carbon, $\mathbf{1 1 . 6 3 \%}$ hydrogen and rest oxygen. The molecular mass of the compound is 86 . It does not reduce Tollens' reagent but forms an addition compound with sodium hydrogensulphite and give positive iodoform test. On vigorous oxidation it gives ethanoic and propanoic acid. Write the possible structure of the compound.
Qno33: Although phenoxide ion has more number of resonating structures than carboxylate ion, carboxylic acid is a stronger acid than phenol. Why?
QNo34: How will you convert ethanal into the following compounds?
(i) Butane-1,3-diol (ii) But-2-enal (iii) But-2-enoic acid

Qno35: Write structural formulas and names of four possible aldol condensation products from propanal and butanal. In each case, indicate which aldehyde acts as nucleophile and which as electrophile.
Qno36: An organic compound with the molecular formula $\mathbf{C} 9 \mathrm{H} 10 \mathrm{O}$ forms 2,4-DNP derivative, reduces
Tollens' reagent and undergoes Cannizzaro reaction. On vigorous oxidation, it gives 1,2benzenedicarboxylic acid. Identify the compound.
Qno37: An organic compound (A) (molecular formula C 8 H 16 O 2 ) was hydrolysed with dilute sulphuric acid to give a carboxylic acid (B) and an alcohol (C). Oxidation of $C$ with chromic acid produced (B). (C) on dehydration gives but-1-ene. Write equations for the reactions involved.
Qno 38: What are the hydrolysis products of
(i) sucrose and (ii) lactose?

Qno39: What is the basic structural difference between starch and cellulose?
Qno40: What happens when D-glucose is treated with the following reagents?
(i) HI (ii) Bromine water (iii) HNO3

Qno41: Enumerate the reactions of D-glucose which cannot be explained by its open chain structure.
Qno42: What are essential and non-essential amino acids? Give two examples of each type.
Qno43: What is the effect of denaturation on the structure of proteins?
Qno44: How are vitamins classified? Name the vitamin responsible for the coagulation of blood.
Qno45: Why are vitamin A and vitamin C essential to us? Give their important sources.
Qno46: What are nucleic acids? Mention their two important functions.
Qno47: [ $\mathrm{Cr}(\mathrm{NH} 3) 6] 3+$ is paramagnetic while $[\mathrm{Ni}(\mathrm{CN}) 4] 2$ - is diamagnetic. Explain why?
Qno48: A solution of $[\mathrm{Ni}(\mathrm{H} 2 \mathrm{O}) 6] 2+$ is green but a solution of $[\mathrm{Ni}(\mathrm{CN}) 4] 2$ - is colourless. Explain.
Qno48: $[\mathrm{Fe}(\mathrm{CN}) 6] 4-$ and $[\mathrm{Fe}(\mathrm{H} 2 \mathrm{O}) 6] 2+$ are of different colours in dilute solutions. Why?
Qno49: Discuss the nature of bonding in metal carbonyls.
Qno50: Explain the violet colour of the complex [ $\mathrm{Ti}(\mathrm{H} 2 \mathrm{O}) 6] 3+$ on the basis of crystal
field theory


## Regards

Vice Principal

