LIST OF EQUIPMENTS WITH THEIR SPECIFICATIONS UNDER DST FIST PROGRRAMME

SI. No.	Name of equipment	Specification
1.	**REAL TIME PCR**	1. Fully functional high throughput and fast Real-Time PCR sy qualitative and quantitative detection of nucleic acids, screening and SNP analysis. 2. It should be an open system capable of running different chemistries using TaqMan, Molecular Beacon, SYBR green etc. 3. System should have 96 well block in plate format to accommodate 0.1/0.2 ml tubes/strips/plate. 4. System should support the reaction volume less than 20 µl. The lesser will be preferred. 5. The system should preferably have touch screen LCD feature to avoid dependency on computer for operation. 6. Temperature range of thermal block should be preferably 4 to 99°C and temperature accuracy should be about ±0.20 to 0.50° C. 7. System should support fast PCR protocol with ramp rate of preferably 6°C/sec or more. 8. System should be capable of multiplexing with **at least 5 different fluorescent** reporters. 9. System should be pre-calibrated for detecting at least five dyes (FAM/SYBR Green, VIC/JOE, TAMRA, Texas red & CY5 or similar wavelength fluorophores). 10. It should have LED as excitation source with CCD detector 11. The Instrument must offer 10 logs of linear dynamic range. 12. The technology should be such as to avoid cross talk between fluorophores in a multiplexing reaction. 13. The software must allow analysis of multiple gene expression. The instrument software must be capable of detecting and analyzing a different gene, SNP or pathogen target in every well of the 96-well plate. Software should support performing Absolute quantification, Relative quantification, Allelic Discrimination, Plus/Minus assays. Along with this system should be able to conduct High Resolution Melting (HRM) experiments for genotyping and mutation scanning experiments. **The HRM software must be provided essentially along with quoted system**. 14. The following accessories must be supplied with the equipment: a. Suitable on line UPS with a minimum 60 minutes power back up on full load.

		b. A desktop computer of a reputed make having following configuration: Processor-Intel Core i7 3rd gen., 4GB RAM, 500 GB HDD and at least 23 inch flat screen LCD/LED monitor and a color laser printer with a licensed Windows 7 professional OS and licensed original MS Office 2013. 15. All consumables and Plastic ware should be supplied along with system for demonstration 16. **Minimum two years onsite warranty**
2	**INVERTED MICROSCOPE WITH FLUORESCENCE PHOTOGRAPH ATTACHMENT**	1. **Microscope body:** Research Inverted Trinocular microscope with Infinity corrected optical system with three way light distribution between eye piece and camera port of 100:0/ 20:80/50:50/ 0:100 and vice a versa. Observation technique should be Bright field, Phase contrast, Fluorescence. Microscope should be upgradable to DIC technology. 2. **Eyepiece:** 10X with FOV 22mm and diopter adjustment facilities on both eyes, anti-fungus type. 3. **Condenser:** Extra-long working condenser suitable for phase contrast, Bright field. 4. **Nosepiece:** Sextuple DIC revolving nosepiece to accommodate 6 objectives at a time. 5. **Stage:** Attachable mechanical stage with universal holder to accept all types of specimen holders. 6. **Illumination:** High intensity uniform brightness distribution scientific Grade LED (15-30W power consumption) cool white light, with life time of 30,000 hrs. or more 7. **Objectives:** Long working distance objectives with specialized phase contrast, Bright field and Fluorescence. a. Achromat 4X, NA 0.10, W.D.30.0mm. b. Plan Achromat Phase 10x, NA 0.30, W.D.16.0mm; Ph1 c. Plan flour LWD 20X, NA 0.45, W.D. 7.5 -6.0mm Ph1 with cover glass correction 0-2.0mm. d. Plan flour LWD 40X, NA 0.60, W.D. 3.6-2.8mm Ph2 with cover glass correction 0-2.0mm. e. Plan Fluor 100X oil N.A 1.30 For BF, Flu. 8. **Fluorescent attachment:** Epi-fluorescence rotating filter turret (with main body), Filter cubes with noise terminator mechanism, Configure with up to 4 Epi-fluorescence filter cubes, Additional positions for bright-field observation, Fluorescence illumination of LED Filter set of DAPI, FITC and TRITC. LED lights source of over 10,000 hour's life time. 9. **Camera:** Digital CMOS / CCD Camera system: Scientific microscopic digital CMOS / CCD color Camera system: High resolution scientific CMOS / CCD camera of sensor size should-be 12 megapixel (image sensor 36mm X 23mm) / 2/3" for CCD, 35-40 frame per second live

		display, 12-14 bit depth, **pixel size 6 micrometer x 6 micrometer or more**, Live cell imaging, USB 3.0 PC interface, Camera should be capable to capture BF/PH/Fluorescence images. Microscope, Objective, camera and software should be from same manufacturer. 10. **Software:** Licensed imaging software for Fluorescence channel mixing / un-mixing, image analysis, live cell imaging, AVI, multichannel & multipoint image capturing, Intensity measurements, manual counting, line profile, spatial measurements such as length, width, area, perimeter, etc. Microscope, camera and software should be from same manufacturer. 11. **Data Processing Unit:** Branded PC with i5 processor, minimum 8 GB RAM, 1TB HDD or higher, Original Windows 7 /10 OS / suitable, DVD RW, at least 23 "LCD/LED monitor, keyboard, mouse, UPS. 12. **Minimum two years onsite warranty**
3	**BENCH TOP FLOWCYTOMETER**	1. Easy to use Flow cell based bench top flow cytometer is required with below two lasers: 488-490 nm Blue Laser and 633- 640 nm Red Laser. System should have four fluorescence detectors and two light scatter detectors (forward & side scatter) with total six parameters measurement capabilities. 2. All Lasers & their excitation & collection optics should be fixed & pre-aligned. System must have the software flexibility to change the number of colour / fluorochrome channels from each given lasers. System should have Fluorescence Sensitivity at least MESF FITC <75; PE <50. 3. Minimum Detectable Particle Size should be 0.5 µm or better. System should have events per second at least 10,000 events / second or higher 4. System should be able to do absolute counting of cells without using any reference bead. System should run on normal lab filtered distilled water (0.2 micron filtered DI water) 5. System should have 24 bit signal processing and digital data with 7decade dynamic range for an ease to user making all data available for analysis. System should be fixed aligned with pre-optimized detector voltage to avoid daily adjustment. 6. System should able to accept many types of manual sample tubes such as 1.5ml, 2 ml, 5 ml, PCR tubes. System should be upgradable to minimum 24 tubes along with 48 &96 well plate loader as automation within the same assembly.

		7. System should have free license system acquisition & analysis software. 8. System should be quoted with computer Windows/Mac OS with 8 GB RAM, Graphics card, removable media support, MS Office, 22 inch flat monitor with laser printer **9. Warranty for minimum two year to be provided on site.** 10. System should be quoted with starter kits, 1 KVA UPS & color laser printer
4	**SEMI DRY BLOT APPARATUS**	1. Full functional semi-dry blotter with rapid transfer time (15-60 min). 2. It should simultaneously transfer 1 to 4 mini gels or 1 to 2 medium-sized gels. 3. It should be an open system, compatible with traditional buffers and all transfer membranes. 4. System allows fast and efficient blotting without buffer tank of gel cassettes. 5. It should have Minimal buffer requirements 6. It should have Single step locking system for simple setup 7. It should have Platinum-coated titanium anode and stainless-steel cathode plate electrodes that provide consistent and reliable transfer, durability and years of use 8. It should have Safety cover to break electrical current when lifted, preventing electrical shock. 9. **Minimum two years onsite warranty**
5	**REFRIGERATED AND HEATING BATH CIRCULATOR**	1. The bath should circulate refrigerated and heating water 2. Stability up to ±0.1°C as per DIN 12876 standard 3. Environmentally friendly refrigerant 4. Range of accessory hosing, connectors, software, and additional pump and temperature probes must be available. 5. Minimum 12 liters tank with drain tap 6. relay control for refrigeration on/off 7. cooling power minimum 140W @ 0°C 8. temperature range 0 to 100°C 9. Temp setting resolution should be 0.1°C 10. PID temperature control 11. It should have Digital LED/LCD Display Must have 2 point calibration 12. Over temperature safety cut off is required 13. Must have high temperature, refrigeration and low level liquid alarm 14. Heating Power should be minimum 1KW 15. Flow rate should be minimum 16 L/min 16. Voltage control stabilizer: As per suitability of equipment 17. CE certified 18. **Minimum two years onsite warranty**
6	**HIGH SPEED**	1. Capacity: 24x1.5/2ml

	REFRIGERATED MICRO CENTRIFUGE	2. RPM: 17,000 or more 3. Maximum: RCF:30,000xg or more 4. Temperature range should be from -11°C to 40°C, should be able to maintain 4°C at maximum speed 5. Rotor should be made of aluminum, rotor and rotor lid should be autoclavable at 121°C for 20 mins 6. Motor should be brushless 7. Instrument should have an in-built condensate drain to prevent water accumulation 8. Operating temperatures: -5to 35 deg C 9. It should be possible to perform a fast pre-cooling of the instrument using a dedicated Fast Temp function 10. Provision to set the limit of Max/Min temperature in the range of 0 to 30 deg C 11. Acceleration and deceleration setup in 15 sec (5 steps) 12. Should possess a separate short spin key for brief spin 13. Speed setting should be possible in both rpm and rcf 14. Instrument should have the possibility to use 15/50ml/250 ml Conical tubes and Deepwell micro Plates 15. Instrument should have automatic rotor recognition facility to automatically recognize and set maximum speeds upon rotor change 16. Rotor lids should have a QuickLock-system for secure lid closing and opening 17. It should be possible to perform gentle acceleration and deceleration using dedicated key 18. Noise levels should be<58 db(A) 19. Program Memory of 10 or more. 20. Control Display: RPM, RCF, Temp, Time, Acceleration/ Deceleration, Program 21. Safety: Feature for detection of Over speed, imbalance, over heat and door opening 22. soft Keypad for easy operation 23. Instrument should be CE Certified and also have a IVD Conformity 24. Instrument should be quoted additional rotor for 15 ml, 50 ml, and 250ml conical tube and Deepwell micro Plates 25. Voltage control stabilizer: As per suitability of equipment 26. **Minimum two years onsite warranty**
7	**NANO SPECTROPHOTOMETER**	1. Spectrophotometer should have Micro-volume, life science and standard spectrophotometer measurement modes 2. Must be Ideal for DNA, RNA and Protein measurements 3. Suitable for minimum 0.5µl sample volume. 4. Purity scan over entire wavelength range should be 190 to 840 nm. 5. Wavelength Accuracy should be ± 2nm or better 6. Spectrum Scanning must be available. 7. Detects DNA concentrations as low as 2 ng/µl 8. It should have Xenon flash lamp Light Source. 9. Easy and quick to clean 10. Results are reproducible, accurate and easily obtained 11. Method and result saving to USB memory stick

		12. It should have less than 2 spectral resolution 13. It should have Path Length : 0.2 to 1mm (auto-ranging) 14. It should have Maximum detection concentration: 15,000 ng/µl (dsDNA) 15. It should have Measurement Time : < 6.5 seconds 16. DNA measurement modes : dsDNA, ssDNA, RNA, Oligonucleotides, 260/ 280, 260/ 230, Variable ratio 17. Protein measurement modes: Pierce 660, BCA, Bradford, Lowry, Biuret, Direct UV 18. Sample Pedestal Material : Quartz stainless steel 19. System should be quoted with computer Windows/Mac OS with 8 GB RAM, Graphics card, removable media support, MS Office, 22 inch flat monitor. 20. **Minimum two years onsite warranty**
8	**BINOCULAR MICROSCOPE**	1. It should have inclined binocular body, 360º rotatable head 2. It should have anti fungus coated 4x, 10x, 40x and 100x (oil immersion) with plan achromatic correction 3. It should have horizontal mechanical stage preferably with fine vernier graduations and coaxial adjustment for slide manipulation 4. It should have Built-in LED light source with white light, 5. It should have acid resistant finish and with 200 to 240V AC 50 Hz input. 6. **Minimum two years onsite warranty**
9	**ANALYTICAL WEIGHING BALANCE**	1. Built-in calibration mode with auto calibration on touch of a button 2. Maximum capacity 220g 3. Tare range: Full to capacity 4. Readability: 0. 1 mg or better 5. Repeatability: 0. 1 mg or better 6. Pan Size: 85 mm or more 7. Average response time: 5 sec or better 8. Tall wind darft shield with easy shield removal & locking; side & top opening shielding windows for easy pan access 9. Backlit large-font digital display with sealed key pad for easy cleaning & maintenance 10. Operating voltage: 220 -240 V 11. Working temprature: 10-40^{O} C 12. Dust protection cover: washable and acid alkali, organic solvent resistant. 13. User Selectable environmental settings 14. Upfront level indicator for quick easy leveling **15.** USB2/RS-232 port computer interface with easy data transfer to Windows® XP/7 OS or better **16. Minimum two years onsite warranty**
10	**PRECISION BALANCE**	1. Built-in calibration mode with auto calibration on touch of a button 2. Maximum capacity 220g 3. Tare range: Full to capacity 4. Readability: 1 mg or better 5. Repeatability: 1 mg or better 6. Pan Size: 85 mm or more

		7. Average response time: 2 sec or better 8. Tall wind darft shield with easy shield removal & locking; side & top opening shielding windows for easy pan access 9. Backlit large-font digital display with sealed key pad for easy cleaning & maintenance 10. Operating voltage: 220 -240 V 11. Working temprature: 10-40^{O} C 12. Dust protection cover: washable and acid alkali, organic solvent resistant. 13. User Selectable environmental settings 14. Upfront level indicator for quick easy leveling **15.** USB2/RS-232 port computer interface with easy data transfer to Windows® XP/7 OS or better **16. Minimum two years onsite warranty**
11	**-20˚C UPRIGHT FREEZER**	1. Microprocessor controlled upright model (vertical) 2. Microprocessor controlled vertical deep freezer (-20^{0}C) 3. Double door with three shelves inside each door. 4. Operating temperature :-15^{0}C to -25^{0}C 5. Capacity : 300-350 liters 6. Programmable control system with safety alarm 7. CFC free refrigerant 8. Digital display of temperature and time 9. Durable, high impact plastic/stainless steel interior 10. Electrical requirements : 220-240 volts, single phase, 50 Hz to suit local conditions 11. Voltage control stabilizer: As per suitability of equipment 12. **Minimum two years onsite warranty**
12	**DIGITAL VORTEX MIXTURE**	1. Orbital diameter of 4 -5 mm 2. Speed selection from 300 RPM to 4200 RPM for gentle to rigorous mixing 3. LED Digital display 4. Timer Setting of 1 to 999 mins Pulse mode programming feature (set On & Off times in secs) 5. Heavy metal base with rubber feet 6. Choice of continuous and touch mode 7. Optional attachment for low speed shaking with Microplate, Microtubes & others 8. **Minimum two years onsite warranty**
13	**PORTABLE PH METER**	1. pH Range: -1.0-15 pH 2. Resolution : 0.01 pH 3. Temperature Range : 0.0 to 50ºC 4. Temperature compensation: ATC 5. LCD Display : Dual display LCD (2.1 x 2.7 cm) 6. Power Supply : 4 x 1.5 V 'A 76' micro alkaline batteries 7. Calibration check facility & Calibration Error indication 8. Water Proof 9. **Minimum two years onsite warranty**
14	**MICRO-CENTRIFUGE**	1. It should have Maximum Speed not less than 6000 RPM 2. It should have Microprocessor controlled digital display of speed & Time 3. It should have Variable speed with timer 4. It should have Brush less than DC motor

		5. It should have Safety lid lock 6. It should have noise level less than 55db 7. It should have Place for maximum 8x 1.5/2.0 microcentrifuge tube 8. **Minimum two years onsite warranty**
15	**ELECTROPORATOR**	1. Interfaces: USB 2.0 2. Power supply: 230 V, 50–60 Hz 3. Capacitor: 10 µF 4. Pulse form: Exponentially decreasing 5. Pulse voltage: 200–2500V 6. Resistance: 600 Ohm or better 7. Electronic protective circuit to prevent arcs 8. Time constant :Nominal 5 ms 9. System should have facility for transformation of bacteria, yeast or microorganisms with an optimum transformation efficiency of up to 1.8 x 10 to the power 10 transformant cells per µg of DNA. 10. Mainly for delivery of plasmid DNA, but also RNA, proteins and other small molecules 11. **Minimum two years onsite warranty**
16	**-80˚C UPRIGHT ULTRA LOW DEEP FREEZER**	1. Fully microprocessor controlled 2. Inner chamber should be made of quality corrosion resistant stainless steel (SS-304) with rounded corner & Outer chamber is made of heavy gauge cold rolled steel with anti microbial coating which eleiminaes 99.9% of surface becteria within 24 hrs 3. CFC/HCFC free insulation of thickness 5" of high density polyurethane foam insulation to maintain temperature for longer time during power failure at an ambient of 32˚C 4. There should be 2 nos. stainless steel shelves with 2 nos. inner doors to minimize cold air loss 5. There should be maximum 6 rack per freezer 6. Independent external Heavy door handle with locking arrangement 7. Inner door should have silicone seal to prevent temperature loss and Outer door should have safe silicone triple point seal Rim heating system by hot gas by pass to prevent ice collection on the gasket 8. Freezer must have capacity to hold minimum 60 boxes of 5 cm (2 inch) in height 9. System should have Programmable operating temperature from –50°C up to–86°C with 1°C increment 10. Ambient to-85 C pull down timing should be 5.3hrs 11. Noise level : <56 dba 12. Capacity : 100-120 lits 13. Compressor : Powerful compressor 2 x 1.0 HP (Cascade refrigeration) to attain desired temperature smoothly & quickly 14. Audible and visible alarms for temperature, power failure, system failure, etc. 15. Freezer must have ISO 9001 standard quality test requirements and IEC 61010 Electrical safety CE & UL

		certified. 16. Voltage control stabilizer: As per suitability of equipment 17. **Minimum two years onsite warranty**