SHAHEEN GROUP OF INSTITUTIONS

II-PUC THEORY PREPARATION SCHEDULE

From 14-03-2022 To 21-04-2022

S.No.	Date	Day		Physics	Chemistry	Biology	Maths
1	14/03/2022	Mon	1	**Chapter 1 - Electric charges & fields** 1. Mention the properties of electric charges. 2.State and explain coulomb's law in Electrostatics. 3.Derive the expression for electric field at a point on the axis of the dipole.	**Chapter 1 – Solid State** 1.Difference between amorphous and crystalline solids and tetrahedral, octahedral voids? 2.Calculation of no. of particles in simple cube FCC & BCC? 3.Calculate the packing efficiency of simple cube? 4.Calculation the packing efficiency of FCC?	**<u>Reproduction in Organism</u>** 1.Distinguish Between Asexual and Sexual Reproduction? 2. Define Fertilization and Bring out the difference between external and Internal Fertilization? Mentioning an example for each? 3.What is Vegetative Propagation? Mention Vegetative Propagules in a) Agave b) Bryophylum c) Water Hyacinth d) Ginger	**<u>Relations and Functions</u>** 1. P.T. the function f : N → Y defined by f(x) = 4x + 3. Where Y = {y : y = 4x + 3, x ∈ N} is invertible. Also write the inverse of f(x) 2. Let R_+ be the set of all non-negative real numbers. S.T. the function f : $R_+ \to [4, \infty)$ given by f (x) = $x^2 + 4$ is invertible and write the inverse of f. 3.P.T. the function f : N → Y defined by f(x) = x^2 where Y = {y : y = x^2, x ∈ N} is invertible. Also find the inverse of f.
2	15/03/2022	Tue	2	4. Obtain the expression for electric field at a point on the equatorial line of the dipole. 5. Deduce the expression for torque on a dipole placed in uniform electric field. When will be the torque acting on the electric dipole maximum and minimum? 6. Mention the properties of electric lines of force	5. Calculation the packing efficiency of BCC? 6. Frenkel and Schottky defect and Vacancy effect? 7. Para magnetism, ferrimagnetism and anti ferromagnetism? **Chapter 2 – Solutions** 8. Define molality, molarity, mole fraction.	4.Name the asexual reproductive Structures of a) Pencillium b) Chlamydomonas c) Hydra d) Yeast e) Sponges **<u>Sexual Reproduction in Flowering Plants</u>** 5. Explain the structure of T.S. of anther or microsporangium?	4. Let f : N → R be a function defined as f(x) = $4x^2 + 12x + 15$. S.T. f : N → s, where S is the range of f, is invertible. Find the inverse of f. 5. Consider f : $R_+ \to [-5, \infty)$ given by f (x) = $9x^2 + 6x - 5$. S.T. f is invertible with $f^{-1}(y) = \left(\frac{\sqrt{y+6}-1}{3}\right)$ 6.State whether the function is one-one, onto <u>or</u> bijective (a) f : R → R defined by f(x) = 3 – 4x (b) f : R → R defined by f(x) = $1 + x^2$
3	16/03/2022	Wed	3	7.State and explain Gauss's law in electrostatics. 8.Obtain the expression for electric field at point a.Outside a charged thin spherical shell. b.Just outside a charged thin spherical shell, by using Gauss law 9.Obtain an expression for electric field due to an infinitely long straight uniformly charged wire by using gauss law.	9.Coligative properties (i) Elevation of Boiling point. (ii) Depression in freezing point. (iii) Relative of lower vapour pressure (iv) Osmotic pressure. 10.Difference between ideal & non-ideal. 11.Henery's law & application.	6.Describe the structure of megasporangium or Anatropous ovule? 7.Explain the 7-celled, 8-nucleate structure of female gametophyte or structure of embryo sac? 8.With a help of neat labeled diagram explain the structure of pollen grain or male gametophyte?	**<u>Matrices</u>** 7.If A = $\begin{bmatrix} 1 & 1 & -1 \\ 2 & 0 & 3 \\ 3 & -1 & 2 \end{bmatrix}$ B = $\begin{bmatrix} 1 & 3 \\ 0 & 2 \\ -1 & 4 \end{bmatrix}$ C = $\begin{bmatrix} 1 & 2 & 3 & -4 \\ 2 & 0 & -2 & 1 \end{bmatrix}$ Find A(BC), (AB) C and S.T. (AB) C = A (BC). 8.If A = $\begin{bmatrix} 0 & 6 & 7 \\ -6 & 0 & 8 \\ 7 & -8 & 0 \end{bmatrix}$ B = $\begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 2 \\ 1 & 2 & 0 \end{bmatrix}$ C = $\begin{bmatrix} 2 \\ -2 \\ 3 \end{bmatrix}$ Calculate AC, BC, and (A + B) C. Also verify that (A + B) C = AC + BC. 9.Find $A^2 - 5A + 6I$, if A = $\begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$

4	17/03/2022	Thu	4	10. Obtained an expression for electric field due to uniformly charged infinite frame sheet by using gauss law. **Chapter 2 - Electro static potential & Capacitance** 11.Derive an expression for electric potential due to an isolated point charge. 12. Derive the relation between electric field and electric potential.	12. Difference in non-ideal solution +ve deviation –ve deviation. 13.Azeotropic mixture and Isotropic, hypertonic, hypotonic solution. **Chapter 3 – Electrochemistry** 14.Standard hydrogen electrode (SHE) 15.Mechanism of corrosion and prevention	9. Explain the process of double fertilization and triple fusion? 10.Explain how pollination occurs in Vallisneria and Sea grasses? 11.Draw a neat label structure of dicot and monocot embryo?	10. If A = $\begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$ P.T. $A^3 - 6A^2 + 7A + 2I = 0$ 11. If F(x) = $\begin{bmatrix} cosx & -sinx & 0 \\ sinx & cosx & 0 \\ 0 & 0 & 1 \end{bmatrix}$ S.T. F(x)F(y) = F (x + y). 12. If A = $\begin{bmatrix} -2 \\ 4 \\ 5 \end{bmatrix}$ B = $\begin{bmatrix} 1 & 3 & -6 \end{bmatrix}$ Verify that $(AB)' = B'A'$
5	18/03/2022	Fri	HOLI				
6	19/03/2022	Sat	5	16. Draw the labeled a diagram of a Van de Graaff generator. **Chapter 3 - Current Electricity** 17. State & explain Ohm's law write its limitations 18. Derive the relation between current density and conductivity of a conductor.	16.Kohlrausch law and its application 17.Faraday I and II law of electrolysis 18.Fuel cell. 19.(a) Lead-storage battery (b) Dry cell **Chapter 4 – Chemical Kinetics** 20.Derive and half period for zero order reaction?	12.What is endosperm? Explain the different types of endosperm? 13.Explain with the help of neat label structure of typical flower? **<u>Human Reproduction</u>** 14.Draw a neat labeled structure of male reproductive system? 15.Draw a neat labeled structure of female reproductive system?	13.If A = $\begin{bmatrix} 1 & 2 & 3 \\ 3 & -2 & 1 \\ 4 & 2 & 1 \end{bmatrix}$ then S.T. $A^3 - 23A - 40I = 0$. 14. If A = $\begin{bmatrix} 1 & 2 & -3 \\ 5 & 0 & 2 \\ 1 & -1 & 1 \end{bmatrix}$ B = $\begin{bmatrix} 3 & -1 & 2 \\ 4 & 2 & 5 \\ 2 & 0 & 3 \end{bmatrix}$ C = $\begin{bmatrix} 4 & 1 & 2 \\ 0 & 3 & 2 \\ 1 & -2 & 3 \end{bmatrix}$ then compute (A + B) and (B – C). Also verify that A + (B – C) = (A + B) – C. 15. If A = $\begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$ B = $\begin{bmatrix} 2 & 0 \\ 1 & 3 \end{bmatrix}$ C = $\begin{bmatrix} 1 & 1 \\ 2 & 3 \end{bmatrix}$. Calculate AC, BC and (A + B) C. Also verify that (A + B) C = AC + BC.
7	20/03/2022	**SUNDAY**					
8	21/03/2022	Mon	6	16. Draw the labeled a diagram of a Van de Graaff generator. **Chapter 3 - Current Electricity** 17. State & explain Ohm's law write its limitations 18. Derive the relation between current density and conductivity of a conductor.	21.Derive an integrated rate equation of first order reaction? 22.Derive an integrated rate equation of zero order reaction? 23.Derive an half period for first order reaction? 24.Differential between order and molecularity of reaction? 25.Define pseudo first order reaction? Give on example?	16. Explain the structure of sperm (Spermatozoa) with neat labeled diagram? 17. Explain the process of spermatogenesis? 18. What is oogenesis? Explain the process of oogenesis?	**<u>Determinants</u>** 16.Solve by matrix method x – y + z = 4 2x + y – 3z = 0 x + y + z = 2 17.Solve by matrix method x + y + z = 6 y + 3z = 11 x + z = 2y 18. Solve by matrix method 2x + y + z = 1 x – 2y – z = $\frac{3}{2}$ 3y – 5z = 9
9	22/03/2022	Tue	7	19.Derive an expression for conductivity of a material in terms of relaxation time. 20.Derive an expression for equivalent resistance. (a) When two resistors are in series. (b) When two resistors are in parallel. 21.Derive an expression for equivalent emf and internal resistance (a) When two cells are connected in series. (b) When two cells are connected in parallel.	26.Explain effect of catalyst on rate of reaction with the help of energy level diagram? 27.Collision theory? 28.Effect of temperature on rate of reaction 29.Define collision frequency activation energy, threshold energy and temperature co-efficient? **Chapter 5 – Surface Chemistry** 30.Explain the mechanism of micelle formation?	19. Describe human female mammary gland by the help of neat labeled diagram? 20. With the help of neat labeled diagram explain the structure of mammalian ovary?	19.Solve by matrix method 3x – 2y + 3z = 8 2x + y – z = 1 4x – 3y + 2z = 4 20. Solve by matrix method 2x + 3y + 3Z = 5 x – 2y + z = –4 3x – y – 2z = 3 21.Solve by matrix method x – y + 2z = 7 3x + 4y – 5z = –5 2x – y + 3z = 12

10	23/03/2022	Wed	8	22. State and explain Kirchhoff's law. 23. Obtain the condition for balance of a wheat stone bridge using Kirchhoff's law. **Chapter 4 - Moving charges & Magnetism** 24. Derive an expression for magnetic field strength (magnetic field intensity) at any point on the axis of a circular current loop using Biot - Savart's law.	31.Explain the cleansing action of soap? 32.(a) Explain bredigs electric are method (b) Explain electrophoris 33.Define the following terms (i) Electro-osmosis (ii) electro kinetic potential or zeta potential (iii) Hardy-Schulze rule (iv) Tyndall effect (how it is caused) (v) Brownian movement (cause for it) (vi) Peptisation 34.What are multi molecular, macro molecular and associated colloids?	21.What is menstrual cycle? Explain the stages of menstrual cycle? **Reproductive Health** 22.Suggest some methods to assist infertile couples to have children? 23.Describe the briefly natural methods of contraception?	**Continuity and Differentiation** 22.If y = A sin x + B cos x P.T. $\frac{d^2y}{dx^2} + y = 0$ 23.If y = 5 cos x –3 sin x. P.T. $\frac{d^2y}{dx^2} + y = 0$ 24. If $y = 3e^{2x} + 2e^{3x}$. P.T. $\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = 0$
11	24/03/2022	Thu	9	25. Derive an expression for magnetic field intensity due to straight current carrying wire by applying Ampere's circular law. 26. Explain the construction and working of a cyclotron & its uses. 27. Derive an expression for the force experience by a current carrying conductor placed in uniform magnetic field.	35.Differentiate between lyophilic and lyophobic colloids? 36.Differences between physisorption and chemiscription 37.Difference absorption and adsorption definition? 38.Explain the mechanism of enzyme catalysis?	24. What is STD? Write a note on syphilis and Gonorrhoea? 25. What is population explosion? Mention the causes, effects and control of overpopulation? **Principles of Inheritance and Variations** 26. Explain monohybrid cross (Law of segregation or inheritance of one gene) with a suitable example?	25. If $y = Ae^{mx} + Be^{nx}$ S.T. $\frac{d^2y}{dx^2} - (m + n)\frac{dy}{dx} + mny = 0$ 26. If $y = 500e^{7x} + 600e^{-7x}$. S.T. $\frac{d^2y}{dx^2} = 49y$ 27. If $e^y(x + 1) = 1$. S.T. $\frac{d^2y}{dx^2} = \left(\frac{dy}{dx}\right)^2$
12	25/03/2022	Fri	10	28.Derive an expression for the force between two straight parallel current carrying wires and hence define ampere. 29.Derive an expression for magnetic dipole moment of an electron revolving in the nth orbit of an hydrogen atom & Bohr's magnetron. 30. What is an ammeter? Explain how a galvanometer is converted into an ammeter.	**Chapter 6 – Metallurgy** 39.HALL – heroult process 40.(a) Extraction of blister copper from copper matte. (b) Leaching of alumina from bauxite 41.Extraction of iron (blast furnace)	27.Describe dihybrid cross (Law of independent assortment or inheritance of two genes)? 28.Explain incomplete or patial dominance with a suitable example? 29.Write a note on haemophilia?	28. If y = 3 cos (log x) + 4 sin (log x) S.T. $x^2 y_2 + xy_1 + y = 0$. 29. If $y = \sin^{-1}x$. S.T. $(1-x^2)\, y_2 - xy_1 = 0$ 30. If $y = \cos^{-1} x$. Find $\frac{d^2y}{dx^2}$ in terms of y alone.

13	26/03/2022	Sat	11	31. What is voltmeter? Explain how a galvanometer is converted into a voltmeter? **Chapter 5 - Semi conductor Electronics** 32.Distinguish between intrinsic and extrinsic semiconductor. 33.Distinguish between n-type and p-type semi conductors.	42.Mond process, Van-arkel method, Zone refining 43.(a) Froth-floatation method (b) Magnetic separation (c) Roasting & Calcinations **Chapter 7 – P-Block Elements** 44. Manufacture of ammonia by Haber's process 45.Manufacture of HNO_3 nitric acids by ostwald's process	30.What is colour blindess? Explain the inheritance of colour blindness in man OR Explain x-linked inheritance with a example? 31.Explain the different types of chromosomal mechanism of sex determination? 32.Write a note on turner and Klinefelter syndrome?	31. If $y = (\sin^{-1} x)^2$ S.T. $(1-x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx} = 2$ 32. If $y = (\tan^{-1} x)^2$. S.T. $(x^2+1)^2 y_2 + 2x(x^2+1) y_1 = 2$. 33. If $y = e^{a \cos^{-1} x}$, $-1 \le x \le 1$ S.T. $(1-x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx} - a^2y = 0$. 34. If $x = a(\cos t + t \sin t)$ $y = a(\sin t - t \cos t)$. Find $\frac{d^2y}{dx^2}$
14	27/03/2022	**SUNDAY**					
15	28/03/2022	Mon	12	34.Explain the formation of p-n junction. 35.Explain the working of p-n junction in the forward and reverse bias. Draw the characteristic curves. 36.With a circuit diagram, explain the work of p-n junction as half wave rectifier. Draw input and output waveform.	46. Explain the manufacture of H_2SO_4 sulphuric acids by contact process. **Chapter 8 – D & F Block Elements** 47.Explain the manufacture of $KMNO_4$ from pyrolusite? 48.Explain the manufacture of $K_2Cr_2O_7$ from chromate ore? 49.General properties (reason type question) (a) Oxidation sate (b) Catalyst property (c) Complex formation (d) Colour properties	**<u>Molecular Basis of Inheritance</u>** 33.Describe the double helix model of DNA or Explain Watson and Crick model of DNA? 34.Define DNA finger print technology. Explain the steps involved in?	**<u>Applications of Derivatives</u>** 35.The length x of a rectangle is decreasing at the rate of 5cm/min and the width y is increasing at the rate of 4cm/min. When x=8cm and y=6cm. Find the rate of change of (i)The perimeter and (ii)The area of the rectangle 36.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 2cm/s. How fast is its height on the wall decreasing when the foot of the ladder is 4 m away from the wall? 37.A ladder 24 feet long leans against a vertical wall. The lower end is moving away at the rate of 3 feet/sec. Find the rate at which the top of the ladder is moving downwards, if the foot is 8 feet from the wall.
16	29/03/2022	Tue	13	37.With a circuit diagram, explain the working of p-n junction as full wave rectifier. Draw input and output wave forms. 38.Classification of solid substance on the basis of energy band. **Chapter 6 - Ray Optics and optical instrument** 39.Cartesian sign conversion and law's of reflection and refraction.	50.General properties (reason type question) (a) Magnetic properties (Calculation on $\mu = \sqrt{n(n+2)}$ (b) Ionization potential (c) Alloy formation 51.(a) Definition and example of intestinal compound? (b) Lanthanoid contraction, and actinoid contraction.	35.Explain the experiment Hershey and Chase to prove that DNA is the genetic material? 36.Describe the Lac-operon concept of E.coli? 37.Write a note on objectives and important achievements of HGP?	38.A balloon, which always remains spherical on inflation, is being inflated by pumping in 900 cubic centimeters of gas per second. Find the rate at which the radius of the balloon increases when the radius is 15 cm. 39.A particle moves along the curve $6y = x^3 + 2$. Find the points on the curve at which the y-coordinate is changing 8 times as fast as the x-coordinate. 40.Sand is pouring from a pipe at the rate of 12 cm^3/sec. 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 4cm?

17	30/03/2022	Wed	14	40. Derive the relation between focal length and the radius of curvature of a mirror. 41. Derive mirror equation in the case of a concave mirror producing real image. 42. Write a short note on TIR.	**Chapter 9 – Co-Ordination Compound** 52. Explain geometry hybridization and magnetic property of following on the basis of VBT (a) $[NiCl_4]^{-2}$ (b) $[Ni(CN_4]^{-2}$ 53.Explain geometry hybridization and magnetic property of following on the basis of VBT (a) $[CO(NH_3)_6]^{+3}$ (b) $[COF_6]^{-3}$ 54.Postulates (Assumption) of Werner's theory?	38. Explain the properties or characteristic features of genetic code? 39. Explain the structure of nucleosome model or explain the packaging of DNA helix? 40. Explain semi-conservative replication or Explain the process of replication of DNA?	**<u>Determinants</u>** (4 Marks) 41.P.T. $\begin{vmatrix} x & x^2 & yz \\ y & y^2 & zx \\ z & z^2 & xy \end{vmatrix} = (x-y)(y-z)(z-x)(xy+yz+zx)$ 42.P.T. $\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^3 & b^3 & c^3 \end{vmatrix} = (a-b)(b-c)(c-a)(a+b+c)$ 43. P. T. $\begin{vmatrix} a^2+1 & ab & ac \\ ab & b^2+1 & bc \\ ca & cb & c^2+1 \end{vmatrix} = 1 + a^2 + b^2 + c^2$
18	31/03/2022	Thu	15	43.Derive the expression. $\int = \frac{\sin\left(\frac{A+D}{2}\right)}{\sin\frac{A}{2}}$ Where the symbols have the usual meaning. 44.Define Scattering of light? Give reasons for the following. (a) Blue colour of the sky. (b) Sun appears reddish during sunrise and sunset. 45.Derive the relation connecting n, u, v & R for refraction at a spherical surface.	55.Ambidentate and chelating ligand (definition and example) 56. Definition and example of (a) Ionisation isomerism (b) linkage isomerism (c) hydrate isomerism (d) co-ordination isomerism 57.Geometrical isomerism (cis and trans form of tetrahedral and octahedral complex) (a) $[Pt(NH_3)Cl_2]$ (b) $[CoCl_2(en)_2]$ (c) $[Co(NH_3)_4Cl_2]$ (d) $[Fe(NH_3)_2(CN)_4]^-$	41.Describe the Griffith experiment? 42.Describe the process of transcription? 43. Describe the process of translation?	44. P. T. $\begin{vmatrix} b+c & a & a \\ b & c+a & b \\ c & c & a+b \end{vmatrix} = 4abc$ 45. S. T. $\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = abc$ $\left(1+\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right) = abc + bc + ca + ab$ 46. P. T. $\begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-a-b \end{vmatrix} = (a+b+c)^3$ 47. P. T. $\begin{vmatrix} x+y+2z & x & y \\ z & y+z+2x & y \\ z & x & z+x+2y \end{vmatrix} = 2(x+y+z)^3$
19	01/04/2022	Fri	16	46.Derive lens makers formula. 47.Derive an expression for equivalent focal length of two thin convex lenses in contact. 48.Draw the ray diagrams for the following and mention the expression for magnification. (a) Image formation at least distance of distinct vision in case of simple microscope. (b) Image formation at infinity in the case of simple microscope	58.Optical isomers of (a) $[co(en)_3]^{3+}$ (b) $[Pt\,Cl_2(en)_2]^{2+}$ (c) $[CrCl_2(ox)_2]^{+3}$ 59.Splitting of d-orbitals in tetrahedral and octahedral geometry? 60.What are homoleptic and heteroleptic complexes and give examples? **Chapter 10 – Haloalkanes & Haloarenes** 61.Explain the mechanism of SN^1	**<u>Evolution</u>** 44.Explain Stanley Miller experiment with a neat label diagram? 45.What is Hardy Weinberg law? Explain any four factors that affect the Hardy Weinberg equilibrium? 46.Give a brief account on origin and evolution of man?	**<u>Continuity and Differentiation</u>** (4 Marks) 48.Find the value of k, so that the function f is continuous, $f(x) = \begin{cases} \frac{k\cos x}{\pi-2x}, & \text{if } x \neq \frac{\pi}{2} \\ 3, & \text{if } x = \frac{\pi}{2} \end{cases}$ at $x = \frac{\pi}{2}$ 49.Find the value of k, so that the function f is continuous, $f(x) = \begin{cases} kx^2, & \text{if } x \leq 2 \\ 3, & \text{if } x > 2 \end{cases}$ at x = 2 50.$f(x) = \begin{cases} kx+1, & \text{if } x \leq \pi \\ \cos x, & \text{if } x > \pi \end{cases}$ at $x = \pi$

20	02/04/2022	Sat	17	49.(a) Image formation at least distance of distinct vision in the compound microscope. (b) image formation at least distance of distinct vision in an astronomical telescope. (c) Reflecting telescope. **Chapter 7 - Wave Optics** 50.State Huygen's principles & Derive the law of reflection of light on the basis of Huygen's wave theory of light.	62.Explain the mechanism of SN^2. 63.What are germinal and vicinal di halides give example. 64.State Saytzeffs rule (Zaitsev) with example.	47.Explain industrial melanism and adaptive radiation? (Darwin-Finches) **<u>Human Health & Diseases</u>** 48.What is innate immunity? Describe the types of defence barriers of innate immunity?	51. $f(x) = \begin{cases} kx+1, \text{if } x \le 5 \\ 3x-5, \text{if } x > 5 \end{cases}$ at x = 5 52. Find the values of a and b such that the function defined by $f(x) = \begin{cases} 5 & ; \text{if } x \le 2 \\ ax+b & ; \text{if } 2 < x < 10 \\ 21 & ; \text{if } x \ge 10 \end{cases}$ is a continuous function. 53. Find the relationship between a and b so that function f defined by $f(x) = \begin{cases} ax+1, & \text{if } x \le 3 \\ bx+3, & \text{if } x > 3 \end{cases}$ is continuous at x = 3. 54.For what value of λ is the function defined by $f(x) = \begin{cases} \lambda(x^2-2x), & \text{if } x \le 0 \\ 4x+1, & \text{if } x > 0 \end{cases}$ continuous at x = 0? What about continuity at x = 1?
21	03/04/2022	**SUNDAY**					
22	04/04/2022	Mon	18	51.Derive the law of refraction (Shell's law) on the basis of Huygen's wave theory of light when the light travels form rarer medium to denser medium. 52.Give the theory of interference. Or Arrive at the conditions for constructive and destructive interference.	65.Explain the following reactions (a) Fitting reaction (b) Wurtz – fitting reaction 66.Explain the following reactions (a) Grooves process (b) Fink elstein reaction 67.Explain the following reactions (a) Swartz reaction (b) Darzan's process. 68.Write the difference between SN^1 and SN^2 reactions.	49.Describe the life cycle of malarial parasite (plasmodium)? 50.What is cancer? Write note on detection and treatment of cancer? 51.Write the difference between active and passive immunity?	**<u>Relation & Functions</u>** 55. Verify whether the operation ∗ defined is associative and commutative or not. i.a ∗ b = a + ab on Q ii. on Z^+, a ∗ b = 2^{ab} iii.a ∗ b = $a^2 + b^2$ iv.a ∗ b = $(a-b)^2$ v. a ∗ b = $\frac{ab}{4}$ vi. a ∗ b = $\frac{ab}{2}$ 56. Let ∗ be a binary operation on the set of natural numbers given by a ∗ b = L.C.M. of a and b. Find 5 ∗ 7, 20 ∗ 16 and 15 ∗ 20. 57. Let ∗ be a b.o. defined on the set of rational numbers by a ∗ b = $\frac{ab}{4}$. Also find the identity element of a ∗ b = a + b + 5, a ∗ b = $\frac{2ab}{3}$, a ∗ b = $\frac{3ab}{7}$
23	05/04/2022	Tue	19	53. Describe Young's double shit experiment to demonstrate interference of light. 54. Obtain an expression for interference fringe width in Young's double slit experiment.	69. Grignard reagent? Preparation of Grignard reagent. 70. Sandmeyer's reaction? Give is equation. **Chapter 11 – Alcohols, Phenols & Ethers** 71. Explain the mechanism of dehydration of alcohol Alkene 72. Explain the mechanism of hydration of alkene to alcohol	52. Explain how drug and alcohol abuse can be prevented (Control measures)? 53. Write a note on life cycle to HIV (Retro virus) ? 54. Describe the structure of antibody molecule?	58. Let ∗ be a b.o. defined on the set of rational numbers Q^* defined by a ∗ b = ab + 1, P.T. ∗ is a commutative. 59.Find fog and gof of : i) If f : R → R is given by $f(x) = (3-x^3)^{\frac{1}{3}}$ find (fof) (x) ii) Find fog and gof if f(x) = |x| g(x) = |5x−2| iii) If f(x) = $8x^3$ g(x) = $x^{\frac{1}{3}}$ **<u>Matrices</u>** 60.If A = $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, find |2A|

24	06/04/2022	Wed	20	55.Explain the Fraunhoffer diffraction through a single slit. 56.Distinguish between interference and diffraction. 57.Write a note on Polaroids.	73.(a) Reimer-Tieman reaction (b) Kolbes reaction 74.(a) Williamsons ether synthesis (b) Cumene process 75.What is lucas reagent distinguish between 1°, 2° and 3° alcohols? **Chapter 12 – Aldehydes, Ketones & Carboxylic Acids** 76.Aldol condensation	**<u>Strategies for Enhancement of Food Production</u>** 55.Explain the process of MOET? Write the significance of Al? 56.Briefly explain various steps involved in plant breeding? 57.Explain different methods of animal breeding with examples?	61. Construct a 2 x 2 matrix A = $[a_{ij}]$ whose elements are given by $\frac{1}{2}\|-3i + j\|$ 62.Find x, for which $\begin{vmatrix} 3 & x \\ x & 1 \end{vmatrix} = \begin{vmatrix} 3 & 2 \\ 4 & 1 \end{vmatrix}$ 63. Define Scalar matrix, Diagonal matrix, Unit matrix, Symmetric, Skew symmetric matrix and Zero matrix.
25	07/04/2022	Thu	21	58.State and prove Brewster's law of polanzation. **Chapter 8 - Atoms** 59.Explain Geiger - Marsden experiment OR Explain Rutherford's experiment. 60.Obtain an expression for the energy of an electron in hydrogen atom in terms of radius using Rutherford model of an atom.	77.Haloform reaction 78.(a) Cannizzaro's (b) HVZ reaction 79. (a) Decarboxylation (b) Esterification 80.(a) Clemmensen (b) Wolf-Kishner reduction	**<u>Microbes in Human Welfare</u>** 58.What is biogas? Explain the how biogas production occurs in biogas plant with help of diagram? 59.Write a note on the role of microbes in household products?	64.i) If A = $\begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 2 \\ 0 & 0 & 4 \end{bmatrix}$ then S.T. $\|3A\| = 27\|A\|$ ii) If A = $\begin{bmatrix} 1 & 2 \\ 4 & 2 \end{bmatrix}$ then S. T. $\|2A\| = 4\|A\|$ 65. Find x and y, if 2 $\begin{bmatrix} 1 & 3 \\ 0 & x \end{bmatrix} + \begin{bmatrix} y & 0 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 5 & 6 \\ 1 & 8 \end{bmatrix}$ 66. If x $\begin{bmatrix} 2 \\ 3 \end{bmatrix}$ + y $\begin{bmatrix} -1 \\ 1 \end{bmatrix}$ = $\begin{bmatrix} 10 \\ 5 \end{bmatrix}$ find x and y.
26	08/04/2022	Fri	22	61.Write the postulates of Bohr's atom model. 62.Obtain the expression for the Radius. 63.Obtain an expression for the energy in the nth Bohr orbit of the hydrogen atom by assuming the expression for radius.	81.Rosenmund reduction reaction (b) Stephens reduction 82.(a) Etards reaction (b) Preparation of ketones from acylchlorides? 83.(a) What is Tollen's reagent and Fehling's reagents? (b) Gattermann Koch reaction?	60.Give a brief account the role of microbes in the production of industrial products? 61.What is sewage? Write a brief note on sewage treatment? **<u>Biotechnology Principles & Process</u>** 62.What is recombinant DNA technology? Explain the process involved in it?	67.If A = $\begin{bmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{bmatrix}$ then Verify that $A'A = I$ 68. For any square matrix A, with real no's entries, A + A′ is a symmetric matrix and A– A′ is a skew symmetric matrix. 69.If A and B are invertible matrices of the same order, then $(AB)^{-1} = B^{-1} A^{-1}$. 70.Using elementary transformation, Find A^{-1} i) A = $\begin{bmatrix} 2 & 1 \\ 7 & 4 \end{bmatrix}$ ii) A = $\begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$ iii) $\begin{bmatrix} 2 & 1 \\ 7 & 1 \end{bmatrix}$
27	09/04/2022	Sat	23	64.Using Balmer's formula write the empirical formula for wave number of different series of spectral lines of hydrogen atom. 65.Write the energy level diagram for hydrogen aton indicating different series spectral lines. 66.What are the limitations of Bohr's theory?	**Chapter 13 – Amines** 76. (a) Gabriel pthalimide synthesis (b) Hoffmann bromamide degradation 77.(a) Carbylamines reaction (b) Diazotization 78.(a) Hins bergs reagent(b) Bromination	63.What is PCR technique? Explain the process of amplification of gene of interest (Explain the process involved in it)? 64.Explain the tools of recombinant DNA technology (rDNA)? 65.Write the features of cloning vector?	**<u>Determinants</u>** 71.Find the equation of line joining (1, 2) and (3, 6) using determinants. 72.Find the area of Δ^{le} with the vertices i)(2, –6) (5, 4) and (–2, 4) ii) (1, 0) (6, 0) and (4, 3) 73.Find the inverse of a matrix. i) $\begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix}$ ii) $\begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos x & \sin x \\ 0 & \sin x & \cos x \end{bmatrix}$ **<u>Continuity and Differentiability</u>** 74. Differentiate w.r.t.x. i) tan (2x + 3) ii) cos (1 – x) iii) $\sin^2$ (x + 5) iv) cos $\sqrt{x}$ v) log (sin x) vi) sin (cos (x^2)) vii) sin (ax + b) viii) 2 $\sqrt{\cot(x^2)}$ ix) cos x^3. $\sin^2$ (x^5)

28	10/04/2022	SUNDAY					
29	11/04/2022	Mon	24	**Chapter 9 - Nuclei** 67. Write the properties of nucleus 68. What are the characteristics of nuclear forces? 69. What is specific binding energy? Explain the features of Binding energy curve.	79. Coupling reaction? Give its equation? Mendius reaction? 80. Basic strength of amines. 81. Diazonium salts, gatterman, sand mayer, schiemann reaction	**<u>Biotechnology & Its Applications</u>** 66. Explain the process of insulin synthesis? (Genetically engineered insulin)? 67. What is gene therapy? Explain its types and explain how to treat SCID through gene therapy? 68. Write biotechnological applications in agriculture?	75.If y + siny = cos x find $\frac{dy}{dx}$ 76.Find $\frac{dy}{dx}$, if y = $\log_7$ (log x) 77. i) If y = $\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)$, find $\frac{dy}{dx}$ ii) y = $\sin^{-1}\left(\frac{2x}{1+x^2}\right)$ iii) y = $\tan^{-1}\left(\frac{3x-x^3}{1-3x^2}\right)$ 78. If y = $\sec^{-1}\left(\frac{1}{2x^2-1}\right)$, 0 < x < $\frac{1}{\sqrt{2}}$, find $\frac{dy}{dx}$
30	12/04/2022	Tue	25	70.Write the differences between nuclear fission and fusion. 71.State and explain Radioactive decay law. 72.Derive N = $N_0 e^{-\lambda t}$ Or Derive an expression for the number of atoms present in a radioactive substance in a given instant of time. Or Show that radioactive decay is exponential. 73.Define half life of a radioactive element and obtain the expression for half life.	**Chapter 14 – Biomolecules** 82. Structure of disaccharide of (i) maltose (ii) lactose (iii) sucrose 83. Differences between starch and cellulose and differences between amylase and amylopectin.	69. Describe the production of Bt cotton? **<u>Organisms & Populations</u>** 70. What is population growth curve? Briefly explain two types of growth curves? 71. Define the following terms and give one example for each (1) Camouflage (2) Symbiosis (3) Hibernation (4) Aestivation (5) Inter specific competition	79. Differentiate $\left(x+\frac{1}{x}\right)^x$ w.r.t.x. 80.Find $\frac{dy}{dx}$, if y = $(\log x)^{\cos x}$ 81. Find $\frac{dy}{dx}$, if $x^2 + xy + y^2 = 100$ 82. If $\sqrt{x} + \sqrt{y} = \sqrt{10}$ S.T. $\frac{dy}{dx} + \sqrt{\frac{y}{x}} = 0$
31	13/04/2022	Wed	26	**Chapter 10 - Dual Nature of Radiation & Matter** 74.Write the experimental observations of photoelectric effect or Laws of Photo electric effect. 75.Outline the Einstein's explanation of photoelectric effect. 76.Mention the properties of a photon.	**Chapter 15 – Polymers** 84. What is vulcanization? Give its equations 85. Bio degradable polymer of (a) PHBV (b) Nylon-2-nylon-6 preparation	72.Explain the effects of light and temperature on plants and animals? 73.Write down the adaptations of prey to avoid to predators? **<u>Ecosystem</u>** 74.Define decomposition? Mention the steps involved in it?	83. If x = $\sqrt{a^{\sin^{-1}t}}$, y = $\sqrt{a^{\cos^{-1}t}}$ P. T. $\frac{dy}{dx} = \frac{-y}{x}$ 84.If x = a (θ + sin θ) y = a (1−cos θ) P.T. $\frac{dy}{dx}$ = tan $\left(\frac{\theta}{2}\right)$ 85. if x = a (θ − sinθ), y = a (1 + cos θ) find $\frac{dy}{dx}$ 86. If x = a [cos t + log tan $\frac{t}{2}$], y = a sin t find $\frac{dy}{dx}$

32	14/04/2022	Thu	27	**Chapter 11 - Alternating Current** 77.Derive the expressions for the instantaneous current in an ac circuit with a (a) Pure resistor. (b) Pure inductor. (c) Pure capacitor. Draw the phasor diagrams and mention the phase relation between and current and voltage in each case. 78.Derive expressions for resultant voltage impedance current and phase angle in series LCR circuit using phasor diagram. 79.Mention the formula for current in series LCR circuit & hence mention the condition for resonance.	86. Explain condensation polymers of (a) terylene or Dacron, melamine (b) Urea-formaldehyde, Bakelite 87. Co polymer → BUNA.S. BUNA. N and Neoprene.	75. Explain ecological pyramids and types? 76. What is biogeochemical cycle? Explain with a schematic representation of phosphorous cycle?	87. If x = a [cos θ + θ sin θ], y = a [sin θ – θ cos θ] find $\frac{dy}{dx}$ 88. If x = at^2, y = 2at find $\frac{dy}{dx}$ 89. If x = 4t, y = $\frac{4}{t}$ find $\frac{dy}{dx}$ 90. Verify Rolles theorem for the function i) f(x) = $x^2 + 2x - 8$, x∈ [−4, 2] ii) f(x) = $\sqrt{4-x^2}$, on [−2, 2]
33	15/04/2022	Fri	28	80.Obtain the expression for resonant frequency. 81.Write a note on transformer. **Chapter 12 - Magnetism and matter** 82.Mention the properties of magnetic field lines.	88. Addition polymerization of homo polymer and co-polymer eg polytheries, HDPE, LDPE, PV POLYSTYRENE? 89.Classification of polymers?	77.Explain carbon cycle? **<u>Biodiversity & Conservation</u>** 78.Explain any four causes of biodiversity losses (Evil quartet)? 79.What are the two basic strategies of biodiversity conservation? Explain briefly?	**<u>Application of Derivations</u>** 91. Verify mean value theorem (MVT), if i) f(x) = x^2-4x-3 in the internal [a, b], where a=1 and b=4. ii) f(x) = x^3-5x^2-3x on [1, 3] 92. Approximate $\sqrt{36.6}$ by using differential. 93. Using differentials, find the approximate value of $\sqrt{49.5}$ 94. Using differentials, find the approximate value of $(25)^{1/3}$ 95. Find two positive numbers x and y such that x + y = 60 and xy^3 is maximum.

34	16/04/2022	Sat	29	83.Show that a bar magnet is equivalent to a current carrying solenoid. 84.Distinguish between diamagnetic and paramagnetic materials. 85.Explain hysteresis.	**Chapter 16 – Chemistry in Everyday Life** 90.(a) Synthetic detergents cationic and anionic? (b) Cleaning action of soap and saponification? 91.What are antacids, anti histamines, tranquiliser, analgesics, antipyratics and antifertility with one example?	**<u>Environmental Issues</u>** 80. Describe the various devices employed to particulate air pollutants from the air? 81. Describe the working of electrostatic precipitator and scrubber?	96. Find two numbers whose product is 100 and whose sum is minimum. 97. Find two numbers whose sum is 24 and whose product is as large as possible. 98.Find two positive numbers whose sum is 15 and the sum of whose squares is minimum **<u>Differential Equations</u>** 99. Find the order and degree of the differential equation (D.E.) i) $\left(\frac{d^2y}{dx^2}\right)^2 + \cos\left(\frac{dy}{dx}\right) = 0$ ii) $xy\left(\frac{d^2y}{dx^2}\right)^2 + x\left(\frac{dy}{dx}\right)^2 - y\frac{dy}{dx} = 0$ iii) $\left(\frac{d^2y}{dx^2}\right)^3 + \left(\frac{dy}{dx}\right)^2 + \sin\left(\frac{dy}{dx}\right) + 1 = 0$ iv) $\left(\frac{d^3y}{dx^3}\right)^2 + \left(\frac{d^2y}{dx^2}\right)^3 + \left(\frac{dy}{dx}\right) + y = 0$ v) $\left(\frac{dy}{dx}\right)^2 + \frac{dy}{dx} - \sin^2 y = 0$ **<u>Linear Programs Problems</u>** 100. i) Define optimal solution of L.P.P. ii) Define linear objective function of L.P.P. iii) Define feasible region of L.P.P iv) Define objective function. v) Define corner point. 91. Solve graphically min and max. $z = 5x + 10y$ subject to $x + 2y \le 120$, $x + y \ge 60$, $x - 2y \ge 0$, $x, y, \ge 0$. 92. Min and max $z = x + 2y$, subject to $x + 2y \ge 100$, $2x - y \le 0$, $2x + y \le 200$, $x, y \ge 0$.
35	17/04/2022	**SUNDAY**					
36	18/04/2022	Mon	30	**Chapter 13 - Electromagnetic induction.** 86. State and explain lenz's law. 87. Deduce an expression for the emf induced across the ends of conducting rod moving in a perpendicular magnetic field. 88. Derive an expression for energy stored in an inductor. 89.Give the theory of AC generator.	92.Antibiotics, Antiseptic, disinfectant and anti microbials and example? 93.What are food preservatives, artificial sweetenings, and antioxidants with examples?	82.What is water pollution? Write a note on effects and control measures? 83.What is global warming? Write its causes and effects? 84.What is ozone depletion? Write its causes and effects?	93.Min and max, $z = 3x + 9y$ subject to the constraints $x + 3y \le 60$, $x + y \ge 10$ $x \le y$, $x \ge 0$, $y \ge 0$. 94.Page No. 514, Q. No. 2, 5, Page No. 509, Q. No. 1 Page No. 519 Q.No. 2 & 5
37	19/04/2022	Tue	**MATHEMATICS PREPARATN DAY – 1**				
38	20/04/2022	Wed	**MATHEMATICS PREPARATN DAY – 2**				
39	21/04/2022	Thu	**MATHEMATICS PREPARATN DAY - 3**				

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