DAV VEDANTA INTERNATIONAL SCHOOL LANJIGARH
POOJA VACATION HW-2025-26
CLASS: XII

ENGLISH

1. Invitation Writing

The Vedanta Township, Lanjigarh Puja Committee has planned to organize a grand Durga Puja celebration in its newly decorated Pandal. As a member of the organizing committee, design a card- type formal invitation inviting the public to visit the Pandal. Mention dates, timings, cultural programmes, and any eco-friendly initiatives.

2. Article Writing

In today's busy world, festivals are more than just rituals—they play a vital role in community bonding, cultural preservation, and mental well-being. Imagine you are a student reporter of your school magazine. Write an article in about 150 words on the topic:

"Significance of Festivals", highlighting their social, cultural, and psychological importance.

3. Report Writing

You are the Secretary of Lanjigarh Puja Mandap Committee. Your committee successfully organized a week-long Durga Puja celebration, starting from the inauguration to the immersion of the deity. Write a report for a local newspaper describing the main events, public participation, safety measures, and conclusion of the festival.

4. Application with Bio-data

Vedanta Aluminium Ltd., Lanjigarh, advertised vacancies for Computer Science graduates in a national daily. You have recently completed your Bachelor's in Computer Science and are keen to apply. Write a formal application with a Bio-data to the Chief Personnel Manager, Vedanta Aluminium Ltd., Lanjigarh, expressing your suitability for the post.

LITERATURE

5. Competency-Based Question (80–100 words)

a) On the Face of It: Imagine Derry is invited to deliver a motivational talk in his school assembly after meeting Mr. Lamb. Write a short speech (80–100 words) expressing how his outlook towards life has changed.

b) The Enemy: Suppose Dr. Sadao is nominated for an international award for Humanitarian Service. As part of the award ceremony, draft a short note (80–100 words) justifying why he deserves this honour.

c) Journey to the End of the World: If you were part of Tishani Doshi's Antarctic journey, what message would you post on your school's eco-club blog (80–100 words) about the urgency of protecting Earth's environment?

d) The Tiger King: Imagine you are a journalist writing a news column on the death of the Tiger King. Write a brief report (80–100 words) highlighting the irony of his fate.

e) The Third Level: If Charley had written a diary entry after his discovery of the "third level," what thoughts and feelings would he express in 80–100 words?

f) A Thing of Beauty: Imagine you are preparing a motivational write-up for your school bulletin board. In 80–100 words, explain how Keats' idea of beauty can help students overcome stress

and negativity.

Keeping Quiet: If Pablo Neruda's message was to be presented as a pledge for humanity, draft that pledge in 80–100 words focusing on peace, harmony and self-introspection.

Class XII (Physics)

Holiday Homework (Puja Vacation)

1. In a certain region of space, electric field is along the z-direction throughout. The magnitude of electric field is, however, not constant but increases uniformly along the positive z-direction, at the rate of $10^5 \mathrm{NC}^{-1}$ per metre. What are the force and torque experienced by a system having a total dipole moment equal to $10^{-7}\mathrm{Cm}$ in the negative z-direction?

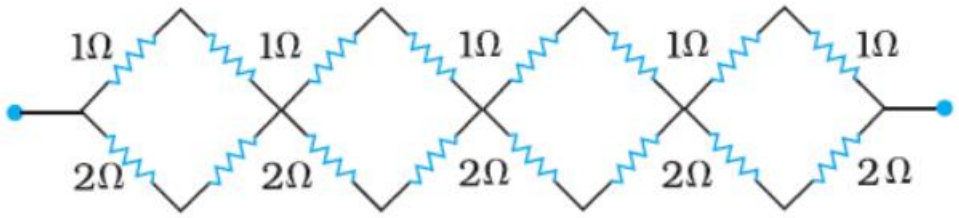
2. A hollow charged conductor has a tiny hole cut into its surface. Show that the electric field in the hole is $(\sigma/2\varepsilon_0)\hat{\mathrm{n}}$, where $\hat{\mathrm{n}}$ is the unit vector in the outward normal direction, and σ is the surface charge density near the hole.

3. (a) Show that the normal component of electrostatic field has a discontinuity from one side of a charged surface to another given by

$$(\mathrm{E}_2 - \mathrm{E}_1) \cdot \hat{\mathrm{n}} = \frac{\sigma}{\varepsilon_0}$$

where $\hat{\mathrm{n}}$ is a unit vector normal to the surface at a point and σ is the surface charge density at that point. (The direction of $\hat{\mathrm{n}}$ is from side 1 to side 2.) Hence show that just outside a conductor, the electric field is $\sigma\hat{\mathrm{n}}/\varepsilon_0$.
(b) Show that the tangential component of electrostatic field is continuous from one side of a charged surface to another. [Hint: For (a), use Gauss's law. For, (b) use the fact that work done by electrostatic field on a closed loop is zero.]

4. (a) Given n resistors each of resistance R, how will you combine them to get the (i) maximum (ii) minimum effective resistance? What is the ratio of the maximum to minimum resistance?
(b) Given the resistances of 1Ω, 2Ω, 3Ω, how will be combine them to get an equivalent resistance of (i) $(11/3)\Omega$ (ii) $(11/5)\Omega$, (iii) 6 Ω, (iv) $(6/11)\Omega$?
(c) Determine the equivalent resistance of networks shown in the figure below.



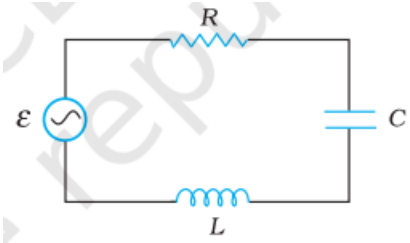
5. A uniform conducting wire of length $12a$ and resistance R is wound up as a current carrying coil in the shape of (i) an equilateral triangle of side a; (ii) a square of sides a and, (iii) a regular hexagon of sides a. The coil is connected to a voltage source V_0. Find the magnetic moment of the coils in each case.

6. A bar magnet of magnetic moment 1.5 JT^{-1} lies aligned with the direction of a uniform magnetic field of 0.22 T .
(a) What is the amount of work required by an external torque to turn the magnet so as to align its magnetic

moment: (i) normal to the field direction, (ii) opposite to the field direction?
(b) What is the torque on the magnet in cases (i) and (ii)?

7. A rectangular wire loop of sides 8 cm and 2 cm with a small cut is moving out of a region of uniform magnetic field of magnitude 0.3 T directed normal to the loop. What is the emf developed across the cut if the velocity of the loop is 1 cm s^{-1} in a direction normal to the (a) longer side, (b) shorter side of the loop? For how long does the induced voltage last in each case?

8. Figure below shows a series LCR circuit connected to a variable frequency 230 V source. $L = 5.0\text{H}, C = 80\mu\text{F}, R = 40\Omega$.



(a) Determine the source frequency which drives the circuit in resonance.
(b) Obtain the impedance of the circuit and the amplitude of current at the resonating frequency.
(c) Determine the rms potential drops across the three elements of the circuit. Show that the potential drop across the LC combination is zero at the resonating frequency.

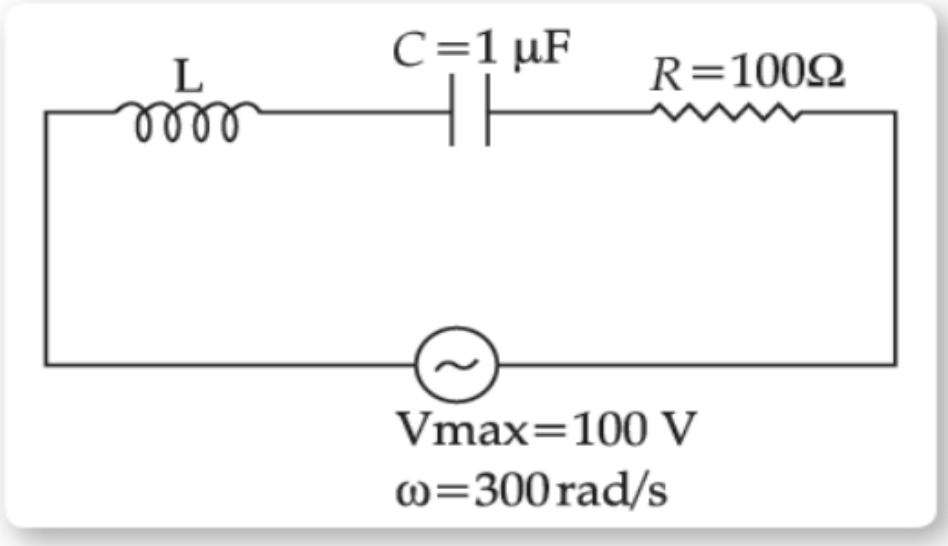
9. A pair of adjacent coils has a mutual inductance of 1.5 H. If the current in one coil changes from 0 to 20 A in 0.5 s, what is the change of flux linkage with the other coil?

10. A series LCR circuit as shown in the diagram is connected to an input ac voltage. The voltage across the capacitor lags the applied input voltage by 45°.

(a) Represent the phase relationship for the voltages across the three elements L, C and R using a phasor diagram.

(b) Determine the phase angle ϕ in the given circuit.

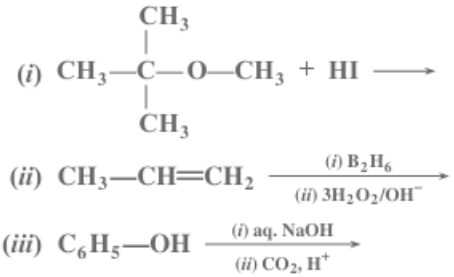
(c) Determine the value of inductor L.



XII-CHEMISTRY

Q. 1. Explain the mechanism of the following reactions:
(i) Addition of Grignard's reagent to the carbonyl group of a compound forming an adduct followed by hydrolysis.
(ii) Acid catalysed dehydration of an alcohol forming an alkene.
OR
Give the mechanism for the formation of ethene from ethanol.
(iii) Acid catalysed hydration of an alkene forming an alcohol.
Q. 2. How do you convert the following?
(i) Phenol to anisole (ii) Propan-2-ol to 2-methylpropan-2-ol (iii) Aniline to phenol.
Q. 3 Give one chemical test to distinguish between the following:
(i) Phenol and propan-1-ol
(ii) Ethanol and dimethyl ether
(iii) propan-1-ol and 2-Methyl-propan-2-ol
Q. 4 An organic compound 'A' having molecular formula C3H6 on treatment with aqueous H2SO4 gives 'B' which on treatment with HCl/ZnCl2 gives 'C'. The compound C on treatment with ethanolic KOH gives back the compound 'A'. Identify the compounds A, B, C.
Q. 5 A compound 'A' is optically active. On mild oxidation, it gives a compound 'B' but on vigorous oxidation gives another compound 'C'. C along with D is also formed from B by reaction with iodine and alkali. Deduce the structures of A, B, C, D.
Q. 6 Account for the following:
(i) Rectified spirit cannot be converted into absolute alcohol by simple distillation.
(ii) Diethyl ether does not react with sodium.
(iii) Phenols do not undergo substitution of the —OH group like alcohols
Q.7

Write the main product(s) in each of the following reactions:



Q.8 How will you bring the following conversions?
(i) Phenol to benzyl alcohol
(ii) Phenol to m-bromophenol
(iii) Phenol to aspirin.
Q. 9 How would you obtain the following?
(i) Benzoquinone from phenol
(ii) 2-Methylpropan-2-ol from methylmagnesium bromide
(iii)Propan-2-ol from propene
Q. 10 Give reasons for the following:
(i) Phenol is more acidic than methanol.
(ii) The C—O—H bond angle in alcohols is slightly less than the tetrahedral angle (109°28´).
(iii) (CH3)3C—O—CH3 on reaction with HI gives (CH3)3C—I and CH3—OH as the main products and not (CH3)3C—OH and CH3—I.
Q.11 A compound 'A' having molecular formula $C_4H_{10}O$ is found to be soluble in concentrated sulphuric acid. It does not react with sodium metal or potassium permanganate. On heating with excess of HI, it gives a single alkyl halide. Deduce the structure of compound A and explain all the reactions.

Q. 12 What happens when
(i) Salicylic acid is treated with (CH3CO)2O/H+?
(ii) Phenol is oxidised with Na2Cr2O7/H+?
(iii) Anisole is treated with CH3Cl/anhydrous AlCl3?
Write chemical equation in support of your answer.

Q. 13 (i) How can you obtain phenol from
(a) Cumene, (b) Benzene sulphonic acid, (c) Benzene diazonium chloride?
(ii) Write the structure of the major product obtained from dinitration of 3-methylphenol.
(iii) Write the reaction involved in Kolbe's reaction.
Q. 14 An aromatic compound 'A' on treatment with CHCl3/KOH gives two compounds 'B' and 'C'. Both B and C give the same product 'D' when distilled with zinc dust. Oxidation of D gives E having molecular formula C7H6O2. The sodium salt of E on heating with sodalime gives F which may also be obtained by distilling A with zinc dust. Identify A to F.
Q. 15 (i) Write equations of the following reactions:
(a) Bromine in CS2 with phenol
(b) Treating phenol with chloroform in the presence of aq. NaOH
(c) Anisole reacts with HI
(ii) Distinguish between
(a) Ethanol and Diethyl ether (b) Propanol and t-butyl alcohol

XII- MATHEMATICS

Relations and Functions:

1. Show that the function f : R → { x ∈ R : -1 < x < 1} defined by f(x) = $\frac{x}{1+|x|}$, x ∈ R is one – one and onto function.

2. Let N be the set of all natural numbers and R be the relation on N×N defined by (a, b) R (c, d) iff ad(b+c) = bc(a+d). Examine whether R is an equivalence relation on N × N?

3. Let N be the set of natural numbers and relation R on set N be defined by $R = \{(x, y): x, y \in N, x + 4y = 10\}$. Check whether R is reflexive, symmetric and transtive.

4. Let $f: [2, \infty) \to X$ defined by $f(x) = 4x - x^2$. Check whether the function is bijective or not.
If it is not, what should be the co-domain so that function would be bijective.

5. If $f: R \to R$ be the function defined by $f(x) = 4x^3 + 7$, show that f is bijective.

6. Let Z be the set of integers. Show that relation R= {(a, b): a, b∈Z and a + b is even) is an equivalence relation on Z.

7. Prove that the relation R in the set of natural numbers N is defined as $R = \{a^2 - 4ab + 3b^2 = 0, a, b \in N\}$ is reflexive but neither symmetric not transitive.

8. Prove that the relation R on Z, defined by R={(x, y): (x − y) is divisible by 5} is an equivalence relation.

9. Show that the relation R in the set A of points in a plane, given by R= {(P,Q): distance of the point P from the origin is same as the distance of the point Q from the origin}, is an equivalence relation. Further, show that the set of all points related to a point P≠(0,0) is the circle passing through P with origin as centre.

10. Show that the function $f: R \to R$ defined by f(x) = $\frac{x}{1+x^2}$, for all $x \in R$ is neither one-one nor onto.

11. Prove that the function $f: N \to N$, defined by $f(x) = x^2 + x + 1$ is one-one but not onto.

12. Show that the relation S in the set R of real numbers defined as $S = \{(a, b): a, b \in R \text{ and } a \leq b^3\}$ is neither reflexive nor symmetric not transitive.

13. Let a relation R on the set A of real numbers be defined as (a, b) ∈ R ⇔ 1 + ab > 0 ∀ a, b ∈ A. Check if R is an equivalence relation or not.

14. Let $f, g: R \to R$ be two functions defined as $f(x) = |x| + x$ and $g(x) = |x| - x$. Check for bijective functions. Give the reason.

15. Consider $f : R_+ \to [-9, \infty)$ given by $f(x) = 5x^2 + 6x - 9$ where R^+ is the set of all non-negative real numbers. Prove that f is bijective.

Matrix and Detreminants:

16. If $A = \begin{bmatrix} 1 & 3 & 2 \\ 2 & 0 & -1 \\ 1 & 2 & 3 \end{bmatrix}$, then show that $A^3 - 4A^2 - 3A + 11I = 0$. Hence, find A^{-1}.

17. If $A = \begin{bmatrix} 1 & 2 & 0 \\ -2 & -1 & -2 \\ 0 & -1 & 1 \end{bmatrix}$, find A^{-1}. Hence, solve the system of equations:
x-2y = 10; 2x-y-z = 8; -2y + z = 7.

18. Use product $\begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix}\begin{bmatrix} -2 & 0 & 1 \\ 9 & 2 & -3 \\ 6 & 1 & -2 \end{bmatrix}$ to solve the system of equations: x+3z = 9;
-x+2y-2z = 4; 2x-3y+4z = -3.

19. Find A, if $\begin{bmatrix} 4 \\ 1 \\ 3 \end{bmatrix} A = \begin{bmatrix} -4 & 8 & 4 \\ -1 & 2 & 1 \\ -3 & 6 & 3 \end{bmatrix}$

Applications of Integrals:

20. Make a rough sketch of the region $\{(x, y): 0 \le y \le x^2, \& \ 0 \le y \le x, 0 \le x \le 2\}$ and find the area of the region using integration.

21. If the area between $x = y^2$ and x = 4 is divided into two equal parts by the line x = a, find the value of a.

22. Find the area of the region {(x, y): $x^2 + y^2 \le 4$, x + y ≥2}.

23. Using integration find the area of the region $\{(x, y): |x - 1| \le y \le \sqrt{5 - x^2}\}$.

24. Draw a rough sketch of the given curve y = 1 + |x+1|, x = -3, x = 3, y=0 and find the area of the region bounded by them, using integration.

25. Find the area of the region {(x, y): y ≥ x^2 and y = |x|}.

26. Find the area enclosed between the parabola $4y = 3x^2$ and the straight line 3x – 2y+12=0.

Integrals:

27. $\int \frac{(2x-5)e^{2x}}{(2x-3)^3} dx.$

28. $\int \frac{2x}{(x^2+1)(x^2+4)} dx$

29. $\int \frac{x^{1/2}}{1+(x)^{3/4}}dx$ 30. $\int (2x^2+3)\sqrt{x+2}dx$

31. $\int \frac{5x^2+4x+7}{\sqrt{(2x+3)^3}}dx$ 32. $\int \frac{x}{\sqrt{x}+1}dx$

33. $\int \frac{1}{\cos(x-a)\cos(x-b)}dx$ 34. $\int \frac{\cos(x+a)}{\sin(x+b)}dx$

35. $\int_0^{\pi/4} \log(1+tanx)\,dx$ 36. $\int_0^{\pi} \frac{x\,dx}{1+sinx}$

37. $\int_0^{3/2} |x\,sin\pi x|\,dx$ 38. $\int_0^{\pi} \frac{x\,tanx}{secx+tanx}dx$

39. $\int_1^4 [|x-1|+|x-2|+|x-3|]\,dx$

40. $\int_0^{\pi} \frac{x}{a^2cos^2x+b^2sin^2x}\,dx$ 41. $\int_{-1}^{1} \frac{x+|x|+1}{x^2+2|x|+1}\,dx$

42. $\int_1^2 \left(\frac{1}{x}-\frac{1}{2x^2}\right)e^{2x}dx$ 43. $\int_{-1}^{2} |x^3-x|\,dx$

44. $\int_0^{\pi/2} \frac{xsinx\,cosx}{sin^4x+cos^4x}\,dx$ 45. $\int_{\pi/6}^{\pi/3} \frac{1}{\sqrt{cotx}+1}\,dx$

XII- BIOLOGY

1. Tobacco (Nicotiana tabacum L.), an important non-food narcotic cash crop, occupies less than 0.27 percent of the net cultivated area and earns a sizable amount of foreign exchange (Rs. 4,210 crores). Plant-parasitic nematodes cause on average 12.3% losses annually in 40 major crops at a global level; the losses are more in developing countries (14.6%) than in developed nations (8.8%). Microscopic worms called nematodes may seem harmless, but they can devastate a tobacco field, reducing yields, stunting plant growth and cutting into farmer profits. a- On which principal RNA interference is based? b- Which nematode infects the crop of tobacco plants? c- Which vector is used to create nematode resistant tobacco plants? d- Mention the source organism of the vector

2. Corpus luteum in pregnancy has a long life. However, if fertilisation does not take place, it remains active only for 10-12 days. Explain.

3. Why is the frequency of red-green colour blindness is many times higher in males than in the females?

4. DNA is more suitable genetic material over RNA. Why?

5. A sportsperson was tested positive for cannabinoid what are these? From where are these extracted? What are its effects on human body?

6. PCR (Polymerase Chain Reaction) is a revolutionary method developed by Kary Mullis in the 1980s. PCR is an invitro technique. The basic steps involved in PCR are- denaturation, annealing and extension. If the process of replication of DNA is repeated many times, the segment of DNA can be amplified to approximately a billion times-

i-Name the specific type of DNA polymerase enzyme used in PCR
ii- what do you mean by the annealing process?
iii- In PCR varied temperature levels are required. What is the advantage of high temperature?
iv- what are the source of nucleotides in PCR.

7. A person shows strong unusual hypersensitive reactions when exposed to certain substances present in the air. Identify the condition. Name the cells responsible for such reactions. What precaution should be taken to avoid such reactions?

8. For an organ transplant, it is an advantage to have an identical twin. Why?

9. The immune system of a person is suppressed. In the ELISA test, he was found positive to a pathogen.

a. Name the disease the patient is suffering from b. What is the causative organism?

c. Which cells of the body are affected by the pathogen?

10. What is Down's syndrome? Give its symptoms and cause. Why is it that the chances of having a child with Down's syndrome increase if the age of the mother exceeds forty years?

XII- PHYSICAL EDUACTION

1. Differentiate between Intramural and Extramural tournaments. Explain the objectives and significance of Intramural competitions in detail.
2. Imagine you are the Head of the Organising Committee for an inter-school Athletics Meet. Explain the various pre-, during, and post-event responsibilities of any three key committees.
3. Define the term Postural Deformity . Describe Knock Knee, Flat Foot, and Round Shoulders in detail, and explain one corrective measure for each.
4. Discuss the various physical, psychological, and social benefits of sports participation specifically for women.
5. What are Lifestyle Diseases ? Explain any three such diseases and detail the procedure and two key benefits for a specific Yogasana beneficial in preventing or managing each one.
6. Explain the concept of Yogic Kriyas and describe the procedure and benefits of any one of them. Also, discuss the role of Asanas in preventive health care.
7. Explain the concept of Inclusion in sports for Children with Special Needs (CWSN). Discuss the role of a physical education teacher in making activities accessible and creating a supportive environment for CWSN.
8. List the Advantages of Physical Activities for children with special needs. Elaborate on any three specific strategies to promote inclusion in mainstream sports.
9. Explain the concept of a Balanced Diet . Describe the functions and food sources of both Macro Nutrients (Carbohydrates, Fats, Protein) and Micro Nutrients (Vitamins and Minerals) in detail.
10. What is Eating for Weight Control ? Describe a healthy weight strategy, and explain two common pitfalls of dieting along with two examples of prevalent Food Myths .
11. Describe the detailed procedure and purpose of conducting the Rikli & Jones Senior Citizen Fitness Test (Mention at least four components).
12. What are the key principles of Test and Measurement in Sports ? Explain the procedure and calculation for the Harvard Step Test to measure Cardiovascular Fitness.
13. Explain the term Physiological Factors Determining Components of Physical Fitness . Discuss the effect of exercise on the Muscular System with respect to any five changes.
14. What are Sports Injuries? Classify them into different types (Soft Tissue, Bone, and Joint) and explain the classification of Fractures with the help of examples.

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