THE ASIAN SCHOOL, DEHRADUN
HOLIDAY HOMEWORK - SUMMER VACATION 2018 FOR CLASS XII

English:

PART – A
Writing Skills

Q1. Your school is holding a summer camp for training students in Basketball. Write a notice in not more than 50 words to be displayed in the notice board. Invent necessary details. Sign yourself as Hema/ Rishi The Head Girl /The Head Boy of the school.

Q2. Heart diseases have unfortunately become a life style problem these days. Create a poster on theme 'Heart Disease Awareness'.

Q3. Write articles in about 150 – 200 words on the following topics.
1. Children are like wet cement; whatever falls on them makes an impression.
2. Road Rage and Violence
3. How safe are women in India?
4. Deteriorating values amongst the youth.
5. Importance of time management.

Q4. List all literary devices/ figure of speech. Write the definition of the following literary devices giving four examples of each.
Simile, Metaphor, Personification, Apostrophe, Hyperbole, Irony, Alliteration, Onomatopoeia, Antithesis, Epithet, Transferred Epithet.

PART – B
Long Reading Novel

Read the six chapters of the Novel 'The Invisible Man' by H. G. Wells. Write the main characters and their description (Character Sketch).

Hindi : 1. हिन्दी साहित्य का स्वर्णयुग – भक्तिकाल विषय पर एक हजार शब्दों में परियोजना कार्य पूरा कीजिए।
2. पतंग तथा आत्मपरिचय कविताओं को याद कीजिए। (मौखिक परीक्षा के लिए)

Mathematics:

Q1. If $A^{-1} = \begin{vmatrix} 3 & -1 & 1 \\ -15 & 6 & -5 \\ 5 & -2 & 2 \end{vmatrix}$ and $B = \begin{vmatrix} 1 & 3 & 2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{vmatrix}$ find AB^{-1}

Q2. Solve the following system of equation using matrix method :
$\frac{2}{x} + \frac{3}{y} + \frac{10}{z} = 4$, $\frac{4}{x} - \frac{6}{y} + \frac{5}{z} = 1$, $\frac{6}{x} + \frac{9}{y} - \frac{20}{z} = 2$

Q3. Find the inverse of the following matrix using elementary operations $A = \begin{vmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{vmatrix}$

Q4. Using properties of determinants prove that : $\begin{vmatrix} a & a+b & a+b+c \\ 2a & 3a+2b & 4a+3b+2c \\ 3a & 6a+3b & 10a+6b+3c \end{vmatrix} = a^3$

Q5. In a Δ ABC, if $\begin{vmatrix} 1 & 1 & 1 \\ 1+sinA & 1+sinB & 1+sinC \\ sinA + sin^2A & sinB + sin^2B & sinC + sin^2C \end{vmatrix} = 0$
then prove that Δ ABC is an isosceles Δ.

Q6. If $A = \begin{vmatrix} 2 & 0 & -1 \\ 5 & 1 & 0 \\ 0 & 1 & 3 \end{vmatrix}$ Prove that $A^{-1} = A^2 - 6A + 11 I$.

Q7. For what value of K, do the equations 2x- 3y+2z = a, 5x + 4y – 2z = -3, x -13y +kZ= 9, not have a unique solution?

Q8. If $A = \begin{vmatrix} 3 & -2 & 1 \\ 2 & 1 & -3 \\ -1 & 2 & 1 \end{vmatrix}$ find A^{-1} and use it to solve the following equations 3x-2y+z= 2, 2x+y-3z= -5, -x+2y +z = 6.

Q9. Prove that if A is a skew symmetric matrix of odd order n then IAI = 0.

Q10. If A (x_1y_1), B (x_2y_2) and C (x_3y_3) are vertices of an equilateral Δ whose each side is equal to 'a' then prove that $\begin{vmatrix} x_1 & y_1 & 2 \\ x_2 & y_2 & 2 \\ x_3 & y_3 & 2 \end{vmatrix} = 3a^4$

Q11. Show that $\tan \left(\frac{1}{2} \sin^{-1} \frac{3}{4} \right) = \frac{4-\sqrt{7}}{3}$

Q12. Prove that $Cot^{-1} \left(\frac{\sqrt{1+sinx} + \sqrt{1-sinx}}{\sqrt{1+sinx} + \sqrt{1-sinx}} \right) = \frac{x}{2}, x \in \left(0, \frac{\pi}{4} \right)$

Q13. Prove that $\tan^{-1}x + \tan^{-1} \left(\frac{2x}{1+x^2} \right) = \tan^{-1} \left(\frac{3x-x^3}{1-3x^2} \right)$

Q14 If $\sin^{-1}x + \sin^{-1}y + \sin^{-1}z = \pi$ Prove that $x \sqrt{1-x^2} + y \sqrt{1-y^2} + z \sqrt{1-z^2} = 2xyz$.

Q15. Prove that $\sec^2 (\tan^{-1}2) + cosec^2 (Cot^{-1}3) = 15$

Q16 Prove that $\sin^{-1}\frac{4}{5} + \sin^{-1}\frac{5}{13} + \sin^{-1}\frac{16}{65} = \frac{\pi}{2}$

Q17. Evaluate $\tan \left\{ 2\tan^{-1} \frac{1}{5} - \frac{\pi}{4} \right\}$

Q18. Solve the following equations $2\tan^{-1}(cosx) = \tan^{-1}(2cosecx)$

Q19. Solve the following equation $\sin^{-1}(1-x) -2\sin^{-1} x = \frac{\pi}{2}$

Q20. Prove that $\cos [\tan^{-1} \{\sin (\cot^{-1}x)\}] = \sqrt{\frac{x^2+1}{x^2+2}}$

Q21. Find the value of K so that $f(x) = \begin{cases} \dfrac{x^2+3X-10}{X-2}, & if\ x \neq 0 \\ K, & if\ x = 0 \end{cases}$

is continuous at $x = 0$

Q22. Show that the function $f(x) = 2x-|x|$ is continuous but not differentiable at $x = 0$.

Q23. If $x^y = e^{x-y}$ then show that $\dfrac{dy}{dx} = \dfrac{logx}{\{log\ (xe)\}^2}$

Q24. Differentiate $tan^{-1}\left|\dfrac{\sqrt{1+x^2}-1}{x}\right|$ with respect to x.

Q25. If $y = log\ tan\left(\dfrac{\pi}{4} + \dfrac{x}{2}\right)$ show that $\dfrac{dy}{dx} - sec\ x = 0$.

Q26. If $y = x^{xcosx} + \dfrac{x^2+1}{x^2-1}$, find $\dfrac{dy}{dx}$

Q27. Using Rolle's theorem, find the points on the curve $y=x^2$ where $x \in [-2,2]$ and the tangent is parallel to x axis.

Q28. Verify Lagrange's mean value theorem for the function $f(x) = x + \dfrac{1}{x}$ in [1,3]

Q29. If $y = x^x$ prove that $\dfrac{d^2y}{dx^2} - \dfrac{1}{y}\left(\dfrac{dy}{dx}\right)^2 - \dfrac{y}{x} = 0$

Q30. Differentiate with respect to x.

$sin^{-1}\left(\dfrac{2^{x+1}3^x}{1+(36)^x}\right)$

Q31. Solve the following equation for X & Y.

$2x - y = \begin{pmatrix} 6 & -6 & 0 \\ -4 & 2 & 1 \end{pmatrix}$ and $x + 2y = \begin{pmatrix} 3 & 2 & 5 \\ 2 & 1 & -7 \end{pmatrix}$

Q32. IF $A = \begin{pmatrix} 4 & 3 \\ 2 & 5 \end{pmatrix}$, find x & y such that $A^2 - xA + yI = 0$.

Q33. If $A = \begin{pmatrix} 0 & 1 & 0 \\ 0 & 0 & I \\ P & q & r \end{pmatrix}$, show that $A^3 = pI + qA + rA^2$

Q34. Find the inverse of the matrix $A = \begin{pmatrix} a & b \\ c & \dfrac{1+bc}{a} \end{pmatrix}$

and show that $aA^{-1} = (a^2 + b\ c+1)\ I - aA$.

Q35. Use the product $\begin{pmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{pmatrix}$ and $\begin{pmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{pmatrix}$

Solve the equation, $x-y +z = 4$, $x -2y - 2z = 9$, $2x + y + 3z=1$.

Q36. Prove that $\begin{vmatrix} a & b & c \\ a-b & b-c & c-a \\ b+c & c+a & a+b \end{vmatrix} = a^3 + b^3 + c^3 - 3abc$

Q37. Prove that Prove that $\begin{vmatrix} (a + 1)(a + 2) & a + 2 & 1 \\ (a + 2)(a + 3) & a + 3 & 1 \\ (a + 3)(a + 4) & a + 4 & 1 \end{vmatrix} = -2$

Q38. Solve for x , $\begin{vmatrix} a + x & a - x & a - x \\ a - x & a + x & a - x \\ a - x & a - x & a + x \end{vmatrix} = 0$

Q39. Prove that : $\begin{vmatrix} (b + c)^2 & a^2 & bc \\ (c + a)^2 & b^2 & ca \\ (a + b)^2 & c^2 & ab \end{vmatrix} = (a\text{-}b)\ (b\text{-}c)\ (c\text{-}a)\ (a+b+c)\ (a^2 + b^2+c^2)$.

Q40. if $\begin{vmatrix} a & a^3 & a^4-1 \\ b & b^3 & b^4-1 \\ c & c^3 & c^4-1 \end{vmatrix} = 0$ and a, b, c are different, prove that abc (ab +bc + ca) = a + b + c

Q41. If $y = x\ sin^{-1}x/ \sqrt{1 - x^2} + log\ \sqrt{1 - x^2}$, prove that $dy / dx = sin^{-1}/ (1-x^2)^{3/2}$

Q42. if $x\sqrt{1 + y} + y\sqrt{1 + x} = 0$, prove that $dy/ dx = \dfrac{-1}{(1+x)^2}$

Q43. if $y\sqrt{1 - x^2} + x\sqrt{1 - y^2} = 1$, prove that $dy/dx = - \sqrt{\dfrac{1-y^2}{1-x^2}}$

Q44. If $y = (x + \dfrac{1}{x})^x + n^{(1+\frac{1}{x})}$, find $\dfrac{dy}{dx}$.

Q45. if $y = x^x$, prove that $\dfrac{d^2y}{dx^2} - \dfrac{1}{y}\left(\dfrac{dy}{dx}\right) - \dfrac{y}{x} = 0$.

Q46. if $y = sin\ (sin\ x)$, prove that $\dfrac{d^2y}{dx^2} + tanx\dfrac{dy}{dx} + y.cos^2x = 0$

Q47. if $x = sin\ (\dfrac{1}{a} log\ y)$, prove that $(1 - x^2)y_2 - xy_1 - a^2\ y = 0$.

Q48. if $y = \dfrac{ax+b}{cx+d}$, prove that $2y_1\ y_3 = 3\ (y_2)^2$.

Q49. if $y = x\ log\ (\dfrac{x}{a+bx})$, prove that $x^3\dfrac{d^2y}{dx^2} = (x\dfrac{dy}{dx} - y)^2$.

Q50. if $x = a\ (cos\theta + \theta\ sin\ \theta)$, $y = a\ (sin\theta - \theta\ cos\theta)$, prove that $d^2y/ dx^2 = -b^4 / a^2y^3$.

Q51. if $x = a\ cos\ \theta + b\ sin\ \theta$, $b = a\ sin\ \theta - b\ cos\ \theta$, prove that $y^2y_2 - xy_1 + y = 0$.

Physics:

Q1. Make a project on :

a) Capacitor	b) Metre Bridge	c) Potentio Metre	d) Moving Coil Galvanometer
e) Magnetic Materials & types of its		f) AC current	g) Semi conductor and Devices
h) AC and DC generator	i) Communication System	j) Microscope and Telescope	k) Nuclear Reactor
l) Transformers	m) PNP & NPN Transistors		

Instructions :

i) The project report should be handwritten in A-4 size pages.

ii) The project report should be presented in the following order-

a) Cover Page showing title of the project, student information, name of school and academic session.

b) Acknowledgement

c) Chapters with relevant headings

d) Summary and Conclusion based on findings

e) Bibliography

iii) Credit will be awarded to the original circuit diagram, illustrations and creative use of materials.

iv) All photographs and sketches should be labelled and acknowledged.

Q2. Do the following practice questions from Chapter 1 -Electric field and Charges , Chapter 2- Electric Potential and Capacitance and Chapter 3- Current Electricity in your homework notebook.

Q1. a) Calculate the charge carried by 12.5×10^{18} electrons.

b) What is the basic difference between force between two masses and the force between two charges?

Q2. Two identical metallic spheres A and B having charges + 4Q and -10Q are kept a certain distance apart. A third distance apart. A third identical uncharged sphere C is first placed in contact with sphere A and then with sphere B. Spheres A and B are then brought in contact and then separated. Find the final charges on the spheres A and B.

Q3. Two identical metal spheres, having unequal opposite charges are placed at a distance 0.90 m part in air. After bringing them in contact with each other, they are again placed at the same distance apart. Now the force of repulsion between them is 0.025 N. Calculate the final charge on each sphere.

Q4. Calculate the electric field strength required just to balanced a water drop of mass 10^{-7} kg and having a charge of 1.6×10^{-19} C ($g = 10ms^{-2}$).
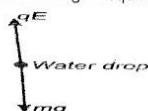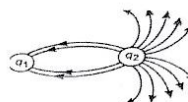

Q5. Why electricity field lines :

a) can never intersect one another?

b) cannot form closed loops?

c) cannot have break in between?

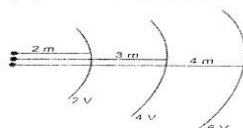Q6. In the figure, electric field lines due to point charges q_1 and q_2 are shown.

i) What are the signs of charges q_1 and q_2?

ii) What is the ratio of q_1 and q_2?

Q7. Sketch the electric field lines, when a positive charge is kept in the vicinity of an uncharged conducting plate.
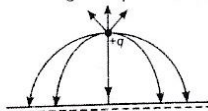
Q8. Calculate the electric field from the equipotential surface shown.

Q9. Three charges – q, Q and – q are placed at equal distances on a straight line. If the potential energy of the system of these charge is zero, then what is the ratio Q: q?

Q10. The flux of the electrostatic field through the closed spherical surface S' is found to be four times that through the closed surface S (figure). Find the magnitude of the charge Q. Given $q_1 = 1\mu C$ and $q_3 = 9.854\mu C$.
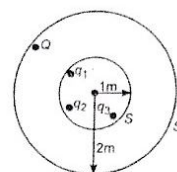
Q11. Consider two hollow concentric spheres S1 and S2 enclosing charges 2Q and 4Q respectively as shown in the figure.
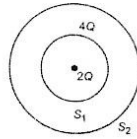   a)   Find out the ratio of electric flux through them.
   b)   How will the electric flux through the sphere S_1 change if a medium of dielectric constant ϵ_r is introduced in the space inside S_1 in place of air? Deduce the necessary expression.

Q12. The graph in the figure shows the variation of charge Q with voltage V for two capacitors K and L. In which capacitor is more electrostatic energy stored?
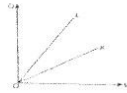
Q13. Calculate the potential difference the energy stored in the capacitor C_2 in the circuit shown in the figure. Given potential at A is 90 V.
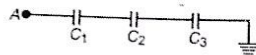
Q14. Net capacitance of three identical capacitors in series is $1\mu F$. What will be their net capacitance if connected in parallel? Find the ratio of energy stored in the two configuration if they are both connected to the same source.

Q15. The equivalence capacitance of the combination between A and B is 4 μF.
   a)   Calculate the capacitance C.
   b)   Calculate charge on each capacitor, if a 12 V battery is connected between A and B.
   c)   What will be the potential drop across each capacitor?

Q16. If E = 3i + 4j - 5k, calculate the electric flux through a surface of area 50 units in Z-X plane.

Q17. Given a uniform electric field E = 5 X 10^3 i NC^{-1}. Find the flux of this field through a square of 10 cm on a side whose plane is parallel to the y-z plane. What would be the flux through the same square if the plane makes a 30^0 angle with the X-axis?

Q18. Four point charges are placed at the four corners of a square in two ways (a) and (b) as shown in figure. Will the (i) electric field (ii) electric potential, at the centre of the square be the same or different in the two configurations and why?
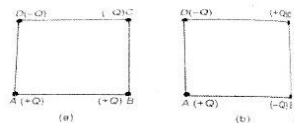

Q19. A parallel plate capacitor is to be designed with a voltage rating I kV using a material of dielectric constant 3 and dielectric strength about 10^7 Vm^{-1}. For safety we would like the field never to exceed say, 10% of the designed strength. What minimum area of the plates is required to have a capacitance of 50F?

Q20. The two plates of a parallel plate capacitor are 4 mm apart. A slab of dielectric constant 3 and thickness 3 mm is introduced between the plates with its faces parallel to them. The distance between the plates is so adjusted that the capacitance of the capacitor becomes $2/3^{rd}$ of its original value. What is the new distance between the plates?

Q21. Draw a graph of show the variation of resistance R of the metallic wire as a function of its diameter D keeping the other factors constant.
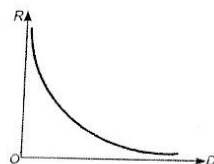
Q22. Calculate the current shown by the ammeter in the circuit shown in figure.
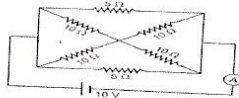
Q23. Nichrome and copper wires of the same length and same diameter are connected in series in an electric circuit. In which wire, the heat by produced at higher rate? Give reason.

Q24. Two identical cells, each of emf E having negligible internal resistance are connected in parallel with each other across an external resistance R. What is the current through the resistance?

Q25.Two cells each of emf E and internal resistances r1 and r2 are connected in series to an external resistance R. Can a value of R be selected such that the potential difference of the first cell is zero.

Q26. Use Kirchhoff's rules to determine the potential difference between the points A and D when no current flows in the arm BE of the electric network shown in the figure.

Q27. Three batteries of 2V, 1V and 4V with internal resistances 4Ω, 3 Ω respectively are arranged in parallel. find the current through each battery.

Q28. Figure shows two circuits each having a galvanometer and a battery of 3V. When the galvanometer in each arrangement do not allow any deflection. Obtain the ratio R_1/R_2.

Set up I   Set up II

Q29. In a potentiometer arrangement, a cell of emf 1.20V gives a balance point at 30 cm length of the wire. This cell is now replaced by another cell of unknown emf. If the ratio of the emf's of the two cells is 1.5, calculate the difference in the balancing lengths of the potentiometer wire in the two cases.

Q30. Two primary cells of emf E_1 and E_2 ($E_1 > E_2$) are connected to the potentiometer wire as shown in the figure. If the balancing lengths for the two cases are 250 cm and 400 cm. find the ratio of E_1 and E_2.

Q31. The plot in figure shows the variation of current I through the cross- section of a wire over a time interval of 10s. Find the charge that flows through the wire over this time period.

Q32. A resistance R is connected across a cell of emf E and internal resistance r. A potentiometer now measures the potential difference between the terminals of the cell as V. Write the expression for r in terms of E, V and R.

Q33. An infinite ladder net work of resistances is constructed with 1 Ω and 2 Ω resistances shown. A 6 V battery between A and B has negligible resistance. Find the effective between A and B.

Q34. In the circuit shown, R_1 = 4 Ω, R_2 = R_3 = 15 Ω R_4 = 30 Ω and E = 10V. Calculate the equivalent resistance of the circuit and the current in each resistor.

Q35. Calculate the value of the resistance R in the circuit shown in the figure so that the current in the circuit is 0.2 A. what would be the potential difference between the points B and E?

Q36. Can a 30W, 6V bulb be connected with supply of 120V? If not, what will have to be done for it?

Chemistry :
- Prepare and investigatory project on the topics :
  1) Study of quantity of casein present in different samples o milk.
  2) Study of effect of potassium bisulphate as food preservative under various conditions.
  3) Study of common food adulterants in various food materials.
  4) Study of presence of insecticides and pesticides in vegetables and foods.
  5) Various Sterilization technique of water.
  6) Preparation of Soyabean milk and its comparison with the natural milk.
  7) Study of alloying.

8) Dyeing of fabrics and its techniques.
9) Study of setting of mixtures of cement.
10) Preparation of rayon threads from cellulose sources. (Chemistry of Polymers)
11) Effect of metal coupling on Rusting of iron.
12) Comparative study of rates o fermentation of different food materials.
13) Comparative study of carbohydrates/ Biomolecules.

Instructions :

i) It should contain 20-25 pages.

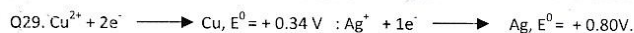The project report should be handwritten in A-4 size pages.

ii) The project report should be presented in the following order-
a) Cover Page showing title of the project, student information, name of school and academic session.
b) Acknowledgement
c) Chapters with relevant headings
d) Summary and Conclusion based on findings
e) Bibliography
iii) All photographs and sketches should be labelled and acknowledged.

- **Write answers of all these questions in your homework notebook.**

Q1. A solid is made up of two elements P and Q. Atoms Q are in ccp arrangement while atoms P occupy all the tetrahedral sites. What is the formula of the compound?

Q2. In chromium (III) chloride, $CrCl_3$. chloride ions have cubic close packed arrangement and Cr (III) ions are present in the octahedral holes. What fraction of the octahedral holes is occupied? What fraction of total number of holes is occupied?

Q3. A solid $A^+ B^-$ has NaCl type close packed structure. If the anion has a radius of 250 pm, what should be the ideal radius of the cation? Can a cation C^+ having a radius of 180 pm be slipped into the tetrahedral site of the crystal A^+b^-? Give reason for your answer.

Q4. An element E crystallizes in body centred cubic structure. If the edge length of the cell is $1\text{-}469 \times 10^{-10}$ m and the density is $19.3 g\ cm^{-3}$, calculate the atomic radius of this element.

Q5. Calculate the density of silver which crystallizes in a face-centred cubic structure. The distance between the nearest silver atoms in the structure is 287 pm. (Molar Mass of Ag = 107.87 g mol^{-1}, N_A = 6.02×10^{23} mol^{-1})

Q6. Aluminium metal forms a cubic-packed crystal structure. Its atomic radius is 125×10^{-12} m. (a) Calculate the length of the side of the unit cell. (b) How many such cells are there in $1.00 m^3$ of aluminium?

Q7. What is the difference between cubic close packing and hexagonal close packing? Give three examples of elements of each type. What is the coordination number in each case?

Q8. Explain the nature of crystal defect produced when sodium chloride is doped with magnesium chloride.

Q9. Explain superconductivity?

Q10. A solution contains 90g of H_2O,, 6.4 g of methanol and 18.4 g of glycerol. What is the mole fraction of glycerol?
(Glycerol = $CH_2OH - CHOH - CH_2OH$)

Q11. Concentrated nitric acid used as laboratory reagent is usually 69% by mass of nitric acid. Calculate the volume of the solution which contains 23g of HNO_3. (The density of the concentrated nitric acid solution is 1.41 g cm^{-3}).

Q12. H_2SO_4 used in lead storage cell is 38% by mass and has a density of 1.30 g cm^{-3}. Calculate its molarity.

Q13. the vapour pressures of benzene and toluene at 293 K are 75 mm and 22 mm Hg respectively. 23.4 g of dbenzene and 64.4g of toluene are mixed. If the two form an ideal solution, calculate the mole fraction of benzene in the vapour phase assuming that the varpour are in equilibrium with the liquid mixture at this temperature.

Q14. Benzene and toluene form nearly ideal solution. At a certain temperature, the vapour pressure of the pure benzene is 150 mm Hg and of pure toluene is 50 mm Hg. For this temperature, calculate the vapour pressure of solution containing equal weights of two substances. Also calculate their composition in the vapour phase.

Q15. A solution of sucrose (molecular mass 342/mol) is prepared by dissolving 68.4 g of it per litre of solution. What is its osmotic pressure at 300 K? (R = 0.082 lit. atm deg^{-1} mol^{-1}).

Q16. At 300 K, 36g of glucose present per litre in its solution has an osmotic pressure of 4.98 bar. If osmotic pressure of the solution is 1.52 bar at the same temperature, what would be its concentration?

Q17. 0.90g of a non electrolyte was dissolved in 87.90g of benzene. This raised the boiling point of benzene by 0.25^0C. If the molar mass of non-electrolyte is 103.0 mol^{-1}, calculate the molal elevation constant for benzene.

Q18. A solution of glycerol ($C_3H_8O_3$), molar mass = 92 g mol^{-1}, in water was prepared by dissolving some glycerol in 500 g of water. This solution has a boiling point of 100.42^0C. What mass of glycerol was dissolved to make this solution? K_b for water = 0.512 mol^{-1}.

Q19. Pure solvent A has freezing point 16.5^0C. On dissolving 0.4 g of B in 200g of A, the solution freezes at 16.4^0C and non dissolving 2.24g of C in 100g of A, the solution has freezing point of 16.0^0C. If the molar mass of B is 74g mol^{-1}, what is the molar mass of C?

Q20. A solution of an organic compound is prepared by dissolving 34.2 g in 500g of water. Calculate the molar mass of the compound and freezing point of the solution. Given that K_b for water = 0.52 K mol^{-1} B. pt of solution = 100.104^0C. K_f for water = 1.87K mol^{-1}.

Q21. Determine the osmotic pressure of a solution prepared by dissolving 2.5×10^{-2}g of K_2SO_4 in 2L of water at 25^0C, assuming that it is completely dissociated.
(R = 0.0821L atm K^{-1} mol^{-1}, Molar mass of K_2SO_4 = 174 g mol^{-1})

Q22. Phenol associates in benzene to a certain extent to form dimer. A solution containing 2.0×10^{-2} kg of phenol in 1.0 kg of benzene has its freezing point decreasing by 0.69K. Calculate the degree of associated of phenol (K_f for benzene = 5.12 kg mol^{-1}).

Q23. Show graphically how the vapour pressure of a solvent and a solution of non volatile solute change with temperature? Show on this graph the boiling points of the solvent and the solution. Which is higher and why?

Q24. How many moles of mercury will be produced by electrolyzing 1.0M $Hg(NO_3)_2$ solution with a current of 2.00 A for 3 hours? [$Hg(NO_3)_2$ = 200.6g mol_{-1}]

Q25. How many hours does it take to reduce 3 mol of Fe^{3+} to Fe^{2+} with 2.00 A current? (1 Faraday = 96,500C mol^{-1}, R = 8.314JK^{-1} mol^{-1})

Q26. The resistance of a decinormal solution of an electrolyte in a conductivity cell was found to be 245 ohms. Calculate the equivalent conductivity of the solution if the electrodes in the cell were 2 cm apart and each has an area of 3.5 sq. cm.

Q27. Molar conductance of a 1.5 M solution of an electrolyte is found to be 138.9 siemen cm^2. What would be the specific conductance of this solution?

Q28. Give molar conductivities at infinite dilution : Λ^0m for Ba $(OH)_2$= 457.6 Ω^{-1} cm^2 mol^{-1}
Λ^0m for $BaCl_2$ = 240.6Ω^{-1} cm^2 mol^{-1},, Λ^0m for NH_4Cl = 129.8Ω^{-1} cm^2 mol^{-1}. Calculate Λ^0m for NH_4OH.

Q29. $Cu^{2+} + 2e^- \longrightarrow Cu, E^0 = +0.34$ V   : $Ag^+ + 1e^- \longrightarrow Ag, E^0 = +0.80$V.
    i)   construct a galvanic cell using the above data.
    ii)   for what concentration of Ag^+ ions will the emf of the cell be zero at 25^0C , if the concentration of Cu^{2+} is 0.01M? (log 3.919 = 0.593)

Q30. What type of battery is lead storage battery? Write the anode and the cathode reactions and the overall reactions occurring in a lead storage battery.

Q31. What is a fuel cell? Give the construction and working of a fuel cell.

Biology: Prepare an investigatory project report on any one topic out of the following – Infertility in human/ IVF Technology/ Assisted Reproductive Technologies/ Tissue Culture/ Apiculture/ Amniocentesis/ Female Foeticide/ Conservation of Biodiversity/ Study of Human Hematology / Bacillus thuringiensis/ Sexually transmitted Diseases/ Study of Ascariasis in children/ GM plants and animals/ Vermicompositing/ Organic Farming/Study of Air Pollution and its control in Doon Valley/ Plastic waste and its remedy/Maintenance of Aquarium/Down's Syndrome.

Instructions :

i) The project report should be handwritten in A-4 size pages.

ii) The project report should be presented in the following order-
a) Cover Page showing title of the project, student information, name of school and academic session.
b) Acknowledgement
c) Chapters with relevant headings
d) Summary and Conclusion based on findings
e) Bibliography

iii) Credit will be awarded to the original drawings, illustrations and creative use of materials.

iv) All photographs and sketches should be labelled and acknowledged.

History : The students should make a project file on 'THROUGH THE EYES OF TEAVELLORS'. The project should consist of the following :
a) Title Page   b) Acknowledgment   c) Table of Contents   d) Introduction   e) The body of the project should have description of the Traveller's Accounts on India, Pictures, Data and other relevant information.
f) Conclusion should have students' observations on the topic.   g) Bibliography and References

Geography : Prepare maps in accordance to the list provided by the subject teacher and also prepare the introduction of field survey.
• Write the answers of the questions given by the teacher in the homework notebook.

Economics : Students to pick ANY ONE of the two suggested projects :
a) **Project (OPTION ONE) :** What is going around us. (eg. Demonetization, Goods and Services Tax)
    Scope of the Project :   a) Introduction   b) Details of the topic   c) Pros and Cons of the Economic event
        d) Major Criticism related to the topic   e) Students views and perceptions
b) **Project (OPTION TWO) :** Analyse any concept from the syllabus.
    Scope of the Project: a) Explanation of the Concept   b) Application of the Concept   c) Diagrammatic Explanation
        d) Numerical Explanation related to the concept if any   e) Students own views and perception.

Q1.Differentiate between: a)Market Economy &Centrally Planned Economy   b)Micro Economics &Macro Economics
    c)Positive Economics &Normative Economics

Q2. State the causes of Economic problem.

Q3. "Economics is about making choices in the presence of scarcity." Explain.

Q4. Explain why PPC is downward sloping curve?

Q5. Explain the problem of 'What to Produce' with the help of PPC?

Q6. Explain why MRT goes on rising? Use a schedule.

Q7. Explain 2 determinants of PPC and how they can lead to shift in PPC.

Q8. Explain the concepts of opportunity cost and marginal rate of transformation using a production possibility schedule based on the assumption that no resource is equally efficient in production of all goods.

Q9.Government announces 'Make In India', what is likely to be its impact on PPC of India? Use diagram.

Q10. Explain the effect of following on PPC.
    a)   New coal mine is discovered.
    b)   Floods in a river, destroying crops and fields.
    c)   Unemployment eradication program launched by government.
    d)   Subsidies provided on import of capital goods.

Q11.If X is a labour intensive goods while Y is capital intensive then what will be the effect on PPC in following cases :
    i)   Migration of people from the economy to other countries.   Ii) Better techniques of production discovered for good Y.

Q12. What is Budget Equation?

Q13.What are monotonic preferences.

Q14. Ice creams are sold for Re 30, Rani who loves ice- cream has already eaten 3 cups, and her MU from eating 3rd ice cream is Rs 90. Suppose further, for her, the MU of Re1 is 3 utils should she eat more ice cream or should she stop?

Q15. Explain why budget line slopes downward?

Q16. Draw diagrams showing elasticity equal to : a) zero b) one   c) Infinity

Q17. Suppose the demand curve D (P) = 10-3p. What is the elasticity at price 5/3?

Q18. A consumer spends Re 250 on a good when its price is Re 5 per unit. When the price rises to Rs 6 per unit, he spends Re 240. Calculate the price elasticity of demand using percentage method. What shape its demand curve will take?

Q19. Explain the following characteristics of IC.
    a)   Higher level of IC gives higher level of satisfaction.   b) Two IC can never interest each other.
    c)   IC never touches the axis.   d) IC slopes downward and is convex to origin.

Q20. A consumer consumes only two goods X and Y. The marginal rate of substitution is 1. Price of X and Y is Re 3 and Rs 4 unit respectively. Is the consumer in equilibrium? What will be the further reaction of the consumer? Give reason.

Q21. Distinguish between demand by an individual consumer and market demand of a good. Also state the factors leading to fall in demand by an individual consumer.

Q22. Differentiate between change in demand and change in quantity demanded.

Q23. Explain the relationship between a) Prices of other goods and demand for the given good. b) Income of the buyers and demand of a good.

Q24. Explain the factors affecting price elasticity of demand.

Q25. Price elasticity of demand of Good – X is -2 and Good – Y is -3. Which of the two goods is more price elastic and why?

Q26. Explain how in any two ways, demand for electricity can be decreased when price elasticity of demand is extremely low.

Q27. Explain the low of variable proportions giving reasons behind each phase. Use diagram.

Q28. Differentiate between Returns to a Factors and Returns to Scale.

Q29. FDI not only bring investment in the domestic economy, it also brings new technology. How would the availability of new technology (relatin to auto industry) impact the short period production function of a car manufacture in India?

Q30.A consumer consumes only two goods. Explain his equilibrium with the help of utility approach.

Account:

- Prepare comprehensive project start your own sole proprietorship business write few transaction for 1 month (atleast 30 transactions).
- Prepare journal ledger and trial balance from it.
- Prepare final accounts from it.

BST :

Make a project on any one of the following topic

Project 1 : Prepare a detailed project on application of Principles of Management stating its validity and importance. Also state how effectivene and efficiency is affected due to the applicability of these principles in the organization.

Project 2: Prepare a detailed project on marketing. The project should cover the following parameters choosing of product, ingredients, productic process, market research, questionnaire, competing brand, branding, labeling, packaging, pricing, channels of distribution, transportatic and warehousing, promotion, firms USP and conclusion.

Note : A child can make a project on any of the topics mentioned in the list of projects provided by CBSE.

Physical Education:

PHYSICAL EDUCATION: (GP – 2)

1. Prepare a project on Yogic Asanas that help in preventing various lifestyle problems – Back Pain, Asthma, Hypertension, Diabete Obesity (Write Benefits, Contra Indications, also paste pictures)
2. Prepare a detailed project on various disorders like (ADHD, SPD, ASD, ODD, OCD), which are prevalent in Indian Society.

PHYSICAL EDUCATION: (GP – 3)

1. Prepare a detailed study on various postural deformities – Knock Knee, Bow legs, Round Shoulders, Lordosis, Kyphosis, Scoliosis. Al suggest Corrective measures for them.
2. Prepare a detailed study on Sports Injuries (Soft Tissue Injuries, Bone Injuries, Dislocations).

Management of Injuries (a) Common sports injuries of soft Tissues (b) First – Aid in common sports injuries

Computer :

Q1: Write programs in order to

a) read a file and find frequency of word "the" from it

b) read a file and count no of words and line in it

c) read a file and display words starting from character 'A'

d) to write your name and yours five friends name in file "abc.txt"

Q2: Differentiate between text mode and binary mode of file handling.

Q3: Differentiate between seekp() and tellp() functions.

Q4: Assuming the class ANTIQUE as declared below, write a function in C++ to read the objects of ANTIQUEfrom binary file ANTIQUE.DAT and display those antique items, which are priced between 10000 and15000.

```
class ANTIQUE
{   int  ANO;   char   Aname[10];
    float Price;
    public: void BUY() { cin>>ANO;gets(Aname);cin>>price;} void SHOW()
    { cout<<ANO<<endl;
        cout<<Aname<<endl;
        cout<<Price<<endl;
    }
floatGetPrice() { return Price;} };
Q5: define the term degree and cardianility.
Q6: Solve question paper of Unit test 1
```

Psychology: * Case Study (clinical/field) or based on Normal Population.

* In a separate notebook (thin)

Painting: * Make 10 still life in water colour.

* Size – Half Imperial sheet.

* Colour – Artist Water Colour (Camelin) * Brushes – Use Round Brushes

Music (Vocal) :   Q1. Write down the life sketch of :   a) Ustad Bade Ghulam Ali Khan   b) Ustad Faiyaz Khan

Q2. Write down the detail description of the following treatise :   a) Sangeet Ratnakar   b) Sangeet Parijat

Q3. Write down the theka of Dhamar Taal and Roopak Taal with description.

Music (Instrumental Tabla) :

Q1. Write down the history of tabla in detail.

Q2. Give the description of all the following gharanas :

a)   Delhi Gharana   b) Ajrara Gharana   c) Lucknow Gharana   d) Banaras Gharana   e) Farukhabad Gharana   f) Punjab Gharna

Q3. Write down the theka, dugun, tigun and chogun with proper formula for the following taals:

a)   Teentaal   b) Jhaptaal   c) Ektaal   d) tilwadataal   e) Roopaktaal   f) Kehrwataal   g) Dadrataal

h)   Dhamartaal   i) Sooltaal   j) Chaartaal

Q4. Write down the biography of the followings with their playing styles.

a)   Pandit Kishan Maharaj (Banaras Gharana)   b) Ustad Latif Ahmad Khan (Delhi Gharana)

c) Pandit Gyaan Prakash Ghosh (Farukhabad Gharana)

Vice-Principal