SHREE VASISHTHA VIDHYALAYA
(English Medium, CBSE affiliated, Member-NPSC, Recipient-International School Award)
PA-IV Assignment: 2025 26
Class-XI Science
DATE OF SUBMISSION: 02-01-2026

1.	ENGLISH
	LEVEL 1

LEVEL 1
1. What was Nick Middleton's purpose in undertaking the journey?
2. What was the author's physical condition during the journey?
3. What problem did Tsetan face while driving?
4. What difficulties did the author face due to weather conditions?
5. Describe the role of Tsetan in the journey.
6. Do you think Andrew was justified in taking a risk without seeking help? Give reasons.
7. What ethical values of the medical profession are highlighted in Birth?
8. How does the story emphasise compassion over clinical detachment?
9. What lessons about resilience and responsibility does the story convey?
10. If Andrew had followed textbook procedures strictly, would the outcome have been different? Analyse.

LEVEL 2:
1. Nick Middleton describes the Changtang as a "land of the past." Analyse this phrase in the context of modern civilisation.
2. Discuss how nature emerges as a dominant force overpowering human endurance in *Silk Road*.
3. Analyse the author's narrative technique in blending travel, history, and personal reflection.
4. "Survival on the Tibetan plateau depends more on adaptation than strength." Justify with reference to the text.
5. Evaluate the role of silence and isolation in shaping the author's experience of the journey.
6. How does Joe Morgan's reaction add emotional depth to the story?
7. Explain the significance of the doctor's exhaustion at the end of the story.
8. Why does the author describe the child as a "stillborn" initially?
9. How does Andrew's past experience influence his actions during the crisis?
10. What does the story reveal about the unpredictability of life and death?

LEVEL 3:
1. "The journey across the Tibetan plateau was both physically challenging and spiritually enriching." Explain.
2. Describe the harsh climatic conditions faced by the author and how he coped with them.
3. How does Nick Middleton bring out the contrast between modern life and traditional Tibetan culture?
4. The chapter Silk Road is not just a travelogue but a reflection on life and nature. Justify.
5. How does the author use vivid imagery to describe the landscape of Tibet?
6. "Dr Andrew Manson's greatest battle in *Birth* is not medical but moral." Analyse this statement.
7. How does A. J. Cronin use the childbirth episode to highlight the limitations and responsibilities of medical science?
8. Examine the role of perseverance and presence of mind in saving the child's life.
9. The story *Birth* explores the thin line between hope and despair. Discuss with reference to the text.
10. Analyse the irony in the title *Birth*.

2.	PHYSICS

LEVEL 1

1. Define simple harmonic motion (SHM).
2. Write the mathematical expression for displacement in SHM.
3. What is time period of a simple pendulum? Give its formula.
4. Define amplitude of oscillation.
5. What is angular frequency? Write its relation with time period.
6. What are mechanical waves? Give one example.
7. Distinguish between transverse and longitudinal waves (any one point).
8. What is a crest and trough?
9. Define wave speed.
10. What is compression and rarefaction in sound waves?

LEVEL 2

1. Derive the expression for total energy of a particle in SHM.
2. Explain phase and phase difference in SHM.
3. What is a second's pendulum? Find its length.
4. Explain the effect of change in length on the time period of a simple pendulum.
5. Distinguish between periodic motion and oscillatory motion (any three points).
6. Explain the formation of transverse waves with a neat diagram.
7. Explain the formation of longitudinal waves with a neat diagram.
8. Derive the wave equation for a progressive wave.
9. Explain the terms wavelength, frequency, amplitude, and wave velocity.
10. Derive the relation $v = f\lambda$.

LEVEL 3

1. Derive the expression for the time period of a mass–spring system. Explain the effect of mass and spring constant.
2. Derive the expression for total energy of a particle in SHM. Show that it remains constant and explain the variation of KE and PE.
3. Explain phase, phase difference, and phase relation between displacement, velocity, and acceleration in SHM with graphs.
4. Describe damped oscillations. Explain the causes of damping and the variation of amplitude with time.
5. Explain forced oscillations and resonance. State the conditions for resonance and its practical applications.
6. Explain the formation and propagation of transverse waves with a neat diagram.
7. Explain the formation and propagation of longitudinal waves with a neat diagram.
8. Derive the wave equation for a progressive wave traveling in the positive x-direction.
9. Explain the principle of superposition of waves and its applications.
10. What are the factors on which the speed of sound in gas.

3.	CHEMISTRY

LEVEL 1

1. Define chemical equilibrium.
2. What is the value of Kc for the reaction at equilibrium?

   $H_2 + I_2 \rightleftharpoons 2HI$

   if $[HI] = 1 \text{ mol L}^{-1}$ and $[H_2] = [I_2] = 0.5 \text{ mol L}^{-1}$?
3. State Le-Chatelier's principle.
4. What happens to the equilibrium when pressure is increased for a reaction involving gases?
5. Write the expression of Kc for:

   $N_2 + 3H_2 \rightleftharpoons 2NH_3$
6. Define homologous series.
7. What is the IUPAC name of $CH_3–CH_2–OH$?
8. Identify the functional group present in $CH_3–COOH$.

9. Draw the structural formula of butane.
10. What is catenation?

LEVEL 2

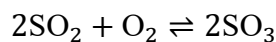1. For the reaction:
   $$PCl_5 \rightleftharpoons PCl_3 + Cl_2$$
   Explain the effect of temperature increase on equilibrium.
2. A reaction has $Kc = 10^5$. What does it indicate about the extent of reaction?
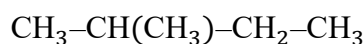3. Define reaction quotient (Q). How does it help predict direction of reaction?
4. For the reaction:
   $$2SO_2 + O_2 \rightleftharpoons 2SO_3$$
   What will happen if SO_2 concentration is increased?
5. Write the relationship between Kp and Kc.
6. Give IUPAC name of:
   $$CH_3-CH(CH_3)-CH_2-CH_3$$
7. Write structural isomers of C_4H_{10}.
8. Explain inductive effect with one example.
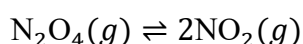9. What are electrophile and nucleophile?
10. What is resonance? Give one example.

LEVEL 3 – DIFFICULT (10 Questions)

1. Derive the relationship:
   $$K_p = K_c(RT)^{\Delta n}$$
2. For the reaction:
   $$N_2O_4(g) \rightleftharpoons 2NO_2(g)$$
   At 300 K, $K_p = 0.144$. If total pressure is 1 atm, calculate the degree of dissociation (α).
3. Explain the concept of buffer solution and derive Henderson equation for acidic buffer.
4. A 0.1 M weak acid ($Ka = 1 \times 10^{-5}$) is 1% ionised. Check whether this is consistent with the ionisation expression.
5. Explain how the equilibrium constant changes with temperature and pressure.
6. Explain +I and -I effect.
7. What do you mean by metamerism? Give one example.
8. Draw geometrical isomers of but-2-ene.
9. Explain +M and –M effects with examples.
10. Suggest the purification method for:
    (a) A solid organic compound
    (b) A liquid organic compound

4.	**MATHEMATICS**

LEVEL 1

1. Differentiate the function with respect to x: $(ax^2 + \cot x)(p+q \cos x)$
2. Differentiate $1/(ax^2+bx+c)$ with respect to x.
3. Evaluate the derivative of 99x at x=100
4. Find the derivative of the following trigonometric functions:
   (i) 2 tan x – 7 sec x
   (ii) sin x cos x
   (iii) 5 sec x + 4 cos x
5. Differentiate the function: $\cos(x^2+1)$.
6. Differentiate $x^2 \sin x + \cos 2x$.
7. Differentiate $(2x – 7)^2 (3x+5)^3$.

8. Find the derivative of $f(x) = x^3$ using the first principle.

Level 2

1. Determine the equation of the circle with radius 4 and Centre (-2, 3).
2. Compute the centre and radius of the circle $2x^2 + 2y^2 - x = 0$
3. Determine the focus coordinates, the axis of the parabola, the equation of the directrix and the latus rectum length for $y^2 = -8x$
4. Determine the foci coordinates, the vertices, the length of the major axis, the minor axis, the eccentricity and the length of the latus rectum of the ellipse $(x^2/49) + (y^2/36) = 1$
5. Determine the equation for the ellipse that satisfies the given conditions: Centre at (0, 0), the major axis on the y-axis and passes through the points (3, 2) and (1, 6).
6. Determine the equation of the hyperbola which satisfies the given conditions: Foci (0, ±13), the conjugate axis is of length 24.
7. Find the equation of ellipse whose eccentricity is 2/3, latus rectum is 5 and the centre is (0,0).
8. Find the equation of the circle which touches x-axis and whose centre is (1,2).
9. Find the coordinates of a point on the parabola $y^2=8x$ whose focal distance is 4.

5.	**BIOLOGY**

LEVEL 1
1. What is plasma?
2. Name the pigment present in RBCs.
3. Which blood cells are called "soldiers of the body"?
4. What is the normal pH of human blood?
5. Name the valve present between left atrium and left ventricle.
6. Which chamber of the heart has the thickest wall?
7. What is breathing?
8. Name the respiratory surface in humans.
9. Which gas is transported mainly by haemoglobin?
10. What is tidal volume?

AVERAGE LEVEL (10 Questions)
11. Differentiate between serum and plasma.
12. Why are RBCs biconcave in shape?
13. What is double circulation? Why is it important in humans?
14. Explain the role of platelets in blood clotting.
15. What is systole and diastole?
16. Define cardiac output.
17. Explain the mechanism of inspiration.
18. Why does oxygen bind more readily to haemoglobin in lungs?
19. What is the role of bicarbonate ions in CO_2 transport?
20. Differentiate between tidal volume and vital capacity.

MDIFFICULT LEVEL (10 Questions)
21. Explain the mechanism of blood clotting with the role of calcium ions.
22. Describe the structure of human heart with the help of a labeled diagram.
23. Why is blood circulation in humans called double circulation? Explain with a pathway.
24. Explain the significance of ECG and what information it provides.
25. Describe the Bohr effect and its physiological importance.
26. Explain the chloride shift during transport of carbon dioxide.
27. Why is foetal haemoglobin more efficient than adult haemoglobin?
28. Describe the regulation of respiration by chemoreceptors.
29. Explain how pH, temperature, and pCO_2 affect oxygen–haemoglobin dissociation curve.
30. What happens to breathing and circulation during strenuous exercise? Explain physiologically.

6.	**INFORMATICS PRACTICES**

1. Differentiate between CHAR and VARCHAR Datatypes.

	2. What is a database system? What is its need?
	3. What are the disadvantages of database systems?
	4. What is SQL? What are different categories of commands available in SQL?
	5. Differentiate between DDL and DML commands.
	6. Write two usage of DESC in SQL

Consider the following Table named „empl" and Write SQL commands from (a) to (n)

empno	ename	job	mgr	hiredate	sal	comm	deptno
8369	SMITH	CLERK	8902	1990-12-18	800	NULL	20
8499	ANYA	SALESMAN	8698	1991-02-20	1600	300	30
8521	SETH	SALESMAN	8698	1991-02-22	1250	500	30
8566	MAHADEVAN	MANAGER	8839	1991-04-02	2985	NULL	20
8654	MOMIN	SALESMAN	8698	1991-09-28	1250	1400	30
8698	BINA	MANAGER	8839	1991-05-01	2850	NULL	30
8882	SHIAVNSH	MANAGER	8839	1991-06-09	2450	NULL	10
8888	SCOTT	ANALYST	8566	1992-12-09	3000	NULL	20
8839	AMIR	PRESIDENT	NULL	1991-11-18	5000	NULL	10
8844	KULDEEP	SALESMAN	8698	1991-09-08	1500	0	30
8886	ANOOP	CLERK	8888	1993-01-12	1100	NULL	20
8900	JATIN	CLERK	8698	1991-12-03	950	NULL	30
8902	FAKIR	ANALYST	8566	1991-12-03	3000	NULL	20
8934	MITA	CLERK	8882	1992-01-23	1300	NULL	10

a) Display all the records from table empl.
b) Display EmpNo and EName of all employees from the table empl.
c) Display employee name, salary, and department number who are not getting commission from table empl.
d) Display employee number, name, sal*12 as Annual salary whose commission is not NULL from table empl.
e) List all department numbers from table empl.
f) List all unique department numbers from table empl.
g) List the details of all clerks who have not been assigned department as yet.
h) Display the details of employees whose name have only four letters.
i) Display the details of all employee whose annual salary is between 25000 to 40000.
j) How many job types are offered to employees?
k) List the employees who earn more commission than their salaries.
l) Display name, job title and salary of employee who do not have manager.
m) Display the name of employee whose name contains „A" as third letter.
n) Display the name of employee whose name contains „L" as any letter

7.	**PHYSICAL EDUCATION**

EASY LEVEL QUESTION PAPER
(Fundamentals of Anatomy, Physiology & Sports Psychology)
Section A: MCQs (1 × 4 = 4 marks)
1. Anatomy is the study of:
   a) Body movements
   b) Body structure
   c) Body functions
   d) Body diseases
2. Which system protects vital organs?
   a) Muscular
   b) Nervous
   c) Skeletal
   d) Respiratory
3. The heart is part of which system?
   a) Digestive

b) Respiratory
c) Circulatory
d) Nervous

4. Which gas is taken in during respiration?
   a) Carbon dioxide
   b) Nitrogen
   c) Oxygen
   d) Hydrogen
5. **Assertion (A):** Muscles help in movement.
   Reason (R): Muscles contract and relax to produce movement.
6. Define Physiology.
7. Name any two functions of the skeletal system.
8. Explain the importance of Anatomy in sports.
9. Write any three functions of muscles.
10. What is Team Cohesion?
11. List any three adolescent problems.
12. Describe the structure and functions of the heart.
13. Explain the respiratory system and its functions.
14. Define Psychology and explain its importance in Physical Education and Sports.

Moderate Level

1. Which type of joint allows free movement?
   a) Fixed joint
   b) Slightly movable
   c) Ball and socket
   d) Fibrous
2. Which muscle works without our control?
   a) Skeletal
   b) Smooth
   c) Voluntary
   d) Striated
3. Oxygen is transported by:
   a) Platelets
   b) Plasma
   c) RBC
   d) WBC
4. Mental Toughness mainly helps an athlete to:
   a) Increase height
   b) Control emotions
   c) Improve digestion
   d) Improve flexibility
5. **Assertion (A):** Adolescence is a critical stage of development.
   Reason (R): Rapid physical and emotional changes occur during this stage.
6. Name any two types of bones.
7. What is attention in sports psychology?
8. Explain the functions of the skeletal system.
9. Describe the properties of muscles.
10. Explain the structure of the circulatory system.
11. Discuss any two methods to manage adolescent problems.
12. Explain classification of bones with examples.
13. Describe the structure and functions of the respiratory system.
14. Explain Team Cohesion and its importance in sports performance.

HARD LEVEL QUESTION PAPER

1. Which bone protects the brain?
   a) Femur
   b) Vertebra

c) Skull
d) Pelvis
2. Cardiac muscles are found in:
   a) Arms
   b) Legs
   c) Heart
   d) Lungs
3. The main function of alveoli is:
   a) Air transport
   b) Gas exchange
   c) Blood purification
   d) Muscle contraction
4. Resilience in sports refers to:
   a) Physical strength
   b) Ability to recover from setbacks
   c) Speed
   d) Endurance
5. **Assertion (A):** Team cohesion improves sports performance.
   Reason (R): Cooperation and trust among players increase efficiency.
6. Define mental toughness.
7. What is a hinge joint?
8. Explain the importance of Physiology in sports training.
9. Describe different types of joints with examples.
10. Explain the functions of blood.
11. Discuss psychological problems during adolescence.
12. Explain attention and its role in sports.
13. Describe the functions of the circulatory system.
14. Explain in detail the structure and functions of the skeletal system.
15. Describe properties and functions of muscles in relation to sports.
16. Explain developmental characteristics at different stages of development.

8.	**PSYCHOLOGY**

Define the following:
1. Modeling
2. Insight learning
3. Latent learning
4. Verbal learning
5. Free recall
6. Partial Reinforcement Effect
7. Learning Disabilities
8. Encoding
9. Storage
10. Retrieval
11. Chunking
12. Episodic Memory
13. Semantic Memory
14. Flashbulb Memories
15. Implicit Memory
16. Mnemonics

A. How the paired associates learning different from serial learning?
B. Explain the determinants of verbal learning?
C. Explain Motivation.
D. What do you mean by dyslexia?
E. Explain the symptoms of learning disabilities.
F. Explain the difference form of cognitive learning.

	G. Why is motivation being prerequisites for learning? H. How can you distinguish between generalization and discrimination? I. Explain the Stage Model. J. Explain the nature of memory? K. Draw and explain the Ebbinghaus curve of forgetting. L. Explain the causes of forgetting. M. How the mnemonics can be improved by image? N. How the mnemonics can be improved by organization?
9.	**ARTIFICIAL INTELLIGENCE**
	Very Short Type (2 Mark) **Q1.** What does learning from experience mean in Machine Learning? **Q2.** Why is Machine Learning called self-improving technology? **Q3.** What is training data? **Q4.** What is a prediction in Machine Learning? **Q5.** What is a reward in Reinforcement Learning? **Q6.** What is feature extraction? **Q7.** What is an application of unsupervised learning? **3 MARKS QUESTIONS** **Q8.** Describe the role of an algorithm in Machine Learning. **Q9.** Explain why large datasets are required in Machine Learning. **Q10.** State three limitations of Machine Learning. **Q11.** Explain the concept of trial and error learning. **Q12.** Mention three uses of supervised learning in daily life. **Q13.** Write three characteristics of Deep Learning. **Q14.** Explain how a machine learning model is trained. **Q15.** Explain clustering in Unsupervised Learning. **Q16.** Explain how feedback improves learning in Reinforcement Learning. **Q17.** Explain the importance of neural networks in Deep Learning. **Q18.** Describe four real-world uses of Machine Learning. **Q19.** Explain why Deep Learning outperforms traditional Machine Learning in image recognition.