BIOLOGICAL SCIENCES			
S. No.	**Name of laboratory**	**Area of Core Competency**	**Exportable R&D Services**
1.	**Centre for Cellular and Molecular Biology**	1. Biotechnology & biomedicine 2. Genetics & evolution 3. Cell biology & development 4. Molecular biology 5. Biochemistry & biophysics 6. Genomics 7. Bioinformatics	1. Novel assay system for screening of anti cancer drugs 2. Use of RNAi silencing technology
2.	**Institute for Genomics and Integrative Biology**	1. Immunology and molecular genetics of allergy including respiratory disorders 2. Genomics and molecular medicine 3. Nucleic acid and peptides 4. Genome Informatics (in-silico biology) 5. Gene expression, proteomics and structural biology	1. Sequencing services (for DNA and protein) 2. Genotyping services 3. MALDI TOF services 4.Primer design and synthesis 5. Gene chip and micro array analysis services
		6. Environmental biotechnology enzymes and simple diagnostics	6. Short Term courses in Bio-informatics 7. R&D consultancy services in biotechnology 8. IPR services involving customized prior art searches and patent drafting in genomics, proteonics and molecular genetics

3.	**Institute of Himalayan Bioresource Technology**	1. Tea sciences	1. Training i. Processing, evaluation and testing of natural products ii. Genomics, proteomics and development of transgenic plants iii. Viral diagnostics in plants iv. Pesticide residue analysis v. Survey and mapping in GIS environment vi. Tea husbandry, tea manufacture and development of diversified products
		2. Plant biotechnology	2. Testing and evaluation i. Evaluation of marker compounds of medicinal and aromatic plants ii. Quality evaluation of essential oils iii. Viral diagnosis in ornamental plants. iv. Pesticide residue analysis v. Soil analysis with respect to tea
		3. Floriculture	3. Turn Key projects i.Essential oil extraction ii.Production of steviosides iii.Establishment of tissue culture units iv.Rejuvination of abandoned tea gardens v.Value addition to herbals
		4. Natural Plant products	4. Survey of plant resources
		5. Biodiversity	5. Consultancy in i. Project formulation and feasibility reports ii. Database on bioresources

			iii. DNA fingerprinting of plant genetic resources iv. Cryopresevation of seed and plant tissues v. Floriculture vi. Setting up of tissue culture labs vii. Tea husbandry and quality tea manufacture viii. Value addition to herbals
		1. Technology transfer	6. Design Development of: i. Design of distillation unit for processing of aromatics and herbals ii. Implements for mechanization of tea farm operations
			7. Product development of : i.SOD and other stress tolerant genes ii.neutraceuticals iii.viral diagnosis kits iv.stevioside production v.diversified tea products
			8. Process development of : i. marker compounds from medicinal and aromatic plants and their identifications and evaluation ii.flavoring molecules iii.natural dyes and colors iv.preparation of β-aescin v.micropropagation of economically important plants and Protocol thereof. vi. transgenic plants and Protocol thereof.

4.	**Indian Institute of Chemical Biology**	1. Biotechnology 2. Synthetic, biophysical and natural products chemistry 3. Drug design & development and molecular modelling 4. Human genetics and genomics 5. Immunology 6. Infectious disease 7. Cellular physiology	1. Custom synthesis of organic molecules 2. Extraction and characterization of natural products 3. In vitro and in vivo testing (preclinical level) for diseases such as asthma, leukemia, type I & II diabetes, gastric ulcers, neurodegenerative diseases, narcotic addiction, infectious disease (leishmaniasis and cholera), as well as immunomodulators, antioxidants, antifertility agents, etc. 4. Diagnostics kits development & validation
5.	**Central Drug Research Institute**	1. Malaria filariasis, leishmaniasis 2. Reproductive healthcare 3. Cardiovascular, central nervous system and other disorders 4. Technology development (chemical technology, fermentation technology and pharmaceutical technology)	1. Analytical services of samples (synthetic, plants, marine) 2. Supply of cultures 3. Biological screening of samples 4. Regulatory pharmacology and toxicological studies
		5. Biological screening, clinical trials, pharmacokinetic studies 6. Regulatory pharmacology and toxicology	5. Supply of animals for experimentation 6. Supply of literature, information related to drugs and pharmaceuticals 7. Training to academia, industrial staffs (Indian as well as foreigners) and R&D institutions

6.	**Central Institute of Medicinal and Aromatic Plants**	1. Agrotechnology, variety development and improvement of medicinal and aromatic plants 2. Process, product development and value addition of medical and aromatic plants	1. Training for cultivation practices and processing technologies of medicinal and aromatic plants; advance biotechnology tools and techniques including genomics and plant tissue culture quality analysis and instrumentation; and bioinformatics. 2. Testing and evaluation: specialized testing, calibration and certification – based on compliance to the quality standards meeting ISO / IEC guide – 25 and EN-4500 criteria (CIMAP has been accredited by national accreditation board for testing and calibration laboratories, government of India in 1999 for biological and chemical testing.)
		3. Collection, Conservation and characterization of medicinal and aromatic plants 4. Quality Evaluation – phytochemicals, aroma chemicals and essential oils analyses	3. Consultancy i. Feasibility reports (technical-economic) on medicinal and aromatic plants cultivation practices and processing technologies. ii. Fabrication and installation of field distillation units for essential oil crops. iii. DNA fingerprinting and germplasm evaluation. iv. Organic farming and certification v. Biological activity testing 4. IPR Services: involving customised prior art searches and patent drafting related to plant varieties and natural products of medicinal and aromatic plants 5. Process technologies of medicinal and aromatic plants.

			6. Distillation units upto 1 ton capacity meeting specific requirements for crops like geranium, rose, lemongrass, palmarosa, citronella, mint etc. on turnkey basis. 7. Product development for plant variety and chemotype development, herbal formulations and semi-synthetic phytomolecules and derivatives for drug development as sponsored/contract projects.
			8: Process development i. Agrotechnology for specific crops & agroclimates ii. Distillation of essential oils & fractionation of high value isolates & monoterpenes iii. Extraction, phytomolecule isolation & purification iv. Semi-synthetic derivatization of phytomolecules v. Bioactivity evaluation (in-vitro & in-vivo) vi. DNA fingerprinting for authentication of plant materials vii. Marker development for quality validation
7.	**National Botanical Research Institute**	1. Plant biodiversity & conservation biology	1. Training i. Biodiesel, bioenergy, biofuel ii. Phytoremediation iii. Neem iv. Pharmacognostical, phytochemical and ethnopharmacological identification of botanicals v. Survey, inventorying, documentation and biodiversity assessment, herbarium

			techniques and curation vi. Methods & approaches in plant taxonomy vii. Floriculture viii. Plant tissue culture
		2. Biomass biology & environmental sciences	2. Testing and evaluation i. Biodiesel, bioenergy, biofuel Phytoremediation ii. Neem iii. Biodiversity iv. Pharmacognostical, phytochemical and Ethnopharmacological identification of botanicals, standardization, QC, GLP's, GCP's, GMP's of herbal drugs, compound formulations
		3. Genetics and plant breeding & agrotechnology	3. Consultancy services i. Biodiesel, bioenergy, biofuel ii. Phytoremediation iii. Biodiversity iv. Pharmacognostical, phytochemical and Ethnopharmacological identification of botanicals, standardization, QC, GLP's, GCP's, GMP's of herbal drugs, compound formulations v. Medicinal and aromatic plants (Ex-situ conservation, Cultivation and post harvesting processing, organic cultivation techniques) vi. Floriculture vii. Plant tissue culture

		4. Bioinformatics	4. Contract / Sponsored research : i. Design development for QC, standardization development of novel herbal products ii. Process Development for phytoremediation, floriculture and plant tissue culture iii. Product development for neem, floriculture and pharmaceutical, cosmaceutical and nutraceutical
		5. Molecular biology & genetic engineering	5. Surveys and epidemiological studies a. Pharmacognostical, phytochemical and Ethnopharmacological identification of botanicals, standardization, QC, GLP's, GCP's, GMP's of herbal drugs, compound formulations b. Air pollution monitoring and management studies c. Study of biology of greenhouse gas emission from croplands and wetlands d. Water pollution monitoring and management e. Bioremediation and bio-utilisation of Industrial wastes

		6. Pharmacognosy & ethnopharmacology 7. Phytochemistry 8. Botanic garden & floriculture 9. Plant conservation & eco-education 10. Biotechnology & plant physiology	6. Turn key projects i. Hi-Tech low cost nursery ii. Herbal beer iii. Herbal lipstick 7.Technology Transfer: i. Plant Tissue culture ii. Plant growth promoting bacterial inoculants iii. Bt cotton for insect resistance iv. Floriculture plant tissue culture
8.	**Institute of Microbial Technology**	1. Molecular biology and microbial genetics 2. Protein science and engineering 3. Cell biology 4. Fermentation technology and applied microbiology	1. Contract research including consultancy in the area of microbial technology 2. Space to set-up business incubators 3. Fermentation support including scale up and down stream processing 4. High end training in the areas of bioinformatics, bio processing, strain isolation and characterization

9.	**Regional Research Laboratory, Jammu Tawi**	1. Prospecting biodiversity for its chemistry and bioactivity 2. Development of the bio enhancers of the plant origin 3. Cultivation, processing, improvement, conservation, and standardization of agro technologies of medicinal and aromatic plants 4. Prospecting biodiversity (plant and microbial) of North – west Himalayas	1. Screening of enzymes 2. Fermentation facility of RRL 3. Screening of plants and fractions thereof for specific biological activities 4. Standardization of herbal formulation and their quality control 5. Quality control assurance and analysis of drugs, pharmaceuticals minerals, coal, water etc. 6. Up scaling of lab processes using chemical engineering facilities.
10.	**Indian Toxicology Research Centre**	1. Toxicological studies of petroleum products and chemicals	1. Health and environmental monitoring a. Epidemiological surveys / studies on occupational diseases in industrial workers with remedial measures b. Survey for adulteration and contamination of food material c. Environmental & air monitoring studies d. Monitoring of noise level in industrial environmental and residential areas e. Environmental and ecotoxicological impact assessment studies
		2. Human exposure risk to food, agro-chemicals and mineral fibers	2. Analysis of pollutants i. Quality assurance studies for purity of herbal raw drugs and presence of contaminants ii. Analysis of residues of pesticides and metals in biological and environmental samples iii. Waste water analysis from industries

			iv. Analysis of serum samples of protein malnourished children for their anti-oxidant status i.e. SOD, glutathione peroxide total thiol content and TBARS levels
		3. Neurotoxicity and cardiotoxicity of pyrethroids, quinalphos, and organochlorines: mechanism and bio-makers	3. Safety evaluation i. Safety evaluation of drinking water and packaged water ii. Safety evaluation of agrochemicals dyes, food additives, plastics and polymers, petrochemicals, detergents, fibres and particulate matter iii. Long term toxicity studies for neurological, reproductive, tetratogenic, mutagenic, carcinogenic and phototoxic evaluation iv. Safety evaluation of herbal products
		4. Effects of pollutants on bio-diversity and environmental detoxification 5. Toxicocity evaluation, monitoring of pollutants and development of mathematical models for prediction of fate of chemicals in environmental compartments 6. Toxicity of inhaled vapours, aerosols and particulates	4. Disposal of wastes i. Microbial conversion of liquid wastes to commodities ii. Biodegradation of persistent pesticide iii. Bioremediation of contaminated sites

11.	**Central Food Technology Research Institute**	1. Post – harvest technology 2. Food biotechnology 3. Traditional foods 4. Natural food additives 5. Food safety 6. Food microbiology 7. Genetically modified foods and nutrigenomics	1. Analysis of food samples 2. Technology transfer in the field of food technology 3. Training and human resource development in the field of food technology

CHEMICAL SCIENCES			
S. No.	**Name of laboratory**	**Area of Core Competency**	**Exportable R&D Services**
1.	**Central Electro Chemical Research Institute**	1. Corrosion Science and Engineering 2. Electrochemical Power Sources 3. Metal Finishing 4. Metallurgy 5. Electrodics and Electro catalysis 6. Electrochemical material science 7. Pollution control 8. Electro chemicals	1. Consultancy, sponsored (contract) projects and technical services in corrosion, electrochemical power sources, metal finishing, metallurgy, electrodics and electro catalysis. 2. Consultancy is pollution control in electrochemical process 3. Process Know how for electrochemical and electro-chemical materials 4. Training programmes and academic courses in electrochemical sciences and corrosion engineering
2.	**Central Salt & Marine Chemicals Research Institute**	1. Salt and marine chemicals 2. Specialty inorganic chemicals and catalysis 3. Analytical sciences in the areas of salt and marine chemicals 4. Membrane science and technology 5. Sea-weeds (cultivation and products) chemicals 6. Desert economic and halophytic plants (waste land development) 7. Process design, engineering in the areas of salt and marine chemicals	1. Design and layout of solar salt works 2. Design installation and commissioning of salt washery and refinery 3. Process know how for marine chemicals such as bromine, potash and magnesia 4. Process know how for speciality inorganic chemicals such as precipitated silica and calcium carbonate, calcium silicate, organo clay, zeolite etc. 5. Process know how for sea weed cultivation (gelidiella, gracilaria, eucheuma), algal chemicals such as agar agar, sodium alginate, bacteriological agar, kappa-carrageenan, liquid sea weed fertilizer etc. 6. Process know how for cultivation of salt tolerant plants, plantation in wasteland such as jatropha, salicornia, jojoba and value addition such as herbal salt 7. Process know how for desalination of

			brackish and seawater by membrane processes, RO for water treatment (sewage water) 8. Process know how for ion-exchange resins for removal of arsenic and fluoride from contaminated water. 9. Environment audit and environment impact assessment studies. 10. Know how for solar Stills (for distilled water and also for drinking water in very remote areas)
3.	**Central Leather Research Institute**	1. Leather process technology 2. Leather chemicals and auxiliaries 3. Products: leather technology 4. Environmental technologies for leather 5. Biological sciences for leather 6. Engineering area for leather 7. Nuclear magnetic resonance: leather technology 8. Human resource development: leather technology	1. Training – leather and allied area 2. Testing and evaluation –material testing, chemical analysis, testing for eco-testing, physical testing. 3. Consultancy and technical services for leather processing, shoe design, and construction, leather apparels/ accessories development, environmental technology, Industrial safety and Risk assessment, chemical engineering, leather economics 4. Surveys and epidemiological studies– techno – economic surveys in the leather field. 5. Technology transfer in leather technology. 6. Turn key projects in leather technology 7. Contract / sponsored research in the areas of leather technology

4.	**Indian Institute of Chemical Technology**	1. Organic chemistry 2. Natural product chemistry 3. Nano technology 4. Catalysis 5. Lipid chemistry 6. Novel drug delivery systems 7. Process design & engineering	1. Basic research work in the area of chemical technology 2. Process development in the area of chemical technology 3. Product development in the area of chemical technology 4. Process up gradation in the area of chemical technology
			5. Alternate process pathways in the area of chemical technology 6. Technology transfer in the area of chemical technology 7. Analytical services in the area of chemical technology 8. Evaluation and characterization in the area of chemical technology
5.	**Indian Institute of Petroleum Technology**	1. Refining technology 2. Conversion process in petroleum technology 3. Chemical and biotechnology 4. Analytical sciences in petroleum technology 5. Petroleum products application	1. Evaluation of crude oils 2. Evaluation (Pilot / lab scale) of catalysts for petroleum refinery processes 3. Analytical services for petroleum industry 4. Performance evaluation of fuels, lubes, additives on IC engines including field trials 5.Technology forecasting and assessment in the area of petroleum technology 6. Assistance in technology selection and process know how in the area of petroleum technology 7. Preparation of project profiles / reports in the area of petroleum technology

			8. Techno – economic feasibility studies in the area of petroleum technology 9. Process improvement and revamping in the area of petroleum technology 10. Process design and scale up in the area of petroleum technology
			11. Training of personnel in the area of petroleum technology 12. Information sourcing and services in the area of petroleum technology 13. Process simulation and modelling in the area of petroleum technology 14. Process integration and APC in the area of petroleum technology 15. Problem identification and solution in the area of petroleum technology
6.	**National Chemical Laboratory**	1. Catalysis 2. Biochemical science 3. Organic chemistry 4. Polymer science and engineering	1. Contract Research in chemical sciences 2. Process development and consultancy services in chemical sciences 3. Technical services in chemical sciences 4. Testing and analysis in chemical sciences
		5. Physical and materials chemistry 6. Chemical engineering science	
7.	**Regional Research Laboratory, Jorhat**	1. Agrotechnology 2. Biotechnology / bioscience 3. Environmental science	2. Expert services in survey and scientific analysis of natural products based on medicinal and aromatic plant 3. Seismic surveillance with high efficiency as part of international studies 4. Survey and utilization of valuable minerals

		4. Geoscience	5. Testing / analysis of building materials minerals, petroleum products, food products, water and soil
		5. Engineering science	5. Process development and consultancy service in chemical sciences
		6. Chemical science	

PHYSICAL AND INFORMATION SCIENCES			
S. No.	**Name of laboratory**	**Area of Core Competency**	**Exportable R&D Services**
1.	**National Physical Laboratory, New Delhi**	1. Measurement standards 2. Materials science 3. Materials characterization 4. Radio & atmospheric science 5. Superconductivity & cryogenics	1.International calibration services 2.Training Services in the area of calibration
2.	**National Institute for Science, Technology and Developmental Studies**	1.Globalization and development policy studies 2.Focus on ecology and economic development studies 3.Innovation & knowledge society studies 4.Technology & integrated assistance to rural artisans studies 5.Science-technology-education valuation studies 6.History & philosophy of science / public awareness of science studies	1. Scientometrics studies 2. Knowledge management studies 3. Geographical information system (GIS) studies 4. Technological change and Innovation studies 5. Rural development studies

3.	**National Institute of Science Communication and Information Resources**	1.Science writing and science editing 2.Database creation, and management, patent search, and traditional knowledge protection system 3.Graphic art and designing 4. Training library professionals	1. Science writing and science editing 2. Database creation and management, patent search, and traditional knowledge protection system 3. Training to library and information professionals 4.Science writing and science editing
4.	**National Institute of Oceanography**	1. Biogeochemistry and ecosystems of marine environments 2. Drugs and chemicals from the sea 3. Instrumentation and engineering for oceanographic research 4. Marine archaeology	1. Oceanographic surveys 2. Training of scientific manpower in different fields of ocean sciences 3. Consultancy / sponsored projects in the area of oceanography
5.	**National Geophysical Research Institute**	1. Hydrocarbon exploration 2. Mineral exploration and engineering geophysics 3. Groundwater exploration, assessment and management 4. Earthquake hazard assessment 5. Lithospheric studies 6. Geo – environment studies 7. Geophysical instrumentation	1. Seismic reflection / refraction surveys for mineral exploration (hydrocarbon) 2. High resolution seismic surveys for coal explorations 3. Acromagnetic studies for mineral exploration (diamonds) 4. Groundwater management and recharge studies 5. Magneto –telluric studies for geothermal resources and mineral exploration 6. Integrated geophysical surveys for oil and minerals

6.	**Central Scientific Instruments Organization**	1. Agri – electronic instrumentation 2. Environmental monitoring instrumentation 3. Instrumentation for energy management 4. Instrumentation for geo-science and disaster mitigation 5. Instrumentation for strategic and defense application 6. Medical Instrumentation 7. Optics and opto-electronics 8. MEMS sensors for diverse applications 9. Biomolecular electronics and nanotechnology	2. Research, design and development of scientific & industrial instruments, components and system 3. Service & maintenance of instruments / components 4. Human resource development in the area instrumentation 4. Technical assistance to industry in the area of Instrumentation
7.	**Central Electronic & Electrical Engineering Research Institute**	1. Silicon based semiconductor devices and processes 2. III-V Compound Semiconductor based devices and Processes 3. Very large scale Integrated circuit designs	1. Consultancy services for device design & prototype development of silicon based semiconductor devices, VLSI, MEMS, micro sensors, hybrid microcircuits, electron tubes and related technologies. 2. Consultancy services for device design & prototype development services and customized services in process control instrumentation, speech technology, power electronic systems 3. Mask making services for VLSI

		4. MEMS and micro sensors	4. Advanced courses in the area of VLSI design, silicon devices, MEMS, compound semiconductor Devices, industrial process control instrumentation, power electronics and electron tubes and related technologies
		5. Hybrid Micro-circuits	
		6. Speech technology	
		7. Power electronic systems	
		8. Electron tubes	

ENGINEERING SCIENCES			
S. No.	**Name of laboratory**	**Area of Core Competency**	**Exportable R&D Services**
1.	**National Environmental Engineering Research Institute**	1. Environmental impact assessment 2. Environmental system design 3. Environmental audit & risk 4. Wastewater management	1. Environmental impact assessment 2. Wastewater treatment
2.	**National Metallurgy Laboratory**	1. Mineral processing and engineering 2. Ferrous and non-ferrous Metal Extraction 3. Material characterization and evaluation 4. Metal casting and forming 5. Refractories and Advanced ceramics 6. Corrosion protection of metals / materials 7. Process modeling and simulation 8. SRM and hall marking	1. Analysis and testing of metallography structure 2. Heat Treatment and hardness Tests 3. Chemical analysis of metal, mineral and alloys 4. Corrosion tests 5. Physical tests 6. Magnetic material testing 7. Mechanical tests 8. Tensile tests 9. Compression tests 10. Torsion tests 11. Transverse tests 12. Bend tests 13. Ductility tests 14. Wear tests 15. Creep tests 16. Refractories test 17. Iron ores and coal samples 18. Testing of bentonite

			19. Testing of molding sands 20. Evaluation of dextrine or other cellustic material as foundry biner 21. Know how for laboratory scale mineral processing plants 22. Pilot plant scale investigation of metallurgical process 23. Material testing and characterization
3.	**Regional Research Laboratory, Tiruvananthapuram**	1. Agrotechnology 2. Environmental engineering 3. Building materials	1. Fresh spice processing and oil seeds processing- turn key packages 2. High Tech building and ceramic materials 3. Odour control and sanitation devices for effluents
4.	**Regional Research Laboratory, Bhubaneshwar**	1. Minerals processing and engineering 2. Extractive metallurgy 3. Energy and environment management 4. Bioresources management	1. Process development to beneficiate low grade ores and minerals for their effective utilization 2. Process development to recover values from waste and byproducts from mineral and metallurgical industries 3. Expert evaluation / consultancy of the existing process / plants 4. Improving the performance of existing mineral beneficiation plants 5. Development of process know how for extractive metallurgy, smelting of ore (ferrous and non-ferrous)

5.	**Regional Research Laboratory, Bhopal**	1. Metal matrix composites 2. Agrotechnology 3. Building materials	1. Synthesis of aluminium particles composites using certification processes 2. Characterization of composite material in terms of particle distribution and interface investigation 3. Wear of composite material and ascertain the mechanism of material removal 4. Wear of composite material and ascertain the mechanism of material removal 5. Development of prototype component using aluminium composite 6. Appropriate surface modification techniques that can be applied on agricultural and mining components based on its present material and nature of exposure during service 7. Optimization of surface modification techniques / parameters 8. Metallurgical characterization of metallic components
			9. Development and performance evaluation of industrial wastes based wood substitute products, coating materials, bricks and blocks and natural fiber based composites 10. Bulk utilization of fly ash in converting wasteland into agriculturally productive land

6.	**National Aeronautical Laboratory**	1. Aerospace vehicle aerodynamics 2. Design and fabrication of complex wind tunnel models using advance composites 3. Wind tunnel testing of aerospace vehicles 4. Ground vibration testing of full airframe structures 5. Testing of aerospace structures in the acoustic test facility 6. Software for computational fluid dynamics (on sequential and parallel computing machines) 7. Evaluation and characterization of materials for fatigue and fracture	1. Aerospace vehicle aerodynamics 2. Design and fabrication of complex wind tunnel models using advanced composites 3. Wind tunnel testing of aerospace vehicles 4. Ground vibration testing of full airframe structures 5. Testing of aerospace structures in the acoustic test facility 6. Software for computational fluid dynamics (on sequential and parallel computing machines) 7. Evaluation of materials for fatigue and fracture
		8. Evaluation of structural integrity of airframe and other structural components 9. Testing and optimization of compressor and turbine blade profiles using cascade tunnel 10. Design and development of composite materials and structures including smart materials 11. Failures analysis and accident investigation 12. FOQA avionics software 13. Control law	8. Evaluation of structural integrity of airframe and other structural components 9. Testing and optimization of compressor and turbine blade profiles using cascade tunnel 10. Design and development of composite materials and structures 11. Failure analysis and accident investigation

7.	**Structural Engineering Research Center**	1. Wind engineering, Field experimentation and structural dynamics	1. Design and development including software development and laboratory based and field experiments / testing including prototype testing as contract research for: i. Improvement to structural design of steel / concrete structures with special reference to natural hazards such as wind, earthquake and such disaster prevention and to withstand the effects and vagaries of nature. ii. Guidelines and improvement / strengthening codal provisions with regard to steel structures with reference to transmission line towers, wind mill turbines
		2. Fatigue and fracture, Experimental Mechanics and Shock and vibration	2. Product development as contract research for: i. New materials (cement based) improvements to existing materials and improved use of the available materials for enhanced durability. ii. Supplementary cementitious materials, viz fly ash, ground granulated blast furnace slag, silica fume; iii. Concrete compositions viz ferro cement, fibre reinforced concrete iv. Application of cement based new materials supplementary cementitious materials and concrete compositions for repair / retrofitting of disturbed concrete structures v. Fibre reinforced plastic for special applications.

		3. Steel structures, transmission line towers and other steel skeletal structures	3. Process development as contract research for: i. Prefabricated construction materials and new form of construction and prefabricated elements and structures, self compacting / consolidating concrete etc. ii. Conditional assessment / life extension of structures
		4. Computer aided analysis and design of structures and software development 5. Concrete composites and materials and reinforced concrete structures 6. Construction engineering and prestressed concrete structures	
8.	**Central Road Research Institute**	1. Pavement engineering and materials	1. Training in the areas of i. Highway design model (HDM) of the World Bank for economic & financial evaluation of highway projects. ii. Design, quality control and preparation of detailed project reports for highways iii. Sub-soil investigation and design of substructures. iv. Zonation of landslides and corrective measures. v. Traffic engineering and management for the city engineers and traffic managers including traffic police. vi. Transportation planning including the methods of travel demand estimation,

			analysis of transport systems characteristics and capabilities. vii. Environmental impact assessment (EIA) of highway projects. viii. Feasibility study of highway projects. ix. Road safety Audit (RSA) procedures to field engineers.
		2. Geotechnical engineering 3. Bridge and instrument engineering	2. Testing and evaluation of: i. Highway materials, pavements etc. including airfield pavements. ii. Traffic signs and road marking materials iii. Elasto-meric bearing iv. Coding on steel bearing 3. Consultancy services for: i. Preparation of transportation plans for urban and regional context ii. Preparation of traffic systems management plans iii. Conduct of road safety audit iv. Preparation of Road Safety management (RSM) plans v. Preparation of detailed techno-economic feasibility study reports related to road transportation vi. Preparation of Detailed Project Reports (DPR) for road research and transportation vii. Application of geo-synthesics and ground improvement techniques viii. Long term performance monitoring of bridges ix. Aerodynamic studies of towers and bridges

		4. Traffic and Transportation 5. Engineering including Safety and Environment 6. Road Planning and Management	x. Preparation of Environmental Impact Assessment (EIA) reports for highways and road transportation xi. Sub-soil investigation and design of foundations xii. Landslide investigations and corrections xiii. Development of pavement management systems xiv. Bridge ratings and evaluation 4. IPR Services in the areas of road research: Guidance in protecting the IPR and commercialization of IP 5. Technology transfer in i. Transportation planning ii. Land slide corrections iii. Techniques of conducting traffic studies 6. Turn key projects in i. Transportation planning and development ii. Highway design and development iii. Preparation of DPR and its implementation for highways and road transportation 7. Contract R&D for: i. Traffic engineering and management ii. Pavement design and management iii. Bridge design and management iv. Instrumentation of highways and bridges v. Investigations of land slides and corrections

9.	**Central Mechanical Engineering Research Institute**	1. Robotics & mechatronics 2. Heat power engineering 3. Advance manufacturing technology 4. Rapid prototyping & tooling 5. Farm machinery & post harvest technology 6. Life enhancement studies	1. Post harvest technology for drying of grain 2. Residual life assessment studies of mechanical systems 3. Industrial component development 4. Computer aided design analysis
10.	**Central Buildings Research Institute**	1. Shelter planning 2. New material	1. Advisory consultancy for: i. Housing and planning ii. Urban and rural buildings ii. Educational and health care buildings, v. Building materials and constructional technologies for rural and hilly areas; v. Sustainable development of hilly towns vi. Space norms and design guidelines for buildings in hilly areas ii. Building physics – illumination, thermal comfort, ventilation, acoustics, driving rain studies etc. 2. Testing and evaluations services for: i. Organic building material ii. Cement lime and clay products ii. Pollution mitigation in brick and lime industries, waste recycling v. Development of environment friendly termite control pesticides v. Structural and building components out of new / waste material vi. Fire retardant materials.

		3. Structure and foundation 4. Disaster mitigation 5. Process development	3. Structural analysis and design i. Construction technology, ii. Rehabilitation of distress structures iii. Concrete technology iv. Geo technological engineering – pile foundation v. Strengthening of weak soils for foundation and other foundation related problems vi. Landslide mitigation vii. Slope stability viii. Rock mechanics. 4. Sponsored studies for: i. Building dynamics ii. Earthquake mitigation – earthquake resistant construction iii. Retrofitting and rehabilitation of earthquake damaged buildings iv. Studies on strong motion seismic instrumentation v. Pre and post disaster management with reference to cyclones vi. Landslides vii. Fire hazards viii. Fire resistance systems ix. Fire spreading modeling and simulations.
11.	**Central Fuel Research Institute**	1. Resource quality assessment	1. Resource quality assessment of coal and its characterization 2. Surveys of energy (coal) resources

		2. Coal preparation	3. Full scale washability studies of coal and interpretation of results including sampling of coarse and fine coals standardization of auto sampler for quality monitoring of washed product 4. Lab/ bench/ pilot scale investigations by various techniques on the beneficiation of coarse, small and fine coals 5. Process know-how for the beneficiation of coking and non-coking coals 6. Performance evaluation and technical audit of washeries.
		3. Coal carbonization	7. Testing and characterisation 8. process know how for i. Briqutting ii. Active carbon iii. High temperature carbonisation

		4. Power Coal	9. Chemicals & Liquid Fuels i. Recovery of chemicals from Coal tar and other by-products of carbonization & further synthesis to value added chemicals. ii. Production of alternative fuels through Fischer-Tropsch Synthesis. iii. Catalysts for coal to liquid processes
		5. Environment Management	10. Coal Liquification and Gasification i. Process Development ii. Clean Coal Technology iii. Gasification
		6. Coal Liquification and Gasification	
		7. Chemical Liquid Fuels	
12.	**Central Glass and Ceramic Research Institute**	1. Optical communication Fibre	1. Contract Research / Sponsored projects in the areas of glass and ceramics 2. Characterization of materials in the areas of glass and ceramics 3. Training and development in the areas of glass and ceramics 4. Strategic materials supply in the areas of glass and ceramics 5. Technology transfer in the areas of glass and ceramics
		2. Glass science and technology	
		3. Sol-Gel Science and technology	
		4. Oxide and Bio-ceramics	
		5. Ceramic membrane	
		6. Electro-ceramics	
		7. Non-oxide ceramics	

13.	**Central Mining Research Institute**	1. Mine technology	1. Contract R&D in the area of mining
		2. Mine safety	2. Consultancy services concerning any mining activity
		3. Mine Engineering	3. Testing of equipments for approval in Mining Industry and Ariel Ropeway (NDT)
		4. Mine Environment	4. Service to industry concerning any mining activity