SWARNPRASTHA PUBLIC SCHOOL

Sonepat

Under the aegis of Indraprastha Education and Charitable Society

HOLIDAY HOME WORK / PROJECT

2019-20

Class - XI

The more you learn, the more you want to learn.

ENGLISH

ADVANCED WRITING SKILLS

1. You are Anil/ Anila, a social activist. Design a poster in about 50 words to observe 'Road Safety Week' spreading awareness among the masses especially students who ride on two wheelers and drive four wheelers risking their lives.
2. Water is precious and each one of us must stop its wastage. Prepare a poster in not more than 50 words urging people to employ various methods of rain water harvesting in their colonies.
3. Your school is organizing a fete to collect funds for charity. Only school students are eligible to put upstalls. As Head Boy/ Head Girl of ABC International School, draft a notice in not more than 50 words to be put up announcing the sale of stalls giving all the necessary details.
4. You are Nitin/Natasha a student of Class XII at K. P. N. Public School Faridabad. The student is required to cope with lot of pressure in today's competitive environment. Write a letter to the editor in about 125 words of a national daily highlighting the increasing stress faced by students and suggest ways to combat the same.
5. You are Satish/Sakshi. You are worried about the hike in the prices of essential commodities like gas, pulses, vegetables etc. Write an article on this in about 150-200 words for publication in a local daily, suggesting certain steps to curb price hikes.
6. You are Rohan/Ruchika, a student of class XII at A.P. International School, Agra. Your school is organising an Inter-School Debate competition. The topic for the debate is "Poetry should be removed from the curriculum." Write the debate on the same in about 200 words.

LITERATURE

QUESTION ANSWER OF LESSON – BIRTH and THE TALE OF MELON CITY

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MATHEMATICS

1. Revise Ch-03,10,13 and 15
2. Complete Math Lab Manual – 10 Activities.

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PSYCHOLOGY

Revise chapters 1, 2, 4, 7, 8

A) Answer the following questions:-

1. How can you distinguish scientific psychology from the popular notions about the discipline of psychology?
2. Give a brief account of the evolution of psychology.
3. Describe some of the areas of everyday life where understanding of psychology be used to promote environment friendly behavior.
4. Explain the nature of psychological data.

5. What are the goals of scientific enquiry?
6. Differentiate between an interview and a questionnaire.
7. How do socio-cultural factors influence development?
8. What are the challenges faced by individuals on entry to adulthood?
9. Differentiate between declarative and procedural memory.
10. Define mnemonics. Suggest a plan to improve your own memory.
11. Are judgment and decision- making interrelated processes? Discuss.
12. How does reasoning help in problem solving?
13. Identify the obstacles that one may encounter in problem solving.

B) Complete the practical file and notebook till chapter -07 Human Memory.

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PHYSICS

1. What is the dimension of power?

(a) $M^{-1}L^{2}T^{-3}$ (b) $M^{1}L^{-2}T^{-3}$

(b) (c) $M^{1}L^{2}T^{-3}$ (d) $M^{2}L^{-1}T^{3}$

2. Einstein was awarded Nobel prize in physics for

(a) Theory of relativity (b) law of gravitation

(c) Uncertainty principle (d) photo electricity

3. If distance covered by a particle is zero, what can be its displacement?

(a) It may or may not be zero (b) it cannot be zero

(c) It must be zero (d) it is negative

4. The acceleration (in m/s2) of a body starting from rest varies with time t (in sec) following the equation, a=3t+4. The velocity of the body at time t=2sec will be

(a) $10m/s^{-1}$ (b) $18\ m/s^{-1}$ (c) $14\ m/s^{-1}$ (d) $26\ m/s^{-1}$

5. Dimension of work is _____?

(a) $M^{1}L^{2}T^{-2}$ (b) $M^{1}L\,T^{-2}$

(c) $M^{2}L\,T^{-2}$ (d) $M^{1}L^{-1}\,T^{-2}$

6. 1gCm = _____ergs.

(a) 980 (b) 10^{5}

(c) 1000 (d) 10^{7}

7. Dimension of torque is _____?

(a) $M^{1}L^{2}T^{-2}$ (b) $M^{1}L\,T^{-2}$

(c) $M^{2}L\,T^{-2}$ (d) $M^{1}L^{-1}\,T^{-2}$

8. A person holds on a weight of 10kg at a height of 5m above the ground for 5 minutes. Work done by him is?

(a) Zero (b) 50J

(c) 300J (d) 250J

9. Give an example of negative work done.

10. What do you understand by conservative forces? Give an example.

11. If light projectile collides with a heavy target what are the final velocities of projectile and target?

12. Write an expression for torque in polar coordinates.

13. Write an expression for Angular momentum in Cartesian coordinates.

14. Is it possible that momentum is changing but kinetic energy is constant? Justify it.

15. Derive an expression for torque in Cartesian co−ordinate.

16. A Box is pushed through 4.0 m across a floor offering 100N resistance. How much work is done by the (i) applied force (ii) resisting force?

17. Write any two limitations of dimensional analysis.

18. What is the magnitude and direction of (i+j).

19. State principle of homogeneity.

20. When is the sum of the two vectors (a) maximum and (b) minimum?

21. A ball is thrown vertically upwards. Draw its velocity–time graph.

22. How many significant figures are there in "$0.0006032 m^2$"?

23. Convert energy of one joule into ergs.

24. State and prove triangle law of vectors addition. Also find its direction.

25. Check the correctness of the relation, $S_{nth} = u + {}^{a}/_{2}(2n-1)$, where 'u' is initial velocity, 'a' is acceleration and 'S_{nth}' is the distance travelled by the body in n^{th} second.

26. Find the angle between force F= (3i +4j -5k) and displacement d =(5i + 4j +3k) unit. Also find the projection of F on d.

27. In Vander wall's equation: $P + {}^{a}/_{v^2}(V-b) = RT$, What are the dimensions of a and b? Here, P is pressure, V is volume, T is temperature and R is gas constant.

28. Derive the equation for 'position-time' relation using calculus method.

29. The Frequency of vibration of a string may depend upon length (l) of the string, tension (T) in the string and mass per unit length (m) of the string. Using the method of dimensions, derive the formula for frequency.

30. Derive the equation of trajectory for oblique projectile. Calculate the time of flight for it.

31. A man walks for 1 minute at a speed of 1m/s and then runs for 1 minute at a speed of 3m/s along a straight track. What is the average speed of the man?

32. We measure the period of oscillation of a simple pendulum. In successive measurements, the readings turn out to be 2.63 s, 2.56 s, 2.42 s, 2.71 s, and 2.80 s. calculate the absolute errors, relative error and percentage error.

33. Prove that $S_n = u + {}^{a}/_{2}(2n-1)$. Where u is initial velocity and S_n is the distance covered in n^{th} sec.

34. Two resistors of resistances $R_1 = 100 \pm 3$ ohm and $R_2 = 200 \pm 4$ ohm are connected (a) in series, (b) in parallel. Find the equivalent resistance of the (a) series combination (b) parallel combination.

35. A car is moving along a straight line OP. it moves from O to P in 18 seconds and returns from P to Q in 6 seconds, where OP=360m and OQ=240m. What are the average velocity and average speed of the car in going (a) from O to P? And (b) from O to P and back to Q?

36. (a) The period of oscillation of simple pendulum is $T = 2\pi \sqrt{{}^{L}/_{g}}$. Measured value of L is 20.0cm known to 1mm accuracy and time for 100 oscillations of the pendulum is found to be 90sec using a wrist watch of 1sec resolution. What is the accuracy in the determination of g?

(c) Consider a simple pendulum having a bob attached to a string that oscillates under the action of a force of gravity. Suppose that the period of oscillation of the simple pendulum depends on its length (l), mass of the body (m) and acceleration due to gravity (g). Derive the expression for its time period using method of dimensions.

(d) 5.74g of a substance occupies $1.2 cm^3$. Express its density by keeping the significant figures in view.

37. (a) Draw the velocity-time graph for the following : 1)Zero acceleration 2) Decreasing acceleration.

(b) For what value of m , the vector A= 2i +3j -6k is perpendicular to B= 3i –mj + 6k?

38. Prove that in absence of external force. Centre of mass moves with constant velocity.

39. A force F= (10 + 0.50x) acts on a particle in x direction, where F is in newton and x is in metre. Find the work done by this force during a displacement from x=0 to x=2m.

40. The linear momentum of a body is increased by 10%. What is the percentage change in its kinetic energy?

41. A rubber ball falls on a floor from a height of 19.6 m. Calculate the velocity with which it strikes the ground. To what height will the ball rebounce if it loses 25% of its energy on striking the ground?

42. Derive an expression for Angular Momentum in polar co−ordinate.

43. Write the relationship between kinetic energy and linear momentum. Also draw the graph between kinetic energy and mass.

44. A body of mass 2kg makes an elastic collision with another body at rest and continues to move in the original direction with a speed equal to one third of its original speed. Find the mass of the second body.

45. State and prove conservation of energy.

46. Show that in case of 1−D perfectly elastic collision, the velocities of 2 bodies gets interchanged having same masses.

47. Water falling from a 100m high fall is to be used for generating electrical energy. If 1.8×10^5 kg of water falls per hour and half of the gravitational potential energy can be converted into electrical energy. How many 100W bulbs can be lit?

48. Prove that in a region where gravitational field intensity is zero gravitational potential is constant.

49. State perpendicular axes theorem.

50. If earth shrinks to half of its present radius the how will time period of satellite be affected?

51. If the earth were to suddenly contract to half of its present radius , by how much would the day decreses?

52. Ballet dancer increases her angular velocity by folding her arms. Why?

53. How will you distinguish between a hard boiled egg and raw egg by spinning it on a table top?.

54. Three uniform spheres each of mass m and radius R are kept in such a way that each touches the other two. Find the magnitude of the gravitational force on any sphere due to other two.

55. Calculate the time period of revolution of Neptune around the sun. orbital radius of Neptune=30 (orbital radius of earth).

56. Derive the total energy of an orbiting satellite.

57. What is the effect of height on 'g'? Hence, deduce it.

58. Earth is continuously pulling the moon towards its Centre, still it does not fall to the earth , why ?

59. (a)State universal law of gravitation. Write its formula.

(b) Write S.I unit of gravitational constant.

60. State and proof "parallel axes theorem" with the help of suitable diagram.

61. Deduce Newton's gravitational law from kepler's III law.

62. The masses and radii of earth and moon are M_1,R_1 and M_2,R_2 resp. Their centers are distance'd' apart. Find the minimum speed with which a particle of mass 'm' should be protected from a point midway between the centres so as to escape to infinity.

63. (c) If unit vectors A and B are inclined at an angle , then prove that : $|A-B| = 2\sin\theta/2$

64. Prove that time period and height is independent of mass of the satellite.

65. With the help of suitable diagram, Define radius of gyration and hence deduce its relation.

66. (a) Define escape velocity.

(b) Derive the relation between escape velocity and orbital velocity.

67. (a) Find out the relation between angular momentum and moment of inertia.

(b) Express power in rotational motion

(c) State and proof law of conservation of angular momentum.

24. (a) Prove that an "astronaut in a satellite experience weightlessness".

(b) Derive the relation between gravitational field intensity and gravitational potential.

68. Prove kepler's II^{nd} law of motion.

69. (a) Derive an expression for centre of mass for two particle system.

(b) In an HCL molecule separation between the nuclei of two atoms is 1.27Å. Find the position of CM of the molecule. Given that $M_{Cl} = 35.5\ M_H$.

70. (a) With the help of suitable diagram derive an expression for kinetic energy of the body.

(b) With the help of an example prove that Gravitational forces are conservative in nature.

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CHEMISTRY

1. Define mole fraction.
2. Calculate the volume occupied by 1.5 moles of CO_2 at STP.
3. State Aufbau's principle.
4. Write the electronic configuration of Fe^{3+} (Atomic number=26).
5. Which of the following orbitals are not possible: 1s, 2f ,3f, 4d
6. What is the charge carried by an electron?
7. The empirical formula and molecular mass of a compound are CH_2O and 180 g respectively. What will be the molecular formula of the compound?

(i) $C_9H_{18}O_9$
(ii) CH_2O
(iii) $C_6H_{12}O_6$
(iv) $C_2H_4O_2$

8. The group having isoelectronic species is:

(i) O^{2--} , F^{--} , Na ,Mg^{2+}
(ii) O^{--} , F^{--} , Na^{+} , Mg^{+}
(iii) O^{2--} , F^{--} , Na^{+} ,Mg^{2+}
(iv) O^{--} , F^{--} , Na , Mg^{+}

9. The correct order of first ionization energy of C , N , O , F is:

(i) F < N < C < O
(ii) C < N < O < F
(iii) C < O < N < F
(iv) F < O < N < C

10. For principal quantum number n = 4, the total number of orbitals having l = 3 is

(i) 3
(ii) 7
(iii) 5
(iv) 9

11. Calculate percentage of hydrogen in ethanol (C_2H_5OH)?
12. Account for low value of electron affinity of nitrogen.
13. Calculate the molarity of a solution containing 5g NaOH dissolved in 450 ml of solution.
14. Calculate the wave number of radiation having a frequency of 4×10^{14} Hz.
15. (i) how many sub shells are associated with n=4?
    (ii) how many electrons will be present in the sub shells having s = -- ½ for n = 4?
16. In the reaction $A + B_2 \rightarrow AB_2$, identify the limiting reagent , if any, in the following mixtures:
    (i) 300 atoms of A + 200 molecules of B
    (ii) 2 mol A + 3 mol B
    (iii) 100 atoms of A + 100 molecules of B
17. A proton is accelerated to 1 / 10 th of the velocity of light. If its velocity can be measured with a precision of 0.5% then what must be its uncertainty in position? (mass of proton = 1.66×10^{-27} kg).
18. Define electronegativity. How does it vary along a period and a group?
19. From each pair choose the atom which has the more negative electron gain enthalpy? Explain your answer.
    (i) O or F
    (ii) F or Cl
    (iii) F or Ne
20. Predict the block, period and group of the elements with atomic number 26.

21. Which of the following sets of quantum numbers are correct and if not explain giving reason:

	n	l	m	s
(i)	1	1	+2	+1/2
(ii)	2	1	+1	+1/2
(iii)	3	2	--2	--1/2
(iv)	3	4	--2	--1/2
(v)	4	3	0	0

22. (i) Define empirical formula.

(ii) Calculate empirical formula of the inorganic salt with the following percentage composition:

Na = 29.11 % , S = 40.51 % , O = 30.38 %

(Given atomic mass of Na = 23 , S = 32 , O = 16)

23. (i) What is de-Broglie relation?

(ii) Give two differences between matter wave and electromagnetic wave?

(iii) What will be the wavelength of a ball of mass 0.1 kg moving with a velocity of 10 ms^{-1}.

24. Calculate the internal energy change when a system absorbs 15 kJ of heat and does 5 kJ of work.
25. Predict whether the entropy increases or decreases in the following case:
H_2 (at 298 K, 1 atm) → H_2 (at 298 K , 10 atm)
26. Give two examples of state functions.
27. Write expression for K_C for the following reaction:
$Fe^{3+}(aq) + 3OH^{-}(aq) \rightleftharpoons Fe(OH)_3(s)$
28. How will the following reaction get affected by increasing the pressure? Mention whether the change will cause the reaction to go into forward or backward direction.
$COCl_2(g) \rightleftharpoons CO(g) + Cl_2(g)$
29. At 473 K, K_C for the decomposition of PCl_5 is 8.3 X 10^{-3}. If decomposition is depicted as:
$PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$, then what would be the effect on K_C if more PCl_5 is added to it.

30. Given the following thermo chemical equations:
(i) S (rhombic) + O_2 (g) → SO_2(g) , ΔH = -- 297.5 kJ mol^{-1}
(ii) S (monoclinic) + O_2 (g) → SO_2(g) , ΔH = -- 300.0 kJ mol^{-1}
Calculate ΔH for the transformation of 1 mole of rhombic Sulphur into monoclinic Sulphur.
31. To what type of system the following belong:
(i) tea placed in a cup
(ii) tree
32. Will the process $N^{2-}(g) + e^{-} \rightarrow N^{3-}(g)$ be exothermic or endothermic and why?
Describe the effect of:
(a) addition of H_2 (b) removal of CO , on the following equilibrium: $2H_2(g) + CO(g) \rightleftharpoons CH_3OH(g)$
33. On dissolving NH_4Cl in water, cooling effect is caused. Predict on the basis of Le Chatelier's principle the effect of increase of temperature on the solubility of NH_4Cl.

34. Ethyl acetate is formed by the reaction between ethanol and acetic acid and the equilibrium is represented as:

$$CH_3COOH\ (l) + C_2H_5OH\ (l) \rightleftharpoons CH_3COO\ C_2H_5\ (l) + H_2O\ (l)$$

(i) Write the expression for K_c for this reaction if water is not in excess here and neither a solvent.

(ii) At 293 K , if one starts with 1.00 mol of acetic acid and 0.18 mol of ethanol & there is 0.171 mol of ethyl acetate in the final equilibrium mixture. Calculate the value of equilibrium constant.

35. For the equilibrium: $2N_20\ (g) + O_2(g) \rightleftharpoons 4\ NO(g)$; $\Delta H > 0$

(i) Write the expression for K_P for the reaction.

(ii) What will be the effect on equilibrium when: (a) volume of vessel decreases (b) temperature decreases

36. The enthalpy change (ΔH) for the reaction $N_2\ (g) + 3\ H_2(g) \rightarrow 2NH_3\ (g)$ is –92.38 Kj at 298K. what is ΔU for the reaction at 298 K?

37. Comment on the following statements:

(a) Thermodynamically an exothermic reaction is not always spontaneous.

(b) The entropy of steam is more than that of water at its boiling point.

(c) Neither q nor w is a state function but q+w is a state function.

38. Two litres of ideal gas at a pressure of 10 atm expands isothermally into vacuum until its total volume is 10 litres. How much heat is absorbed & how much work is done in the expansion?

39. (A) Is enthalpy an extensive or intensive property?

(B) The enthalpies of combustion of methane, graphite & dihydrogen at 298 K are -- 890.3 Kj/mol, --393.5 Kj/mol & --285.8 Kj /mol respectively. Calculate the enthalpy of formation of methane using the above data.

(C) Also from the $\Delta_f H$ value of methane, comment on its stability.

40. (a) For the reaction, A + B $\rightarrow$C+ D ; ΔH= 10,000 J mol^{-1} , ΔS = 33.3 J mol^{-1} K^{-1}. At what temperature will the reaction occur spontaneously from left to right?

(b) Why for predicting the spontaneity of a reaction , free energy criteria is better than entropy criteria?

(c) Predict whether entropy increases or decreases in the following cases:

i) $2\ NaHCO_3\ (s) \rightarrow Na_2CO_3\ (s) + CO_2(g) + H_2O\ (g)$

ii) a liquid crystallizes into solid

41. At 473 K, K_C for the decomposition of phosphorous pentachloride i.e., PCl_5 is 8.3 X 10^{-3}. The reaction is depicted as: $PCl_5\ (g) \rightleftharpoons PCl_3\ (g) + Cl_2\ (g)$; $\Delta_r H = 124.0$ Kj mol^{-1} .

(i) What will be the value of K_C for the reverse reaction?

(ii) What would be the effect on K_C if :(a) more PCl_5 is added (b) the temperature is increased

(iii) What is the effect of a catalyst on equilibrium state?

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BIOLOGY

1. Define thecodont and diphodont
2. Draw a well labeled diagram of human digestive system.
3. Describe the various terms used for dentition in human.
4. Write the dental formula of human.
5. Explain the histology of wall of alimentary canal.
6. Write a note on various digestive glands in human .
7. Explain the physiology of digestion of food.
8. State the role of pancreatic juice in digestion of proteins.
9. Bile juice contains no digestive enzymes, yet it is important for digestion. Why?
10. What is the role of HCl secreted in stomach?
11. How are polysaccharides & disaccharides digested?
12. Discuss the main steps in the digestion of proteins as the food pass through different parts of the alimentary canal.
13. How does butter in your food get digested and absorbed in the body?
14. What is deglutition?
15. Explain and write a brief note on various disorders of digestive system.
16. Define respiration.
17. Draw a well labeled diagram of human respiratory system.
18. How do the following organisms respire?
    (a) Earthworm (b) Aquatic arthropods (c) Terrestrial vertebrates
19. What are the various steps involved in respiration?
20. Explain the mechanism of breathing.
21. Define the following.
    (a) Tidal volume (b) Inspiratory reserve volume (c) Expiratiory reserve volume
    (d) Residual volume (e) Inspiratory capacity (f) Expiratory capacity (g) Functional residual capacity
    (h) Vital capacity (i) Total lung capacity
22. Explain the mechanism of exchange of gases.
23. Explain how O_2 & CO_2 is transported?
24. Define oxygen dissociation curve. Can you suggest any reason for its sigmoidal pattern?
25. How is respiration regulated?
26. Write a note on Asthma, Emphysema and Occupational disorders.
27. Define (a) exocrine gland (b) endocrine gland (c) hormone
28. Explain the various hormones secreted by various parts of pituitary gland.
29. How hypothalamus will regulate the functioning of pituitary gland.
30. Explain the role of thymus gland. Where are adrenal glands located? What are the various secretions of adrenal cortex & adrenal medulla?
31. Where is pancreas located? What are the secretions of pancreas? How they regulate carbohydrate metabolism?
32. How does diabetes mellitus occur?
33. Explain the hormones of testis & ovary.
34. Explain the hormones of heart, kidney and gastrointestinal tract.
35. How the hormones are classified based on their chemical composition?
36. Which hormonal deficiency is responsible for the following?
    (a) diabetes mellitus (b) goiter (c) cretinism
37. Give examples of
(a) hyper glycemic hormone and hypoglycaemic hormone
(b) Hypercalcaemic hormone
(c) gonado trophic hormone
(d) Blood pressure lowering hormone.

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