

Department of Scientific & Industrial Research

Statement of Outlays and Outcomes/Targets: Annual Plan 2005-06

(Rs. in crores)

Sl No.	Name of the Scheme/ Programme*	Intended Objective/Outcome	Annual Plan 2005-06 Outlay	Quantifiable Deliverables On Annual basis(2005-06)	Processes/ Timelines of approvals	Remarks/ Risk Factors
DSIR Schemes						
1.	Technology Promotion, Development and Utilization (TPDU) Programmes	<ul style="list-style-type: none"> promote and support industry efforts towards R&D. encourage R&D system-industry cooperation. support industry for technology development, demonstration and absorption of imported technology. build indigenous capabilities for development and commercialization of contemporary products and processes of high impact. evaluate the status and performance of technology in selected sectors/areas. facilitate effective transfer and management of technology. promote international technology trade including export of technology projects, services and technology intensive products. promote and strengthen consultancy capabilities for domestic use and export requirements. support and use mechanisms, both national and international, towards transfer of technology, both within and outside the country. Generate endogenous capacities for the development and utilization of digital information resources for providing inputs to scientific & industrial research in the country. 	24.47	<ul style="list-style-type: none"> Recognition of new 120 in-house R&D units Renewal of recognition of 312 in-house R&D units Recognition of new 40 SIROs Renewal of recognition of 180SIROs 15 projects will be supported under. Technology Development & Demonstration Programme; 25 projects of individual innovators will be supported will be supported under Technopreneur Promotion Programme. 2 Exhibitions & Seminar of which one will be international under Technology Absorption and Transfer . 30 programmes will be considered under Technology Information Facilitation Programme. 		

Department of Scientific & Industrial Research

2.	National Research Development Corporation	<ul style="list-style-type: none"> • Promotion and commercialization of inventions • Commercialisation of Laboratory Know-How Financing Technology development • Development and Commercialisation of Rural Technology • Promotion of Export of Technology • Dissemination of Information on Technology Transfer 	4.00	<ul style="list-style-type: none"> • Support to 20 new projects besides on-going Technology Development projects in various areas • To provide assistance to file patents for the individual inventors, Universities, Govt. R&D organisations and Industries • To provide online International Patent search services to the universities, R&D organisations and industry 		
3.	Central Electronic Limited (CEL)	<p>The company's operations are structured in terms of three product categories, which are also in corresponding business groups, as under:</p> <p>i) Solar Photovoltaics (SPV):Crystalline Silicon Solar Cells, Modules and SPV Energy Systems for rural, remote areas and industrial applications.</p> <p>ii) Strategic Electronics:Electronic Ceramics, Professional Ferrites for TV, Telecommunication and Defence, Microwave Ferrite Phase Shifters for Missile, Radars, Microwave Components</p> <p>iii) Electronic Systems: Railway Electronic Equipment, Cathodic Protection System for Oil/Gas Pipelines & Very Small Aperture (Satellite) Terminals (VSAT)</p>	20.00	<ul style="list-style-type: none"> • Solar Photovoltaic Cells, Modules and Systems upgradation to the capacity from 2 MW to 10 MW production of higher wattage modules up to 150 Watt. • Procure trial orders for Multi section Digital Axle Counter after obtaining RDSO approval and successful field trials by the end of second quarter and supply and install at least 5 Nos. for field performance before asking for bulk order • Induct Train Actuating Warning System (TWAS) at Level Crossings of Indian Railways. Procure orders for at least 25 Numbers and execute all of these to be ready for bulk production next year. • Complete the supply of C-band & X-band PCMs orders of BEL & LRDE by second quarter to look for fresh order for 6000 Numbers of PCM for one more WLR for the continuity of production. 		

Department of Scientific & Industrial Research

CSIR Schemes					
4.	National Laboratories	<ul style="list-style-type: none"> Activities of CSIR encompass the establishment of capabilities in the newer S&T areas, generation of technological know-how and strategic options over a wide spectrum of science & technology, human resource development etc. The laboratories of CSIR undertake a wide gamut of research and development activities ranging from genomics to geophysics, nano materials to nutraceuticals, fuel cells to computational fluid dynamics, aerospace to ocean science and many more. The key feature of CSIR's programmes during the Tenth Plan is the creation of major and innovative knowledge networks across and beyond CSIR laboratories. The focus of the programmes thus evolved have been to synergise the vast competencies developed in CSIR laboratories and to implement the programmes / projects in network mode. CSIR activities in the national labs in the tenth five year plan include: (a) target oriented core network R&D projects; (b) building of capabilities and facilities, and (c) provision of technical consultancy services. 	642.53	CSIR operates 55 Networked Projects under scheme "National Laboratories". The quantifiable deliverables of these projects are provided in Annexure I	One of the networked projects on procurement and commissioning of Oceanographic Research Vessel shall be placed for the consideration of CCEA shortly.

Department of Scientific & Industrial Research

5.	National S&T Human Resource development Scheme	<ul style="list-style-type: none"> To promote and foster the upgradation of the stock of qualified, highly specialised scientists / engineers and technologists in R&D in all disciplines of S&T in the country; and integrated approach for the national human resource development for S&T by encouraging and promoting research in the universities and institutions of higher learning. 	10.00	Support to: <ul style="list-style-type: none"> Junior Research Fellow: 1200 Senior Research Fellow: 225 Research Associate: 60 Senior Research Associate : 70 Emeritus. Scientist: 25 Inter-disc Research Schemes: 25 Entrepreneurship support to Research Scholars: 100 Faculty Training and Motivation and adoption of Schools and colleges by CSIR Labs: 28 Fellowship in Transdisciplinary areas: 25 CSIR Programme on Youth for Leadership in Science: 100 Shyama Prasad Mukherjee Fellowship: 25 		
6.	Intellectual Property & Technology Management	<ul style="list-style-type: none"> Intellectual Property and Technology Management Scheme is aimed at capturing, securing and managing the intellectual property assets of CSIR so as to realise appropriate and commensurate value from it. 	30.00	Patent Filing: Indian: 400; Foreign: 500 Trademark / Copy rights: 50		
7.	R&D Management Support	<ul style="list-style-type: none"> Provide R&D Management Support and catalyze/ facilitate the laboratories by establishing, equipping and realizing excellence in R&D, promoting brand equity, financial self-sufficiency, global competitiveness and disseminating organizational learning through human resources development, international scientific collaboration, publicity and public relations, performance appraisal, scientific audit etc. 	15.00	<ul style="list-style-type: none"> Promoting brand equity; Carrying out institutional reforms; Carrying out performance appraisal of CSIR Labs; Facilitating good laboratory practices, acquiring NABL accreditation, safety and environmental standards for CSIR labs. Facilitate business development activities of CSIR labs. and developing guidelines. Setting of HRD groups in CSIR labs 30 Training programmes for skills upgradation of CSIR personnel. 		

Department of Scientific & Industrial Research

8.	New Millennium Indian Technology Leadership	<ul style="list-style-type: none"> NMITLI seeks to catalyze innovation centered scientific and technological developments as a vehicle to attain for Indian industry a global leadership position, in selected niche areas in a true 'Team India' spirit, by synergising the best competencies of publicly funded R&D institutions, academia and private industry. 	70.00	<ul style="list-style-type: none"> Launching of a Simple Office Computer (SofComp) based on a System-on-Chip architecture with a high degree of integration and several innovative features; Submission of Investigational New Drug (IND) application for lysostaphin -to counter streptococcal infection; Completion of Phase-I Clinical Trial of Anti-TB Molecule; Completion of Phase-II Clinical Trial of Anti-Psoriatic formulation; Setting up a mini Pilot plant for production of cellulose from fractionation of bagasse; Completion of IOP projects, Screening & selection; and Completion of identification of new areas under the Nationally evolved projects. Launching of 5 -6 new projects; Completion of pre-clinical studies on Dry Powder Inhalation (DPI) of microparticles containing anti-TB drugs; and Ten 8-Node high speed computing machines for weather forecasting will be fabricated and will be placed at different locations; 		
9.	Infrastructure Renovation Refurbishing (Information Technology)	<ul style="list-style-type: none"> To provide ICT support to S&T programmes and R&D areas and strengthening of computational and data resources by establishing grid functionality. 	30.00	<ul style="list-style-type: none"> Establishment of ICT infrastructure across CSIR lab and improve inter -connectivity Development of ERP software for administration, finance and management function 		
Grand Total			846.00			

Programme wise Major Deliverables under the Scheme 'National Laboratories'

S. No.	Title of the Programme	Major Deliverables (2005-06)
1	Spearheading small civilian aircraft design, development & manufacture	<ul style="list-style-type: none"> • Study of 4 Seater Aircraft, Master Moulds, Material Characterization • Design & Development of Software and Preliminary Installation for Flight Simulator • Data Generation on Fatigue and Damage Tolerance
2	Exploration and Exploitation of Microbial Wealth of India for novel compounds and biotransformation process	<ul style="list-style-type: none"> • Soil sampling from unique niches, isolation and quantification of microbes (bacteria, actinomycetes and fungi) • Isolation of community DNA, construction of metagenome library, sequencing the cloned DNA, and sequence analysis; • Creation of metagenomic library.
3	Molecular biology of selected pathogens for developing drugs targets	<ul style="list-style-type: none"> • Construction of knockout mutant of Rv3878 to be completed and validation by studying its growth behavior in vitro and in vivo.
4	Study of Mesozoic sediments for Hydrocarbon exploration	<ul style="list-style-type: none"> • Seismic data acquisition system with accessories and software • Magnetotellurics field investigations at 100 stations • Field operations at 3000 stations for gravity survey • Field operations at 30 stations for deep resistivity sounding • Acquisition of data in Gulf of Kutch for marine survey
5	Pollution monitoring mitigation systems and devices	<ul style="list-style-type: none"> • Survey of AMD sites in coal mines/deposits and selection of strategic sites in Meghalaya. • Development of Chemosensors, Biosensors and Bioindicators • To study the selectivity and sensitivity of the sensors towards sulphur dioxide by using different catalysts and promoters.
6	Asthmatic and allergic disorders mitigation mission	<ul style="list-style-type: none"> • Pharmacokinetics of the available active preparations/ molecules • To determine precise dosage, bioavailability, retention time (in vivo) etc. to cover the regulatory requirements for a drug preparation • Identification of novel genes for asthma pathogenesis will be attempted.
7	Newer scientific herbal preparations for global positioning	<ul style="list-style-type: none"> • Chemical and pharmacological profiling of extracts. • 3-4 more formulations will be prepared and bioevaluated for each target disease in consultation with Ayurvedic experts.
8	Special Electron Tube Technologies for large scale applications	<ul style="list-style-type: none"> • Fabrication of rf window and its evaluation • Processing and testing of multi-stage collector after its integration with Ku-band Space TWT • Development of integrated pulse power system for electron tube applications • Fabrication of first prototype of plasma switch

Department of Scientific & Industrial Research

S. No.	Title of the Programme	Major Deliverables (2005-06)
		<ul style="list-style-type: none"> • Development of alumina based collector electrode components.
9	Comprehensive Traditional Knowledge Digital Documentation and Library	<ul style="list-style-type: none"> • Collection & verification of data on tribal knowledge in new areas in Kashmir • Transcription of approx. 50,000 formulations in Unani System of Medicine and approximate 15000 formulation in Ayurveda • Completion of the TKDL database on Siddha System of Medicine containing 10,000 formulations in five international languages in patent application format along with the scanned formulations from the original Tamil texts • Creation of a database on Traditional Foods containing 120 traditional food items. • Software development, testing & trial run and completion of around 100 selected traditional food items
10	Environment friendly Leather Processing Technology	<ul style="list-style-type: none"> • An integrated in-plant control measure; end-of-pipe treatment and management options for safe disposal of treated waste water such that compliance to 2100 mg/lit norm of Total Dissolved Solids (TDS) and reduction of solid wastes from 750 kg/ton to < kg/ton of leather processed. • Technology packages for modernization of tanneries complete with segregation and pre-treatment of waste streams and water saving measures.
11	Catering to Specialised Aerospace Materials	<ul style="list-style-type: none"> • Selection of suitable raw materials for binders and optimization of binder preparation methods for aerospace applications • Development of indigenous ball finishing machine • Fabrication of stationary plasma thruster • Exploratory studies on vacuum metallizing boats
12	Developing Cells & Tissue Engineering	<ul style="list-style-type: none"> • Carrying out trials for transplantation of human cells of fetal origin for treatment of Leishmaniasis • Biological hardening process of tissue culture raised plants for successful field transfers • Proteome analysis of Arnebia for shikonin biosynthesis • Somatic hybridization, cybridization and developing selection procedures • Microarray analysis of Arnebia for shikonin biosynthesis • Establishment of clean room facilities for isolation and transplantation of human fetal cells • Establishment of facilities for maintenance of immuno compromised and immuno deficient mice • Collection of human fetal material and its use in transplant for treatment of chronic and acute liver diseases
13	Toxicogenomics of polymorphism in Indian population to industrial chemicals for development of	<ul style="list-style-type: none"> • Gene expression microarray scanning, profile acquisition, data analysis • SNP analysis in the genes responsible for the differential toxic response • Proteomic and microarray analysis to identify any biomarker

Department of Scientific & Industrial Research

S. No.	Title of the Programme	Major Deliverables (2005-06)
	biomarkers	
14	Designing animals and plants as bio-reactors for proteins & other products	<ul style="list-style-type: none"> • Optimization of bioreactor for production of gynsenoside through plant cell culture technique and product recovery and purification • Expression of hygromycin resistance marker in mushroom protoplast and regenerated fruit body. • Expression analysis of transgenic bioreactors. • Cultured sponge cell process development and harvesting of collagen • Up-scaling the immobilized enzyme system for TF at pilot plant scale level (5 to 10lt capacity).
15	Development of Catalysis & Catalysts	<p>Mesoporous Materials:</p> <ul style="list-style-type: none"> • Optimization of the preparation methods for (i) silica based mesoporous materials (ii) encapsulation and stabilization of gold nano-particles in porous solids and (iii) carbon based mesoporous materials <p>Methane coupling</p> <ul style="list-style-type: none"> • Preparation, characterization and catalytic screening of different catalysts based on zeolite, pillared clays, salts of heteropoly acids and promoted metal oxides for methane to ethylene conversion. <p>Speciality Chemicals:</p> <ul style="list-style-type: none"> • Liquid phase low temperature catalytic processes for aromatic chemicals • Development of eco-friendly two-step process for Dimethyl carbonate (DMC) synthesis <p>Nitrogen Utilization</p> <ul style="list-style-type: none"> • Chemoselective hydrogenation of substituted nitroaromatics novel water-soluble iron complex catalysts. <p>Chiral auxiliaries</p> <ul style="list-style-type: none"> • Optimization of reaction conditions for hydrogenation of acetophenone, 6-methoxy naphtheone (precursor for Naproxen) etc.
16	Developing Green Technology for Organic Chemicals	<ul style="list-style-type: none"> • Bench scale process for isolation of VCR & VLB from <i>C. roseus</i>. • Pilot scale extraction of valepotriates from <i>Valeriana jatamansi</i> • To initiate synthesis of the possible pheromone components identified by GC-MS • Development of integrated process scheme for optimum production and recovery of PLA • Design, fabrication, installation and operation of bench scale unit for continuous production of carboxylic acids from identified wastewaters
17	Acquisition of Oceanographic Research Vessel (ORV) for Oceanographic Research	<ul style="list-style-type: none"> • Initiate action for building up of the vessel after finalization of consultant

Department of Scientific & Industrial Research

S. No.	Title of the Programme	Major Deliverables (2005-06)
18	Impact of anthropogenic perturbations oceanographic atmospheric Processes in and around India in the context of global change	<ul style="list-style-type: none"> • Continuation of data collection of: <ol style="list-style-type: none"> a. groundwater, river & estuarine along Indian Coast b. Chemical & isotopic data collection for modeling studies c. Arabian Sea
19	Development of Key Technologies for Photonics and Opto Electronics	<ul style="list-style-type: none"> • Transfer of technology of the C-band amplifier to industry. • To study the solid-state emission properties of the compounds stabilized in polymer matrix • To develop light emitting materials with desired emission properties. • Fabrication of long length chirped gratings and their characterization • Optimization of FBG/LPG parameters and grating writing as per specifications.
20	Developing capabilities and facilities for Microelectromechanical systems (MEMS) and Sensors	<ul style="list-style-type: none"> • Realization of electronic nose using polymer cavity and micro-hot plate embedded gas sensors in array form. • Development of application specific Micro-total Analysis System test kit for microanalysis of biological samples. • Realization of a virus sensor using micro cantilever array structure. • LIGA based fabrication of nickel microstructures for inertial sensor applications. • Estimation of activity and density of sensor molecules on ISFET gates.
21	Coal Characterisation and Resource Quality Assessment	<ul style="list-style-type: none"> • Data Analysis and Pilot Scale test • Experiments for kinetics of gasification with different coals
22	Developing New Generation Fuels & Lubricants	<ul style="list-style-type: none"> • Facilities for preparation of catalyst at 10-100 g scale • Development of Gas to Liquid Technologies for DME and Fischer Tropsch Fuels • Development of liquid fuels and Ethanol Production from Biomass. • Development of Biodegradable Lubricants from Vegetable Oils, Sugars, Strach and Cellulose. • Performance evaluation of lubricating oils based on castor, rubber seed and karanj oils. • Preparation of larger quantities of catalyst for bench scale.
23	Positioning Indian nutraceuticals and neutrigenomics in a global platform	<ul style="list-style-type: none"> • To isolate the active ingredients in the traditional foods and tribal foods along with the genetic materials in to study the role of nutraceuticals (molecules) • Generating and standardizing transgenics of tea, potato with the genes leading to stevioside biosynthesis
24	Setting up a World Class Drug Research Institute	<ul style="list-style-type: none"> • Site development and procurement of equipment
25	Predictive medicines using repeat and single nucleotide polymorphisms	<ul style="list-style-type: none"> • SNP discovery and validation on the samples • Analysis of the data for 20 genes sequenced in the previous year and completion of the sequencing of the 30 remaining genes initiated last year.

Department of Scientific & Industrial Research

S. No.	Title of the Programme	Major Deliverables (2005-06)
26	Drug target development using in-silico biology	<ul style="list-style-type: none"> • High throughput screening software for drug candidate identification using Visual C++ platform • New methods for predicting secondary and tertiary structural elements. • Creating drug-target and pharmacophore databases • Development of chemical library and methods for virtual screening
27	Animal models and animal substitute technologies	<ul style="list-style-type: none"> • Monitoring the changes in the expression pattern of selected genes in response to various growth • Comparison of microarray data with the data available on human tumors and selection of genes for detailed analysis • Continuation of Antiestrogenicity/ Antiproliferative potential evaluation of compounds • Identification of genes involved in toxicological and tumorigenic pathways using customized Microarray slides for target organ toxicity. • Establishment of Protein truncation test for the evaluation of drug induced mutation. • Establish non-invasive cardiac output studies using electrical bioimpedance techniques in rats.
28	Developing New Building Construction Materials	<p>Development of:</p> <p>Inorganic Materials</p> <ul style="list-style-type: none"> • Water-Resistant Gypsum Boards and Blocks from Industrial Wastes • High Performance Concrete and Concrete Composites • Bricks/Blocks From Fly Ash/Bottom Ash and Industrial Wastes • Ceramic Floor Tiles Utilizing Steel Plant Waste • Porous Tiles from Marble Dust and Other Industrial Wastes • High Performance Smart Concrete <p>Organic Materials</p> <ul style="list-style-type: none"> • Polymer Composites for Door Shutter, Wall Panel, Partition, etc. • Polymeric Sealants for Cracks and Joints in Buildings • Self Curing Repair Mortar/Materials for Buildings • Cement Based Building Boards from Bagasse • Corrosion-Resistant Coating System for Steel Structures exposed to Saline & Humid (Marine) Environments • Wood Substitute Products Using Industrial Wastes • Wood Substitute from Agro-Industrial Waste with Polymeric Binder
29	Mathematical Modelling and Computer Simulation	<ul style="list-style-type: none"> • Integration with FINEART for solution of solidification model; Testing of solidification code; Completion of GUI; First version of Mesh Generator; Design of post processor • Development of smart elements; Enhancement of GUI based pre-processor • Development of program module based on EPFM; Case studies by ANSYS and ABAQUS; Interfacing with FINEART & Verification/benchmarking

Department of Scientific & Industrial Research

S. No.	Title of the Programme	Major Deliverables (2005-06)
30	Technologies for Standardization of Bioresources for and from Leather	<ul style="list-style-type: none"> • Optimization of parameters and standardization of technologies for at least 8 specific bioresources for and from leather inclusive of lipases (for degreasing), enzymes (for chemical assisted dehairing), liquefaction of solid wastes from tanneries, soluble collagen derived biomaterial products and second generation of reconstituted collagen based products for clinical applications.
31	Custom tailored special materials	<ul style="list-style-type: none"> • Preparation and characterization of Nano structured BiMnO₃, LaGaO₃ and CeO₂ based oxides and the properties will be compared to bulk materials. • Study on the rheological behaviour of sols in different oxide systems • Detailed experiments on the preparation of silica-silica composites ~ Characterization of the silica-silica composites • Vapour phase deposition technique for ore constriction using tubular membranes • Optimization of process parameters for hydrothermal synthesis of zeolite powders
32	Capacity building for Coastal placer mineral mining	<ul style="list-style-type: none"> • Placer mineral exploration of deposits along Nagoor to Poompuhar (Tamil Nadu) coastal tract is Goa and South Maharashtra coasts • Provenance study and evaluation on distribution pattern of placers along selected stretches will be completed with all geological and mineralogical experiments. • Geo-statistical modeling of some selected deposits will be completed
33	Upgradation of SI Base Units, National Standards of Measurements & Apex Calibration Facilities	<ul style="list-style-type: none"> • Estimation of measurement uncertainty • Implementation of Quality System • Training of manpower on Calibration procedures • NABL Accreditation
34	High Science & Technology for National Aerospace programmes	<ul style="list-style-type: none"> • Commencement of combustion test rig fabrication. • Demonstration of use of pressure sensitive paint technique for wind tunnel experiments.
35	Medicinal plant chemotypes for enhanced marker and value added compounds	<ul style="list-style-type: none"> • Evaluation of Twenty four accessions for biomass and bacoside-A content at different harvesting seasons. • Chemical investigation for the isolation of marker compounds from Swertia chirayita & Picrorrhiza kurooa will be completed. Development of microanalytical techniques for the marker compounds from Picrorrhiza kurooa. Chemical modification of the isolated marker compounds and their bioactivity evaluation.
36	Globally competitive chemicals processes and products	<ul style="list-style-type: none"> • Synthesis of trimannanm Man1-alpha-6-[man1-alpha-3]Man-alpha-Ome • Up gradation of laboratory scale isolation process of VCR and VLB upto bench scale from 10-20 Kg leaves of C.roseus • Laboratory scale transformation of artemisinin into rationale derivatives by developed process.

Department of Scientific & Industrial Research

S. No.	Title of the Programme	Major Deliverables (2005-06)
		<ul style="list-style-type: none"> • Pilot-scale extraction of valepotriates from Valeriana jatamansi • Optimization of reaction conditions for hydroformylation of 2,5-dihydrofuran/2,5-dihydropyrrole Development of heterogenized catalysts for hydroformylation reaction
37	Development of Novel Polymeric Materials	<ul style="list-style-type: none"> • Applications of Nanoparticle-Conducting film composites as sensors and electrocatalysts will be elucidated. The attempts would be made to develop conducting polymer based plastic solar cells. • Scale up and functional studies of functional polymer • Clear and pigmented photo-curable formulations for the coating industries • Development of multifunctional acrylate resins based on renewable resources. • Completion of pilot scale composite for PVC-and-TPU-based composites and testing their mechanical properties. • Multifunctional additive for plastic and elastomers based on CNSL; scale up studies. • Conducting / Electroactive Polymers:
38	Development of Techniques and Methodologies for Exploration, Assessment and Management of Ground Water in hard rock areas	<ul style="list-style-type: none"> • Evaluation of geophysical & tracers data and verification by drilling and well logging • Secondary recharge measurements. • Characterization of chemical constituents in the water, rock and soil samples • Resource well sustainability monitoring • Evaluation of groundwater outflow from resource well site area • Simulation of groundwater regime on the island.
39	Tectonic and oceanic processes along Indian Ridge System and back arc basins	<ul style="list-style-type: none"> • Deep Tow/ROV investigations. • Study of inter-relationships among physical, chemical and biological properties. • Delineation of hydrothermally active regions.
40	Electronics for societal purposes	<ul style="list-style-type: none"> • Design of mechanical, optical and electronic hardware & software for sorting and grading of citrus fruits & potatoes • Advanced Off-line & On-line Measurement System for Quality • Intelligent Prosthetic Devices for Rehabilitation of Physically Challenged • Development of Artificial Knee • Development of a device capable of doing the endurance test of the developed Artificial Knee Joint (hydraulic)
41	Industrial Waste Minimization and Clean up	<ul style="list-style-type: none"> • Preparation and characterization of supported NF membranes • Optimization of NF coating technique over single channel tubes • Scaling up studies on ion exchange and reverse osmosis methods to separate and recover metallic values and water from prepared effluents
42	Coal Preparation for quality enhancement	<ul style="list-style-type: none"> • Collection of coals from the major coal sources and detailed characterization • Washability characteristics and computer simulation followed by pilot scale run of selected samples • Detailed characterization of individual coals and their blends in terms of their chemical, physical petrographic

Department of Scientific & Industrial Research

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		makeup, ash and mineral compositions, trace elements, surface properties <ul style="list-style-type: none"> • Computer simulation for producing power coal from the coarser fraction and steel grade coal from the lower fraction
43	Natural, nature identical or similar biomolecules	<ul style="list-style-type: none"> • Scale up processes of Vanilla, Tea and the finger millet polyphenols at pilot level • Screening and characterization of more peptidomimics in in-vitro and their biological screening in SHR's • Preparation of antioxidant conserves from pruned / coarse tea leaves • Identification of phenolics and tannins in finger millet seed coat and determination of antimicrobial activity • Standardisation of the process for dehydration / dewatering of soap stock preferably by a high temperature and short time (HTST) process, in order facilitate the isolation of oryzanol in subsequent operations on large scale
44	Infectious diseases handling storage and research facilities	<ul style="list-style-type: none"> • Molecular Biochemistry and Diagnostics of fungal diseases • Expression and characterization of functionally important genes of A. fumigatus identified by proteomics and microarray approach • Identification of eosinophilic proteins interacting with lung surfactant proteins and participating in degranulation process • Setting up of molecular detection laboratory and construction of database
45	Design analysis and health assessment of Special structures including bridges	<ul style="list-style-type: none"> • Development of Design aids for multistoried steel buildings • Construction of earthquake engineering laboratory and initiation of action for procurement of equipment. • Studies of wind load effects in structures and long span bridges • Analytical modeling for prediction of across wind response on square/rectangular plan tall buildings. • Development of data base for fatigue and fracture properties of pipes and piping steel. • Analysis of Design of Bridges • Health Assessment of Bridges and other structures • Static tests on pre-stressed concrete specimens using high strength high performance concrete and evaluation of structural behavior in shear/flexure
46	New and Improved Road Technologies	<ul style="list-style-type: none"> • Cost Effective Material and Technology for Construction and Maintenance of Rigid and Flexible Pavement • Development of emulsions for cold mixes for their use in structural layers • Development of design procedure for cold mixes modified emulsions for microsurfacing improve quality bitumen woven and non woven film for packaging • Development of custom tailored emulsions for surfacings in high altitude and desert areas. • Development of materials for Noise barriers • Laboratory scale test on prototype for tag reader, integration of the sub-system, completion of field trials, modifications • Laboratory scale tests on prototypes, system Integration, completion of field trials, modifications

Department of Scientific & Industrial Research

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47	National Science Digital Library (NSDL)	<ul style="list-style-type: none"> • To create 600 e-books • Creation of facilities for e-hosting and e-delivery of products • Setting up the Data Centre and other infrastructure facility
48.	Consortium Access to Electronic Journals	<ul style="list-style-type: none"> • Post agreement monitoring and training to trainers by different publishers will be done to enhance the usage of e-access by CSIR labs/Institutes /Units
49	Establishing Genetically Modified Foods Referral Facility	<ul style="list-style-type: none"> • To spike the various foods with the GM Soya and GM Maize and their processing for higher recovery of the GM. • Validation of methods
50	Establishing Advanced facility for safety evaluation of genetically modified/engineered drugs	<ul style="list-style-type: none"> • Biophysical tests of genetically modified/engineered drugs • Standardization of relevant in vitro & in vivo study parameters using standard/reference agents/biopharmaceuticals
51	Developing Technology packages for disaster prevention and management in underground coalfields	<ul style="list-style-type: none"> • Assessment of fire in potential areas • Spatial modeling using GIS database • Correlation survey and GIS based maps preparation
52	Biomineral processing for extraction of metal values from ores and concentrates	<ul style="list-style-type: none"> • Continuous bio-reactor testing of Ni ore, Coal, China clay, Sulphide ore. • Heap leaching of Uranium, Copper, Zinc. • Optimization of downstream processes
53	Developing capabilities in Advanced Manufacturing Technology	<ul style="list-style-type: none"> • Hydroxyapatite coated dental and hip-implants would be implanted to human patients and post operative data collection • Human trials with bone filling materials and orbital implants • SLS process would be standardized and few patient specific bone plant would be developed and evaluated for post implementation
54	Technology for Engineering Criticality Analysis	<ul style="list-style-type: none"> • Dielectric and Piezoelectric property measurement of PZT thin films • Fabrication and supply of prototype wafers for ultrasonic characterization. • Standardisation and calibration of equipment and fabrication of FBG
55	Discovery Development and Commercialisation of New Bioactive and Traditional preparation	<ul style="list-style-type: none"> • 1500 plants extracts, 2500 Fungal/Microbial extracts and 250 single molecules is planned for discovery of new single molecule