SYLLABUS FOR JUNIOR TECHNICAL SCHOOL LECTURER'S RECRUITMENT

SCIENCE – PM SUB: PHYSICS
1.Measurement,Units and dimensions:

- Fundamental and derived units, fundamental forces in nature, Measurement of longer distance objects like sun, planets etc, measurement of very small distances like size of atom , errors , types of errors, significant figures.

2.Magnetism:

- Magnetic field,properties of magnet, Biot-savart's law, Ampere's circuital law- applications, magnetic lines of force-properties. Solenoid , toroid, Cyclotron – applications, Force on current carrying conductors,Magnetic materials- types and examples. Electromagnets , factors affecting their strength, permanent magnets.

3.Current Electricity:

- Electric current, Drift velocity, mobility, Ohm's law, electrical resistance, resistivity, conductivity, electrical power. Carbon resistors , colour codes of carbon resistors, series and parallel combi9nation of resistors. Cell- Internal resistance, potential difference, emf , series and parallel combination. Kirchhoff's laws. Wheat stone bride, potentiometer, meter bridge principle and applications.

4.Dynamics:

Scalars and vectors meaning and examples, Displacement, Distance travelled, speed, velocity, acceleration units and problems. Newton's three laws of motion and illustrations. Inertia, Force, work, momentum units and problems. Circular motion-centripetal force, centrifugal reaction and applications. Position and displacement vectors, resolution of vectors, scalar and vector product of vectors.Friction , laws of friction, types of friction, factors affecting friction, methods of increasing and reducing friction. Centre of mass, momentum of force, torque, angular momentum. Equilibrium of rigid bodies,rotational motion, moment of inertia.

5.Gravitation & Rockets and artificial satellites :

Meaning, acceleration due to gravity, variation of acceleration due to gravity on the earth. Newton's law of gravitation. Weight, weightlessness

Principle, fuel, payload, Diff... ...stag... ...a...ch...g of ... ...t... ...se....
velocity, orbital velocity, communication satellites, geo-stationary
satellites. ISRO- programs, moon mission, MOM.

6.Thermodynamics.

- Heat and temperature meaning and differences. Different scales of measurement of temperature and inter conversions. Laws of thermodynamics, Isothermal and adiabatic process, reversible and irreversible process. Heat engines- different types, petrol and diesel engine, efficiency of heat engine- problems, refrigerators –principle and working

7.Optics:

- Properties of light,. Mirrors , different types of mirrors and image formation, mirror formula, uses. Lenses , image formation in different types of lenses at different object position, power of lens Uses. Refraction and dispersion of light through prism .Phenomenon and laws of reflection and refraction. Dispersion of light, scattering of light, total internal reflection, optical fibres –uses.Theories of light- Newton's corpuscular theory, Huygen's wave theory,Maxwell's electromagnetic wave theory, Max planck's quantum theory, dual nature of light.Raman effect, optical instruments : simple amd compound microscope, telescope, binoculars - magnifying powers. Polarisation –plane polarised light, polaroids and their uses.

8.Electromagnetic radiation:

- Meaning, examples, properties, uses of different electromagnetic radiations. Photo electric effect, experimental facts about pef, Einstein/s explanation and applications of Pef.Electromagnetic spectrum,

- Laser meaning , production, properties and uses.

9.Energy :

- Meaning different forms of energy, law of conservation of energy . Inter conversion of energy from one form to another form. Power, Kinetic energy and potential energy meaning , example and problems.

10. Electronics and communication system:

- Conductors, insulators and semiconductors meaning and examples. Energy bands in solids, Bias and types. Doping, dopants. p/n junction diode, transistor, LED, Photodiode, Solar cell, Zener diode, Construction of simple circuits, series and parallel combination of cells and bulbs. circuit symbols of components of circuits. Superconductors, Fuse. Logic gates(AND, OR, NOT, NOR, NAND). Radio broadcasting- receiver and transmitter, television broadcasting – transmitter and receiver, modulation, band width of transmission medium, propogation of electromagnetic waves in space. Telephone, Fax, Mobile, internet working and applications.

11. Oscillations and waves:

- Periodic motion –period, frequency, displacement. Simple harmonic motion - k e and p.e, free, forced and damped oscillations, resonance. Wave motion, Transverse and longitudinal waves,, Speed of wave motion. Sound waves, Echo's. Wavelength, period, frequency, amplitude of waves. Infrasonic and ultrasonic sound waves. Sonar, ultra sound scanner, their uses.

- Superposition of waves, reflection of waves, standing waves in strings and pipes, fundamental mode and harmonics , beats, Doppler effect.

12. Modern physics:

- Atom, constituents of atom and their properties. Atomic no, mass no, nuclear chain reaction, Nuclear fission , nuclear fusion and applications. Meaning , elements possess radioactivity, α-decay. β – decay and □-decay. Half-life and mean life period, problems. Isotopes, Isotones, Isobars with ex.Atomic models – Rutherfold's model, Bohr's model, Thomson model. Mass energy relation, mass defect, binding energy- problems.

13. Universe :

- Horizon, Geocentric system, solar centric system, Constellations, Zodiac constellations. Moon, different phases of moon. Formaton of eclipses. Solar system, facts about sun, planets and their satellites, asteroids, comets. Galaxy, types of galaxy, stars, life cycle of different mass stars, Quasars, Pulsars, Stellar luminosity, temp of stars. Hubble's law, bag bang theory.

SUB   : MATHEMATICS

Sl. No	Topic	Sub topics
1	**NUMBER SYSTEM**	a) Place value b) Expanded form c) Basic operation d) Simplification e) Natural, whole, integer, rational, irrational, and real numbers f) Square and cubic numbers g) Square and cube roots h) Playing with numbers i) HCF , LCM fundamental theorem of arithmetic.
2	**SURDS**	a) Definition b) Basic operation c) Simplification d) Binomial surds e) Rationalisation of surds
3	**SETS**	a) Properties b) Types c) Laws d) Venn diagram e) Cardinality of sets f) **Relations and functions**
4	**PROGRESSIONS**	a) Sequence and series b) AP, GP and HP c) Means
5	**COMMERCIAL MATHEMATICS**	a) Unitary method b) Percentage c) Profit and loss d) Brokerage e) Commission f) Simple interest g) Compound interest h) Discount i) Hire purchase and instalment buying.
6	**STATISTICS**	a) Class interval and types b) Graphical representation c) Measurement of central tendency d) Dispersion measures e) Co - efficient of variation
7	**PERMUTATION AND COMBINATION**	a) Meaning b) Formulae c) Fundamental counting principle d) Factorial notation

		COMBINATION	b) Formulae
			c) Fundamental counting principle
			d) Factorial notation
8		**PROBABILITY**	a) Meaning
			b) Types
			random experiments and events
			c) Types of events
			d) Addition rule
9		**BASIC CONCEPTS OF ALGEBRA**	a) Basic terms
			b) Types of polynomials
			c) Basic operations
			d) Special products
			e) Factorisation
			f) Identities
			g) Conditional identities
			h) HCF and LCM
10		**POLYNOMIALS**	a) Meaning and types
			b) Zeros of polynomials
			c) Division algorithm
			d) Remainder factor theorem
			e) Synthetic division theorem
11		**LINEAR EQUATIONS**	a) Linear equations
			b) Simultaneous linear equations
			c) Different methods of solving
12		**EXPONENTS**	a) Laws
			b) Problems
13		**QUADRATIC EQUATION**	a) Meaning and types
			b) Different methods of solving
			c) Descriminant
			d) Sum and product of roots
			e) Formation of quadratic equation
14		**VARIATION**	a) Meaning ant types
			b) Problem based on variation
15		**BASIC GEOMETRICAL IDEAS**	a) Basic definitions
			b) Axioms
			c) Postulates
			d) Statements
			e) Theorems
16		**TRIANGLES**	a) Meaning
			b) Types
			c) Properties
			d) Construction
			e) Area and perimeter
			f) Congruent and similar triangles
			g) Concurrent lines(*centroid, in centre, circumcentre and ortho centre*)
17		**QUADRILATERALS**	a) Meaning
			b) Types
			c) Properties

		d)	Construction
		e)	Area
		f)	Theorems
18	**PLOYGONS**	a)	Meaning
		b)	Types
		c)	properties
		d)	Theorems
		e)	Constructions
		f)	Problems
19	**CIRCLES**	a)	Definition
		b)	Terms and their meaning
		c)	Cyclic quadrilaterals
		d)	Chords and tangents
		e)	Theorems
		f)	Constructions
		g)	**Area of sector**
20	**MENSURATION**	a)	Plane figures
		b)	Solid figures
		c)	LSA and TSA of solid figures
		d)	Volume of solid figures(*cone, sphere, cylinder, frustum of cone, prisms, pyramids and combination of solids*)
21	**TRIGONOMETRY**	a)	Basic ratios
		b)	Identities
		c)	Standard angles
		d)	Complementary angles
		e)	Heights and distances
		f)	Problems
		g)	**allied angles**
22	**CO ORDINATE GEOMETRY**	a)	Ordered pair
		b)	Distance formula
		c)	Section formula
		d)	Slope
		e)	Equation of straight line
		f)	Slope intercept form
		g)	**Analytical treatment of parabola**
23	**SYMMETERY**	a)	Definition
		b)	Line of symmetry
		c)	Point of symmetry
24	**MATRICES**	a)	**Definitions**
		b)	**Types**
		c)	**determinants**

		d) Construction
		e) Area
		f) Theorems
18	**PLOYGONS**	a) Meaning b) Types c) properties d) Theorems e) Constructions f) Problems
19	**CIRCLES**	a) Definition b) Terms and their meaning c) Cyclic quadrilaterals d) Chords and tangents e) Theorems f) Constructions g) **Area of sector**
20	**MENSURATION**	a) Plane figures b) Solid figures c) LSA and TSA of solid figures d) Volume of solid figures(*cone, sphere, cylinder, frustum of cone, prisms, pyramids and combination of solids*)
21	**TRIGONOMETRY**	a) Basic ratios b) Identities c) Standard angles d) Complementary angles e) Heights and distances f) Problems g) **allied angles**
22	**CO ORDINATE GEOMETRY**	a) Ordered pair b) Distance formula c) Section formula d) Slope e) Equation of straight line f) Slope intercept form g) **Analytical treatment of parabola**
23	**SYMMETERY**	a) Definition b) Line of symmetry c) Point of symmetry
24	**MATRICES**	a) **Definitions** b) **Types** c) **determinants**