	d) Heat exchangers - types and use, Efficiency. Concept of LMTD and NTU method for parallel flow and counter flow heat exchangers - simple problems using LMTD method only. e) Laws of radiation, Heat exchange between surfaces - black and non-black surfaces, View factor- simple problems. f) Refrigeration cycles and system components, Choice of Refrigerants, Problems related to performance, COP of refrigeration system. g) Airconditioning - system components and general description. Comfort indices. Cooling load calculation using psychrometric chart. **7. Fluid Mechanics :** a) Newton's law of viscosity: statement and simple problems. b) Hydrostatic force on submerged flat plate - simple problems c) Flow parameter measurement - Manometer, Pitot tube, Weir, Venturi meter, Orifice meter – working principles and simple problems. d) Application of Bernoulli's principle in simple engineering systems. e) Head loss in pipe, Darcy - Weisbach equation, Friction factor as function of Reynolds number and relative roughness, Minor loss, Simple system head loss calculations f) Dimensional analysis - various dimensionless quantities, problems involving model tests and their use in prototype performance prediction. g) Different types of pumps and their applications, Concept of specific speed, System curve and Pump performance curves – operating point. **8. Power plant :** a) Thermal and Hydraulic Power plant components - description only. b) Different types of hydraulic and steam turbines and their areas of application. c) Modern High pressure, high duty boilers - description. d) I.D., F.D and balanced draft boilers – description and simple problems, Dust removal systems - description only. e) Heat balance, Station and plant heat rates, Plant load factor, Load curve; Station economics – simple problems.
MEDICAL SCIENCE :	
Paper – I :	Human Anatomy : Human Physiology : Biochemistry : Pathology : Microbiology : Pharmacology : Forensic Medicine and Toxology.
Paper – II :	General Medicine : General Surgery : Obstetrics and Gynaecology including Family Planning : Preventive and Social Medicine.
PHILOSOPHY :	
Paper – I :	<u>Problems of Philosophy (European and Indian)</u> 1. Plato and Aristotle : Ideas, Substance; Form and Matter; Causation; Actuality and Potentiality. 2. Rationalism (Descartes, Spinoza, Leibnitz) : Cartesian Method and Certain Knowledge; Substance; God; Determinism and Freedom. 3. Empiricism (Locke, Berkeley, Hume) : Theory of Knowledge; Substance and Qualities; Self and God; Scepticism. 4. Kant : Possibility of Synthetic a priori judgments; Space and Time; Categories. 5. Moore, Russell and Early Wittgenstein : Defence of Common sense; Refutation of Idealism; Logical Atomism; Picture Theory of Meaning. 6. Logical Positivism : Verification Theory of Meaning; Rejection of Metaphysics. 7. Cârvâka : Theory of Knowledge; Metaphysics and Ethics. 8. Jainism : Anekântavâda,; Saptabhanginaya. 9. Buddhism : Four Noble Truths; Pratîtyasamutpâda, Kşaṇikavâda, Nairâtmyavâda.

	10. Nyâya – Vaiśesika : Theory of Categories; Theory of Pramâna; Self; Theory of Causation; Atomistic Theory of Creation. 11. Sâmkhya : Prakŗti; Puruşa; Causation; Theory of Evolution. 12. Yoga : Citta; Cittavŗtti. 13. Mîmâmsâ : Epistemology; Theory of Validity. 14. Vedânta : Views of Śamkara and Râmânuja on Brahman; Îśvara; Âtman; Jîva; Jagat; Mâyâ; Avidyâ; Adhyâsa. 15. Swâmi Vivekânanda : Practical Vedânta. 16. Sri Aurobindo : Evolution; Involution; Integral Yoga. 17. Rabindranath Tagore: Nature of Man; Surplus in Man.
Paper – II :	<u>Socio – Political Philosophy and Psychology</u> 1. Social and Political Ideals : Equality, Justice, Liberty: Views of Mill, Locke, Rawls. 2. Individual and State : Rights, Duties and Accountability. 3. Political Ideologies : Anarchism, Marxism, Socialism and Democracy. 4. Humanism; Secularism; Multiculturalism. 5. Social Change : Gandhi, Ambedkar. 6. Mind – Body Problem : Dualism, Philosophical Behaviourism, Person Theory of Strawson. 7. Levels of Mind; Proofs for the existence of the unconscious; Freud's theory of dream, citta, cittavŗtti (Yoga). <u>Ethics and Philosophy of Religion</u> 8. Standards of Morality : Utilitarianism (Bentham and Mill), Deontological Theories. 9. Virtue Ethics : Aristotle. 10. Human Rights and Discrimination. 11. Feminism : Liberal and Radical. 12. Environmental Ethics : Bio-centric ethics and Eco-centric ethics. 13. Theories of Punishment; Capital Punishment. 14. Terrorism and Just war. 15. Indian Ethics : Puruşârtha, Concept of Liberation, Anuvrata and Mahâvrata (Jainism), Brahmavihâra (Buddhism). 16. Proofs for the existence of God : Descartes, St. Anselm, Naiyâyikas. 17. Religion without God, Religion and Morality. 18. Religious Pluralism. 19. Nature of Religious Language : Cognitive and Non-cognitive, Analogical and Symbolic.
PHYSIOLOGY :	
Paper – I :	**1. Biophysical Principles :** Definition and example of osmosis and buffers; Definition of pH. **2. Biochemical Principles :** Definition and chemistry of monosaccharides, oligosaccharides, polysaccharides, triglycerides, cholesterol, HDL, LDL, VLDL; amino acides, nucleotides. **3. Metabolism :** Glycolysis, TCA Cycle, β-oxidation, deamination, transamination. **4. Nutrition & Dietetics :** Definition of food groups, Balanced diet and ACU. Source, functions and deficiency symptoms of vitamin A, B_1, B_6, B_{12}, C, D, E, and Fe, Zn, Na, K, Ca, I. **5. Blood :** Formed elements of blood, functions of hemoglobin; plasma protein. ABO and Rh Blood groups. Overview of innate and acquired immunity. **6. Heart and circulation :** Properties of cardiac muscle, cardiac cycle, definition and determination of cardiac output, normal ECG waves. **7. Respiratory System :** Carriage of oxygen and carbondioxide, definition of lung volumes and capacities, hypoxia. **8. Renal Physiology :** Structure of nephron, formation of urine, non excretory functions of kidney.