SURAJ

SURAJ
SCHOOL
PATAUDI

Summer Vacation Holiday

SESSION 2023-24

HOME WORK

12th NM

ENJOY SUMMER
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English

This summer break, delve deeper into the nuances of the literary word. Your Holiday's Homework consists of 4 different sections based on reading and comprehending the text writing a movie review, Strengthening your knowledge about various Concepts along with your vocabulary and practicing case based reading comprehension passages. Test your understanding by attempting the following in your English register.

SECTION A (READING AND COMPREHENDING THE TEXT)
Read the chapters:
The lost spring (flamingo)
Deep water (flamingo)
Identity the theme of the chapter and write it in your own words (Word Limit: 100 words].

SECTION B (BINGE WATCH)

Watch any (or all) of the following movies and pen down a review concentrating on the plot, historical/ political background, creative elements characterization and theme in not more than 200 words.

Schindler's List, 1993
Dead Poets Society, 1989
Modern Times, 1936
Gandhi, 1982
Cast away, 2000

SECTION C (EXPLORE)

Explore the following concepts and write a brief note In your own words. Note that all these concepts will be helpful in understanding the chapters/poems.

Feminism
Racism
Casteism
Dramatic Irony

Words not only reflect the history of a country but also the many and diverse cultural and linguistic influences which have shaped an changed the English language in India. Figure out 10 Indian words that have been recently added to the Oxford English Dictionary (OED), Write the meaning in English alongside.

SECTION D (PRACTICE)

Practice the Reading Comprehension Passage and solve it in your register.
Read all the lessons and poems which have been completed in the class.

Physics (NDA)

1. Make one chart related to your XII PHYSICS syllabus.
2. Make an investigatory project on one of the topic given in PHYSICS laboratory manual.
3. Make a power point presentation of at least five slides along with audio from one of NDA(SSB)/NEET.
4. Complete laboratory practical file by writing the experiments only.
5. Revise strongly first 3 chapters of part-1 from NCERT for written test purpose(after the end of summer vacation).

Physics

Q1. Two charged capacitors are connected by a conductor wire. Calculate common potential of capacitors (ii) ratio of their charges at common potential. Show that energy is lost this process.

Q2. Drive an expression for potential at any point distance r form the centre O of dipole making an angle θ with the diploe.

Q3. Suppose that three points are set at equal distance r = 90cm form the centre of dipole, point A and point B are on either side of the dipole on the axis (A closer to +ve charge and B closer to negative charge) point C which is on the perpendicular bisector throungthe line joining the charges. What would be the electric potential due to the dipole of dipole moment 3.6×10 19cm at point A, B and C ?

Q4. Drive an expression for capacitor of parallel plate capacitor with dielectric slab of thickness t(t<d) between the plates separated by distance d. How would the following (i) energy (ii) charge (iii) potential to affected (a) if dielectric slab is introduce with battery disconnected (b) dielectric slab is introduce after the battery is connected.

Q5. State gauss's theorem. Derive an expression for the electric field due to a charge plane sheet. Find the potential difference between the plates of parallel plate capacitor having surface density of charge 5×10-8cm-2 with the separation between plates being 4mm.

Q6. Using Gauss's theorem obtain an expression for electric field intensity due to a plane sheet of charge. Hence obtain expression for electric filed intensity in parallel plate capacitor.

Q7. Select an investigatory project on one of the topic given in physics laboratory manual for class 12th and must inform me so that there should not be any repetition.

Q8. Make a power point presentation of at least five slides along with audio from one of the chapter.

Q9. Make a physics model (any)

Q10. What is drift velocity? Give a relation between electric current & drift velocity.

Chemistry

Q1. Define henry law? Give its limitation and its application.

Q2. (A)Define abnormal molecular mass ?
(B)Write application of depression in freezing point colligative property ?
(C)Out of these two molarity and molality which one is better and why.

Q3. Sulphuric acid (H_2SO_4) used in lead storage cell is 38% by mass and has a density of 1.30gcm^{-3} calculate its molarity.

Q4. A solution prepared by dissolving 8.9 g of a gene fragment in 35 L of water has an osmatic pressure of 0.335 torr at 25 ^{0}c assuming that the gene fragment is a non electrolyte calculate its molar mass.

Q5. Calculate the mass of compound (molar mass=256g/mol) to be dissolved in 75g of benzene to lower its freezing point by 0.48k (k_f=5.12 k kg mol^{-1}).

Q6. Explain variation of molar conductivity with concentration (for strong and weak electrolyte).

Q7. Define fuel cell and write anode and cathode reaction of H_2 - O_2 fuel cell.

Q8. Calculate the E.M.F of the following cell at 298k
$2cr(s)+3fe^{2+}$ (0.1 M) $\rightarrow 2cr^{3+}$ (0.01M)+3 fe(s)
Given E^0 (cr^{3+}/cr) = -0.74V , E^0 (fe^{2+}/fe)= -0.44v

Q9. Calculate the standard free energy change and maximum work obtain able for the reaction.
Zn(s) + Cu^{2+}(aq) $\rightleftharpoons$ Cu(s) + Zn^{2+}(aq)
Given E^0 (zn^{2+}/zn) =-0.76v , E^0 (cu^{2+}/cu) = 0.34v ; F = 96500

Q10. A solution of $CuSO_4$ is electrolysed for 10 minute with a current of 1.5 ampere .What is the mass of copper deposited at the cathode (molar mass of cu=63.5 g/mol)

Q11. Write down the difference between order of reaction and molecularity of reaction.

Q12. (A)Define pseudo first order reaction.
(B)Write unit of rate constant for second order reaction.

(C)Define activation energy.

Q13. A reaction is of first order in reactant A and second order in reactant B How is the rate of reaction affected when concentration of A and B is doubled ?

Q14. A first order reaction is 40% complete in 50 minute calculate the value of the rate constant in what time will the reaction be 80% complete?

Q15. A first order reaction is 75% complete in 40 minute calculate its $t_{1/2}$.

Q16. Write down difference between lanthanide and actinide?

Q17 Why transition elements act as catalyst ?

Q18 write preparation of potassium dichromate and potassium permanganate ?

Q19 Why transition elements show variable oxidation state except first and last elements of series?

Q 20 Why most of the transition elements and their compound are colour in solid state or aq. Solution?

Q21 Define lanthanoid contraction ? Give its causes and it's consequences.

Q22 Explain variation of atomic radii along series ?

Q23 Write Assignment of for Formula of solution,electrochemistry and chemical kinetics unit

Mathematics

Q.1 The derivative of $\tan^4 x$ w.r.t x?

Q.2 If $2x+3y = \sin x$ then $\frac{dy}{dx}$ is equal to?

Q.3 If $Y= \sin(\cos x^2)$ then find $\frac{dy}{dx}$?

Q.4 The derivative of $e^{(3x-x^3)}$ is equal to?

Q.5 If $\sin y = x \sin(a + y)$,then $\frac{dy}{dx}$?

Q.6 $Y= \sqrt{\sin x + \sqrt{\sin x + \sqrt{\sin x +\ldots \infty}}}$, then $\frac{dy}{dx}$?

Q.7 If $\log(x^2+y^2) =2 \tan^{-1}\frac{x}{y}$ then $\frac{dy}{dx}$?

Q.8 If $y = \log x - x^2$, then $\frac{d^2y}{dx^2}$?

Q.9 If $y = \log \left(\frac{x^2}{e^x}\right)$, then $\frac{d^2y}{dx^2}$?x

Q.10 The derivative of $\log (e^{x^2})$?

Q.11 If $Y= \log |5x|$, then $\frac{dy}{dx}$?

Q.12 If $Y = 1 + x + \frac{x^2}{2!} ++ \frac{x^3}{3!} + \frac{x^4}{4!} +\ldots \infty$ then $\frac{dy}{dx}$?

Q.13 If $Y =\tan^{-1}\sqrt{\frac{1-\cos x}{1+\cos x}}$, then $\frac{dy}{dx}$?

Q.14 If $Y= \cot^{-1}\sqrt{\frac{1-\sin x}{1+\sin x}}$, then $\frac{dy}{dx}$?

Q.15 If $Y= 2 \sin^2 3x$, then $\frac{dy}{dx}$ at $x = \frac{\pi}{6}$?

Q.16 If $y = \cos^{-1}\sqrt{\frac{1+\cos 2x}{2}}$, then $\frac{dy}{dx}$?

Q.17 If $xy = \tan(xy)$, then $\frac{dy}{dx}$?

Q.18 If $Y = (x)^{\sin x} +(\cos x)^x$, then $\frac{dy}{dx}$?

Q.19 If $Y = (x)^{\sin x} +(\log x)^x$ then $\frac{dy}{dx}$?

Q.20   If $Y = (x)^x + (\sin x)^x$ then $\frac{dy}{dx}$

Q.21   If $f(x) = \sqrt{\frac{\sec x - 1}{\sec x + 1}}$, find the f'(x). Also $f'(\frac{\pi}{3})$.

Q.22   Find $\frac{dy}{dx}$, when y= $\sin^{-1}(\frac{\sqrt{x+1}+\sqrt{x-1}}{2})$.

Q.23   If y= $\tan^{-1} x + \cot^{-1}\frac{1}{x}$, x>0, find $\frac{dy}{dx}$.

Q.24   If y= $x^3(\cos x)^x + \sin^{-1}\sqrt{x}$, find $\frac{dy}{dx}$

Q.25   Differentiate: $\sin^2 x$ w.r.t $e^{\cos x}$

Q.26   If $\sin y = x\cos(a + y)$, then find $\frac{dy}{dx}$.

Q.27   If y= $\log (\sqrt{x} + \frac{1}{\sqrt{x}})^2$, then prove that $x(x+1)^2 y_2 + (x+1)^2 y_1 = 2$

Q.28   Differentiate $\tan^{-1}\left(\frac{\sqrt{1+\sin x}+\sqrt{1-\sin x}}{\sqrt{1+\sin x}-\sqrt{1-\sin x}}\right)$ w.r.t x .

Q.29   If $Y = \frac{x\cos^{-1}x}{\sqrt{1-x^2}}$ - $\log\sqrt{1-x^2}$, prove that $\frac{dy}{dx} = -\frac{\cos^{-1}x}{(1-x^2)^{\frac{3}{2}}}$

Q.30   If $Y = \sin\left(2\tan^{-1}\sqrt{\frac{1-x}{1+x}}\right)$, Prove that $\frac{dy}{dx} = \frac{x-y}{x\log x}$.

Q.31   If $x^y = y^x$, Prove that $\frac{dy}{dx} = \frac{y(x\log y - y)}{x(y\log x - x)}$

Q.32   If y =(Sin x – Cos x)$^{(Sin x - Cos x)}$ find $\frac{dy}{dx}$.

APPLICATIONS OF DERIVATIVE

Q.33   The radius of cylinder is increasing at the rate of 3 cm/sec and its height ids decreasing at the rate of 4 cm/sec. the rate of change of its volume when radius is 4cm and height is 6 cm.

Q.34   Prove that If the rate of change of volume of a sphere is equal to the rate of change of its radius, then its radius is equal to $\frac{1}{2\sqrt{\pi}}$ units.

Q.35   The volume of sphere is increasing at the rate of 4π cm³/sec. The rate of increasing of the radius when the volume is 288π cm³

Q.36   Find the intervals in which the following function is (a) increasing (b) decreasing. F(x) = x³-12x²+36x+17.

Q.37   Find the point on curve Y^2 = 2x which is at a minimum distance from the point (1,4)

Q.38   Find the intervals in which the following function is (a) increasing (b) decreasing. f(x) = (x-1) (x-2)²

Q.39   Find the intervals in which the following function is (a) increasing (b) decreasing. f(x) = 2x³-9x²+12x+15

Q.40   Find the interval in which the function F given by F(x) = Sinx -Cosx , 0≤x≤2π is strictly increasing or strictly decreasing.

Q.41   A wire of length 28 meters is to be cut into two pieces. One of the two pieces is to be made into a square and the other into a circle. What should be the length of the two pieces so that the combined area of these two is minimum.

Q.42   If the length of three sides of a trapezium other than the base is 10 cm each, then find the area of the trapezium, when it is maximum.

Q.43   Show that the volume of the greatest cylinder that can be inscribed in a cone of height 'h' and semi-vertical angle ' α ' is $\frac{4}{27}\pi h^3 \tan^2 \alpha$.

Q.44   Sand is pouring from a pipe at the rate of 12 cm³/s. The falling sand forms a cone on the ground in such a way that the height of the cone is always one-sixth of the radius of the base. How fast is the height of the sand-cone increasing when the height is 4 cm?

Q.45   Show that of all the rectangles with a given perimeter, the square has the largest.

Q.46   Show that of all the rectangles of given area, the square has the smallest perimeter

Q.47   A window has the shape of a rectangle surmounted by an equilateral triangle. If the perimeter of the window is 12 m, find the dimensions of the rectangle that will produce the largest area of the window.

Q.48   Find the volume of the largest cylinder that can be inscribed in a sphere of radius r cm.

Q.49   Show that the height of a closed right circular cylinder of given surface and maximum volume is equal to the diameter of its base.

Q.50   A ladder 5 m long is leaning against a wall. The bottom of the ladder is pulled along the ground, away from the wall at the rate of 2 cm/sec. How fast is its height on the wall decreasing when the foot of the ladder is 4 m away from the wall?

Q.51   Prove that the radius of the right circular cylinder of greatest curved surface area which can be inscribed in a given cone is half of that of the cone

Q.52   Prove that the altitude of the right circular cone of maximum volume that can be inscribed in a sphere of radius r is $\frac{4r}{3}$

Q.53   Show that of all the rectangles inscribed in a given fixed circle, the square has the maximum area.

Q.54   Prove that the volume of the largest cone that can be inscribed in a sphere of radius R is $\frac{8}{27}$ of the volume of the sphere.

Q.55   The amount of pollution content added in air in a city due to x-diesel vehicles is given by P(x)=0.005x+0.02x²+ 30x. Find the marginal increase in pollution content when 3 diesel vehicles are added.

Q.56   The money to be spent for the welfare of the employees of a firm is proportional to the rate of change of its total revenue (marginal revenue). If the total revenue (in Rupee) received from the sale of x units of a product is given by
R (x)=3x²+36x +5, find the marginal revenue, when x = 5.

Q.57   The total expenditure (in Rupee) required for providing the cheap edition of book for poorand deserving students is given by R (x)=3x²+36x, where x is the number of sets of books. If the marginal expenditure is defined as$\frac{dR}{dx}$, write the marginal expenditure required for 1200 such sets.

Q.58   The total cost C(x) associated with provision of free mid-day meals to x students of a school in primary classes is given by C(x)=0.005x³-0.02x²+30x+50. If the marginal cost is given by rate of change is $\frac{dC}{dx}$ of total cost, write the marginal cost of food for 300 students.

Q.59   Determine the interval on which the function is strictly increasing or strictly decreasing
F(x)=3x⁴-4x³-12x²+5.

Q.60   Determine the intervals in which the function is strictly increasing or strictly
F(x) =$\frac{3}{10}$x⁴- $\frac{4}{5}$x³-3x² +$\frac{36}{5}$x +11

Q.61 Find the intervals in which the function $F(x) = \frac{x^4}{4} - x^3 - 5x^2 + 24x + 12$
(a) strictly increasing, (b) strictly decreasing.

Q.62 Show that the height of a cylinder, which is open at the top, having a given surface area and greatest volume, is equal to the radius of its base.

Q.63 A tank with rectangular base and rectangular sides, open at the top is to be constructed so that its depth is 2 m and volume is $8m^3$. If building of tank costs 70 rupees per square metre for the base and 45 rupees per square metre for the sides, what is the cost of least expensive tank?

Q.64 If the radius of a circle is increasing at the rate of 3 cm/sec, at what rate is its area increasing when its radius is 2 cm?

Q.65 Show that the function f defined by $f(x)=(x-1)e^x + 1$ is an increasing function for all $x > 0$.

Q.66 Amongst all open (from the top) right circular cylindrical boxes of volume $125\pi cm^3$, find the dimensions of the box which has the least surface area.

Q.67 Show that the height of a right circular cylinder of greatest volume which can be inscribed in a right circular cone of height ' h 'and radius ' r ' is one-third of the height of the cone and the greatest volume of the cylinder is $\frac{4}{9}$ times the volume of the cone.

Q.68 Find the dimensions of the rectangle of perimeter 36 cm which will sweep out a volume as large as possible, when revolved about one of its side. Also, find the maximum volume.

Q.69 Find the intervals in which $f(x)=(x-1)^3(x-2)^2$ is strictly increasing or strictly decreasing.

Q.70 Find the intervals in which following function is (a) increasing (b) decreasing
$F(x) = 2x^3 - 15x^2 + 36x + 17$

Physical Education

Work Specification (15 days): Do fitness exercise for your physical efficiency and for being physically fit.

Work Specification (15 days): Project Work

Materials required: One file or spiral note book for project, Text Book, Writing and Drawing materials, internet and library support, covering materials, Reference books, photographs where applicable.

Guidelines:

❖ Select one project of your choice
❖ Organize your writing material
❖ Write in your own handwriting in the file as computer print-outs are not allowed
❖ Sub-headings: Title, acknowledgement, index, content
❖ Write rules and regulations of the game, cups, trophies, tournaments and famous player's name.
❖ Cover the file
❖ Write the project title, your name, name of the school and year.