



राजर्षी शाहू महाविद्यालय, लातूर
SCSS-Screening Test 2023
Syllabus

अभियांत्रिकी गट (**IIT** बॅच)

परिशिष्ट 'ब'

SHIV CHHATRAPATI SHIKSHAN SANSTHA, LATUR
SCREENING TEST - 2023
SYLLABUS

BASIC MATHEMATICS	
1	DISCOUNT & PERCENTAGE
	PROFIT & LOSS (PERCENTAGE BASED)
2	LOGARITHMS
	DEFINATION
	PROPERTIES OF LOGARITHMS
3	SPEED , TIME & WORK
4	S.I.UNITS AND SYMBOLS
5	SURFACE AREAS & VOLUMES
6	TRIGONOMETRIC RATIOS OF STANDARD ANGLES
7	PLANE GEOMETRY
	[CONCEPT OF LINE & ANGLES, CIRCLE, QUADRILATERALS AND TRIANGLE]
8	CO-ORDINATE GEOMETRY
	GRAPH OF LINE (CO-ORDINATE SYSTEM)
	COLLINEAR POINTS
9	ALGEBRIC IDENTITIES
	EXPANSION OF $(A+B)^2$, $(A-B)^2$, $(A+B)^3$, $(A-B)^3$, A^3-B^3 , A^3+B^3 & $(A+B+C)^2$

Physics

- 1. Force & Pressure :**
Contact & Non contact forces, Balanced & unbalanced forces, Inertia & Pressure, Pressure on solids & Liquids, Gas pressure & Atmospheric pressure, Archimedes Principle
- 2. Current Electricity & Magnetism :**
Current electricity, Electrostatic potential & Potential difference, electric cells & Their types, Connecting cells, Magnetic effect of electric current & their activities. Potential & potential difference, Potential difference & cell, Free electron & Electric current, Resistance & Ohm's law, Resistivity, Conduction & Insulators, Electric symbols, Resistor in series & parallel
- 3. Measurement & Effects of Heat :**
Sources of heat, Heat & Temperature, Thermometer, Specific heat & calorimeter, effects of heat, Expansion of solids, Liquids & Gases
- 4. Laws of Motion :**
Motion of an Object, Displacement & Distance, Speed & Velocity, Effects of speed & direction on Velocity, Uniform & Non-uniform Linear motion, Acceleration (+ ve, - ve & Zero acceleration), Distance-Time graph (Uniform & Non-uniform motion), Velocity-Time graph (Uniform Motion & Uniformly Accelerated Motion). Equation of motion using graphical method, Uniform circular motion, Newton's laws of motion (Ist, IInd & IIIrd), Momentum & Laws of Conservation of Momentum
- 5. Work & Energy :**
Work & Energy, Work & Units of Work, +ve, -ve & zero work, Energy, Kinetic energy & its expression, Potential energy & its expression, Transformation of energy, Law of conservation of energy, Free fall, Power
- 6. Reflection of light :**
Laws of Reflection & Their Activities, Regular & irregular reflection, Reflection of reflected light (Kaleidoscope, Periscope)
Mirror & types of mirror, Spherical mirrors & images formed by them, Magnification due to spherical mirrors.
- 7. Study of sounds :**
Production of sound, Propagation of sound & medium, Frequency of sound waves & Music, Sound Produced by Human & Loudspeaker
Sound waves, Velocity of sounds, Reflection of sound, Human ear, audible sound, Infra & ultra sounds
- 8. Gravitation :**
Gravitation, Circular Motion & Centripetal force, Kepler's law, Newton's universal law of gravitation, Acceleration due to gravitational force of the Earth, Free fall, Escape velocity
- 9. Effect of electric Current :**
Energy transfer in an electric current, Heating effects of electric current, Magnetic effect of electric current
- 10. Heat :**
Latent heat, Regelation, Anomalous behavior of water, Specific heat capacity, Dew point & Humidity
- 11. Refraction of light :**
Refraction of light, Laws of refraction, Refractive index, Dispersion of light,
- 12. Lens :**
Lenses, Ray diagram of refracted light, Sign convention, Working of human eye & lens, Defects of vision and their correction, use of lens,
- 13. Space mission :**
Space mission, Artificial satellites, Classification of artificial satellites, Orbits of artificial satellites, Satellites launcher vehicles, Space missions away from the earth.

Chemistry

1. **Inside the atom**

Types of substances, Dalton's atomic theory, Thomson's Plum pudding model of atom, Rutherford's nuclear model of atom and scattering experiment, Bohr's atomic model
Subatomic particles (e,p,n), Atomic number, mass number, isotopes and isobars, Electronic configuration of elements, Nuclear reactor.

2. **Composition of Matter :**

Characteristics of states of matter, Types of elements, types of compounds, types of mixture, true and colloidal solution molecular formula and valency, cross formula for writing chemical formula.

3. **Metals and Nonmetals:**

Physical properties of metals and non metals , chemical properties of metals and non metals , Uses of metals and non metals

4. **Pollution :**

Pollutants, Air Pollution, Green house effect, Acid rains, Water pollution, Prevention and control of pollution.

5. **Acids bases and salts :**

Introduction, Indicator, Effects of acid and bases on litmus paper, properties of acids and bases and neutralization.

Arrhenius theory of acids and bases, classification of acids and bases, concentration of acids and bases, pH of solution, universal indicator, Reaction of acids and bases with metals metal oxides, Carbonates and bicarbonates, Types of Salts, Crystallisation of water, Electrical conductivity of ionic compounds Electrolysis and electrolyses of water.

6. **Chemical Change and Chemical bond :**

Introduction, Natural and manmade chemical changes, Ionic bond, Covalent bond.

7. **Substances in common use :**

Importance of salts in daily life, NaCl, NaHCO₃, Na₂CO₃, CaOCl₂, Na₂CO₃, Soap
Nature of radioactive radiation. , Characteristics of α , β , γ rays. , Uses of radioactive isotopes, Some chemical substances in day to day life., Food colours and essences, Dye, Artificial Colours, Deodorant, Teflon, Powder Coating, Anodizing, Ceramic and Porcelain.

8. **Chemical Reaction and equations :**

Chemical reaction, Chemical Equation and balancing of chemical equation, Types of Chemical reactions, Exothermic and endothermic reactions, Factors affecting the rate of chemical reactions, Oxidation and reduction, Corrosion and Rancidity.

9. Metallurgy :

Reactivity series of metals, Ionic Compounds and Properties of ionic compounds , Basic Principles of Metallurgy, Conc of Ores, Gravitation Method, Magnetic Separation Method, Froth Floatation Method, Leaching.

Extraction of reactive Metals, Moderately.

Extraction of Aluminium

Refining of Metals.

Prevention of Corrosion.

10. Periodic Classification of elements :

Classification elements, Dobereiner's Triads, Newland's Law of Octaves, Mendeleev's Periodic table, Merits and demerits, Modern Periodic table and its structure, Groups, Periods and electronic configurations, Periodic trends in the modern periodic table, Valency, Atomic size, Metallic and Non metallic nature.

11. Study of Gas Laws :

Properties Of Gases, Liquids And Solids, Boyle'S Law, Charle'S Law, Gas Equation, Absolute Zero, Standard Temperature Scale , Pressure, N.T.P. And S.T.P.

12. Measurement of Matter (Mole Concept) :

Laws Of Chemical Combination, Atom - Shape, Mass, Valency, Molecular Mass, Atomic Mass, Formula Mass, Radicals, Ions, Mole Concept - Avogadro'S Number, Calculation Of Moles, Mass, Atoms, No. Of Particles.

13. Carbon Compounds

Valency, Catenation Of Carbon Formation Of Double And Triple Bond

Isomerism Including Single, Double And Triple Bond Homologous Series Of Alkane, Alkene, Alkyne And Relation With Molecular Mass.

Nomenclature Of Simple Compounds Having Functional Groups Including Double Bond And Triple Bond

Hydrocarbon, Method Of Preparation Of Alkane, Alkene And Alkyline And Chemical Properties And Uses Also.

Preparation Properties (Physical And Chemical Both) Of Alcohol (Ethanol) And Carboxylic Acid (Acetic Acid) Uses Of Alcohol And Acetic Acid.

Mathematics

1. **Number Theory :**
Real Numbers, H. C. F. and L. C. M
2. **Linear Equations :**
One variable linear equation, Two variable linear equation
3. **Polynomials :**
Zeros of polynomial, Remainder theorem, Factor theorem, Division of polynomial, Factorisation
4. **Quadratic Equations :**
Nature of Roots, Solution of Equations, Solution by factorisation, Relation between roots & coefficients of the equation, Cubic equations
5. **Expansion formulae :**
Algebraic identities
6. **Exponents & Powers :**
Square & Square root, Cube & cube roots, Indices & Surds
7. **Ratio & Proportion :**
Properties of ratio, Proportionality
8. **Arithmetic progression :**
Progression, N^{th} term of A.P., Sum of N term of an A.P., Geometric progression, N^{th} term of G. P. & Sum of G. P.
9. **Plane Geometry :**
Angles, Triangles, quadrilaterals, Circles, Parallel lines, Perpendicular lines, Intersecting lines
10. **Trigonometry :**
Trigonometric ratios, Values of trigonometric ratio, Trigonometric identities, Complementary angles, Heights & Distances, Supplimentary
11. **Mensuration :**
Area & Surface area, Volume of solid figures
12. **Coordinate Geometry :**
Distance Formula, Section formula, Area of triangle & collinearity, Slope of line & equation of line
13. **Probability :**
Classical definition of probability, Problems on dice, coin and playing card etc.
14. **Statistics :**
Mean, Mode, Median, Empirical relation between mean, median, mode
15. **Discount & commission :**
Profit & loss, Simple interest, Compound interest, Percentage calculation