

**Central Selection Committee- 2020**  
**Education (Higher) Department**  
**Govt. of Tripura**

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**Syllabus of the Diploma Engineering Entrance Examination – Tripura 2020**  
**(DEET 2020)**

**SECTION-I: MATHEMATICS**

Unit-I: Arithmetic

Real Numbers

Euclid's division lemma, the fundamental theorem of arithmetic – statement after illustrating and motivating through examples, proofs of irrationality of  $\sqrt{2}$ ,  $\sqrt{3}$ ,  $\sqrt{5}$ . decimal representation of rational numbers in terms of terminating, non-terminating, recurring decimals.

Unit-II: Algebra

Polynomials

zeros of a polynomial. relationship between zeros and co-efficients of quadratic polynomials. statement and simple problems on division algorithm for polynomials with real coefficients.

Pair of linear equations in two variables

Pair of linear equations in two variables and graphical method of their solution; consistency/inconsistency. algebraic conditions for number of solutions. solution of a pair of linear equations in two variables algebraically – by substitution, by elimination and by cross multiplication method. simple situational problems. Simple problems on equations reducible to linear equations.

Quadratic equations

Standard form of a quadratic equation  $ax^2 + bx + c = 0$  ( $a \neq 0$ ), solutions of quadratic equations (only real roots) by factorization, by completing the square and by using quadratic formula, relationships between discriminant and nature of roots, situational problems based on quadratic equations related to day to day activities to be incorporates.

Arithmetic progressions

Motivation for studying arithmetic progression, derivation of the  $n$ th term and sum of the first  $n$  terms of a.p. and their application in solving daily life problems.

Logarithm

logarithm of a real positive number with respect to a base ( $\neq 0,1$ ) laws of logarithm, simple problems involving logarithm.

Unit-III: Geometry

## Triangles, Circles

definitions, examples, counter examples of similar triangles.

### Unit IV: Trigonometry

#### 4.1 Introduction to trigonometry

Trigonometric ratios of an acute angle of a right angled triangle, proof of their existence (well defined), motivate the ratio whichever are defined at  $0^\circ$  and  $90^\circ$  values (with proofs) of the trigonometric ratios of  $30^\circ$ ,  $45^\circ$ , and  $60^\circ$ , relationships among the ratios.

#### 4.2 Trigonometric identities

Proofs and applications of the identities  $\sin^2 a + \cos^2 a = 1$  ;  $\sec^2 a = 1 + \tan^2 a$ ;  $\operatorname{cosec}^2 a =$

$1 + \cot^2 a$  only simple identities to be given, trigonometric ratios of complementary angles.

#### 4.3 Heights and distances

Introduction, line of sight, angles of elevation, angles of depression, simple problems on heights and distances, problems should not involve more than two right triangles, angles of elevation / depression should be only  $30^\circ$ ,  $45^\circ$ ,  $60^\circ$ .

### Unit-V: Mensuration

#### 5.1 Areas related to circles

Motivate the area of a circle, area of sector and segment of a circle, problems based on areas and perimeter / circumference of the above said plane figures (in calculating area of segment of a circle, problems should be restricted to central angle of  $60^\circ$ ,  $90^\circ$ , and  $120^\circ$  only. plane figures involving triangles, simple quadrilaterals and circle should be taken.)

#### 5.2 Surface areas and volumes

5.2.1 Surface areas and volumes of combinations of any two of the following: cubes, cuboids, spheres, hemispheres, and right circular cylinders, cones, frustum of a cone.

5.2.2 problems from real life situation such as converting one type of metallic solid into another, combination of solids( not more than two types), immersing a solid into a liquid contained in another solid, flow of water through a pipe, embankment.

### Unit-VI: Co-ordinate geometry

6.1 Introduction, concept of co-ordinate geometry, distance between two points, section formula, area of a triangle.

### Unit-VII: Statistics and probability

#### 7.1 Statistics

Mean, median and mode of grouped data (bimodal situation is to be avoided) cumulative frequency graph.

## **SECTION-II: SCIENCE/PHYSICAL SCIENCE**

### **Section-IIA: Physics**

#### Unit I: Force and Newton's laws

Force and Motion, Newton's Laws of Motion, Action and Reaction forces, Inertia of a body, Inertia and mass, Momentum, Force and Acceleration, Elementary idea of conservation of Momentum, Work done by a Force, Energy, power; Kinetic and Potential energy; Law of conservation of energy.

#### Unit II: Electricity

Electric current, potential difference and electric current, Ohm's law; Resistance, Resistivity, Factors on which the resistance of a conductor depends, Series combination of resistors, parallel combination of resistors and its applications in daily life, Heating effect of electric current and its applications in daily life, Electric power, Interrelation between P, V, I and R.

#### Unit III: Magnetic effects of Current

Magnetic field, field lines, field due to a current carrying conductor, field due to current carrying coil or solenoid; Force on current carrying conductor, Fleming's Left Hand Rule. Electromagnetic induction, Induced potential difference, Induced current. Fleming's Right Hand Rule, Direct current. Alternating current: frequency of AC. Advantage of AC over DC, Domestic electric circuits.

#### Unit IV: Light - Reflection and Refraction

Reflection of light by curved surfaces; Images formed by spherical mirrors, centre of curvature, principal axis, principal focus, focal length, mirror formula (Derivation not required), magnification, Refraction; Laws of refraction, refractive index. Refraction of light by spherical lens; Image formed by spherical lenses; Lens formula (Derivation not required); Magnification, Power of a lens; applications of spherical mirrors and lenses.

#### Unit V: Sound

Nature of sound and its propagation in various media, speed of sound, range of hearing in humans; ultrasound; reflection of sound; echo and SONAR. Structure of the Human Ear (Auditory aspect only)

#### Unit VI: Sources of Energy

Different forms of energy, conventional and non-conventional sources of energy: Fossil fuels, solar energy; biogas; wind, water and tidal energy; Nuclear energy, Renewable versus non-renewable sources of Energy.

### **Section-IIB: Chemistry**

#### Unit VII: Matter - Nature and Behaviour

Definition of matter; solid, liquid and gas; characteristics - shape, volume, density; change of state-melting (absorption of heat), freezing, evaporation (cooling by evaporation),

condensation, sublimation, Elements, compounds and mixtures, Heterogeneous and homogenous mixtures, colloids and suspensions. Atoms and molecules, Law of constant proportions, Atomic and molecular masses, Mole concept : Relationship of mole to mass of the particles and numbers, Electrons, protons and neutrons, valency, chemical formula of common compounds, Isotopes and Isobars.

#### Unit VIII: Chemical reactions

Chemical Equation, Balanced chemical equation, implications of a balanced chemical equation, types of chemical reactions: combination, decomposition, displacement, double displacement, precipitation, neutralization, oxidation and reduction.

#### Unit IX: Acids, Bases and Salts

Their definitions in terms of furnishing of  $H^+$  and  $OH^-$  ions, General properties, examples and uses, concept of pH scale (Definition relating to logarithm not required), importance of pH in everyday life; preparation and uses of sodium hydroxide, Bleaching powder, Baking soda, washing soda and Plaster of Paris.

#### Unit X: Metals and Non-metals

Properties of metals and non-metals, reactivity series, formation and properties of ionic compounds, basic metallurgical processes, corrosion and its prevention.

#### Unit XI: Carbon compounds

Covalent bonding in carbon compounds. Versatile nature of carbon. Homologous series. Nomenclature of carbon compounds containing functional groups (halogens, alcohol, ketones, aldehydes, alkanes and alkynes), difference between saturated hydrocarbons and unsaturated hydrocarbons. Chemical properties of carbon compounds (combustion, oxidation, addition and substitution reaction). Ethanol and Ethanoic acid (only properties and uses), soaps and detergents.

#### Unit XII: Periodic classification of elements

Need for classification, Modern Periodic table, Gradation in Properties, Valency, Atomic number, metallic and non-metallic properties.

### **SECTION-III: ENGLISH**

English Grammar -

Unit I: Tenses

Unit II: Modals

Unit III: Voice

Active voice, passive voice

Unit IV: Subject – verb concord

Unit V: Reporting/ Narration

Commands and requests, Statements, Questions etc.

Unit VI: Clauses:

Noun clauses, Adverb clauses, Relative clauses etc.

Unit VII: Parts of speech, Determiners

Unit VIII: Prepositions

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N.B.: For Diploma Engineering Entrance Examination-Tripura (DEEET) the learning stage/difficulty level of questions from the syllabus may be considered as per existing Class IX and Class X syllabus of TBSE and CBSE.

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