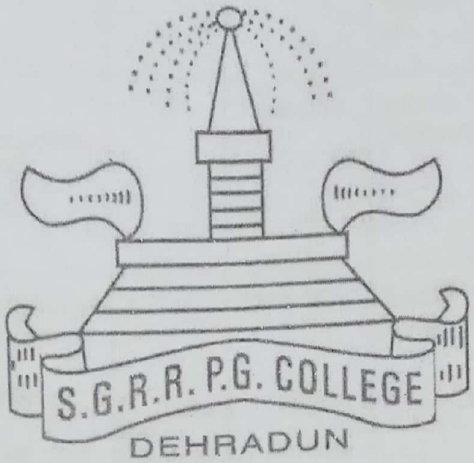
NEW

Lab Equipments List (2015-2021)



DEPARTMENT OF PHYSICS

S.G.R.R. (P.G.) COLLEGE,

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Lab Equipments UG/PG 2015-2021
Department of Physics
S.G.R.R. (P/G.) COLLEGE, DEHRADUN

Sl. No.	Name of Device	Quantity	Date	Bill No./ Invoice no.	Rate per quantity (with GST)	Total cost	Grant
1	**Melde's Experiment Complete** with Melde's set-up,Pully, pan, set of weight and Battery Eliminator(4V-12V) & 3 Amp. wooden meter scale	1	27-08-2019	BIO/19-20/00046	4307.00	4307.00	UGC-CPE Grant
2	**Measurement of the Coefficient of Viscosity of Water by Poiseuille's Method** The experiment consists of the following (a) Complete Viscosity set-up (b) Constant water level tank with stand (c) Rubber tube with pinch cork (d) Measuring cylinder (100 cc) (e) One plastic tray (f) Capillary sample with wooden stand ***Accessories required:*** (i) Digital Stop Clock with LC 1 sec. (table type) **Complete in all respect**	1	27-08-2019	BIO/19-20/00046	3363.00	3363.00	UGC-CPE Grant
3	**To Verify Mathimatical Operation Using of Logic Gates** AND, OR, NOT, NOR, X-OR, NAND and Buffer using IC's and **to Make** OR, NOR, NOT, AND & X-OR Gates and Using NAND Gates and Verify Their Truth Tables	1	27-08-2019	BIO/19-20/00046	3156.50	3156.50	UGC-CPE Grant
4	**To Study The Transistor Characteristics NPN** The following studies can be carried out: Input, output and transfer characteristics in CE and CB Configurations. **Complete in all respect** with two power supplies (0-12V), Two digital voltmeter and Two Digital Milliammeter, Transistors (SL-100) & patch chords	1	27-08-2019	BIO/19-20/00046	5374.90	5374.90	UGC-CPE Grant
5	**To Study The Transistor Characteristics PNP** The following studies can be carried	1	27-08-2019	BIO/19-20/00046	5374.90	5374.90	UGC-

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	out: Input, output and transfer characteristics in CE and CB Configurations. **Complete in all respect** with two power supplies (0-12V), Two digital voltmeter and Two Digital Milliammeter, Transistors (SK-100) & patch chords						CPE Grant
6	**Measurment of Dielectric Constant and Curie Temperature of Ferroelectric Ceramics (in the form of pallet) by temperature only** The set-up consists of; **(a) Probes** : Two with Spring Type Contact **(b) Sample** : Barium Titanate ($BaTiO_3$) **(c) Oven** : High quality temperature controlled oven. **(d) Dielectric Constant Unit** The set-up consists of two units **(i) Oven Controller** Range : Ambient to 473 K Resolution : 1 K Stability : 0.5 K Accuracy : 1 K Oven : Specially designed for this apparatus Sensor : RTD (A class) Display : 3½ digit, 7 segment LED auto polarity & decimal indication Power : 220V ± 10% , 50Hz, 150 W **(ii) Digital Capacitance Meter** Range : 18 - 6000pF Resolution : 1 pF Display : 3½ digit, 7 segment LED auto polarity & decimal indication Complete in all respect with manual and test results	1	27-08-2019	BIO/19-20/00046	37,180.62	37,180.62	UGC-CPE Grant
7	Ballistic Galvanometer with Lamp and Scale arrangement	1	27-08-2019	BIO/19-20/00046	5752.50	5752.50	UGC-CPE Grant
8	**Verifications of Stefan's Law and Determine Stefan's Constant 'σ' using bulb (Electrical Method)**	1	27-08-2019	BIO/19-20/00046	3504.60	3504.60	UGC-CPE Grant

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	Complete with Digital voltmeter and Ammeter, Bulb with regulated power supply.						
9	**To Determine the Thermal Conductivity of Bad Conductor by Lee's and Charlton's Conductivity Apparatus (Brass) with sample (Bakelite), Jointless Steam Boiler and two thermometer** Accessories required . (i) Screw Guage 1/20mm (ii) Vernier Callipers 6" IME type with same blast coating for fine numbering (iii) Digital Stop Clock with LC 1 sec. (table type) (iv) Hot Plate 1 KW **Complete in all respect**	1	27-08-2019	BIO/19-20/00046	8260.00	8260.00	UGC-CPE Grant
10	**To Determine The Specific Rotation of Cane Sugar Solution Using Half Shade Polarimeter.** The apparatus consists of the following (a)Polarimeter Half shade with adjustable height. (b)One polarimeter tube (200 mm). (c)Beaker and Measuring cylinder ***Accessories required:*** (i) **Sodium vapour lamp:** 35 watts fitted in well painted Aluminium box with stand and slit with Leak-proof transformer (for Sodium Lamp) fitted in well painted ms box with ON/OFF switch and indicator. **Complete in all respect except balance**	1	27-08-2019	BIO/19-20/00046	9776.30	9776.30	UGC-CPE Grant
11	**CHARACTERISTICS OF MOSFET** By the experimental set – up, it will be examinal the relationship between : 1. The Gate – to – Source Voltage (VGS). 2. The Gate Drain – circuit (ID). 3. The Drain – to – Source Voltage (VDS). Also it will be measure the corresponding VGS, ID and VDS values and graphically plot them to form a set of drain characteristics values. Digital Voltmeter. 0 – 20, Volt. Digital Milliammeter. 0 – 20, mAmp.	2	27-08-2019	BIO/19-20/00046	3687.50	7375.00	UGC-CPE Grant
12	**To determine the acceleration due**	1		BIO/19-	2696.30	2696.30	

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	to gravity at a place by means of Kater's Reversible Pendulum (Iron) with sharp knife edges. ***Other items required*** (i) Digital Stop Clock with LC 1 sec. (table type)		27-08-2019	20/00046			UGC-CPE Grant
13	**To Determine the Moment of Inertia of a Fly wheel about its on axis of rotation.** **Complete with Fly Wheel 8" Complete** with **counter**, wall bracket, set of weights (200 x 5 gm.), string, meter scale ***Accessories required*:** (i) Digital Stop Clock with LC 1 sec. (table type)	1	27-08-2019	BIO/19-20/00046	4277.50	4277.50	UGC-CPE Grant
14	**To determine the Value of Modulus of rigidity of the material of given wire by Maxwell Needle. Complete with** solid weight and 150 x 5 cm Al strip with complete assembly, meter scale and wire. *Other items required:* (i) **Digital Stop Clock** with LC 1 sec. (table type) (ii) **Screw Guage** 1/20 mm **Complete in all respect**	1	27-08-2019	BIO/19-20/00046	4206.70	4206.70	UGC-CPE Grant
15	**CHARACTERISTICS OF BIDIRECTIONAL DIODE THYRISTOR (DIAC) AND MEASUREMENT OF ITS PARAMETERS** Current – Voltage (Forward and Reverse) Characteristics of the DIAC. 2. Measurement of forward / reverse break – over voltage. 3. Measurement of Delta V. 4. DIAC as Saw Tooth Generator. D.C. Digital Voltmeter. 0 – 25, Volt. D.C. Digital Milliammeter. 0 – 25, mAmp. Digital Multimeter,	2	27-08-2019	BIO/19-20/00046	3245.00	6490.00	UGC-CPE Grant
16	STUDY OF TRANSISTORISED HARTLEY OSCILLATORS, **Study of Frequency variation in Hartley Oscillator with the change in Inductance.** • Circuit is engraved and components are mounted on the top of the decorated	1	27-08-2019	BIO/19-20/00046	2489.80	2489.80	UGC-CPE Grant

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	bakelite sheet to facilitate better and clear understanding. • I.C. Regulated and short circuit proof 15 Volt Power Supply suitable to the experimental board is builtin. • A complete working manual containing theory, circuit details and operating instruction provided. • Stackable type connecting leads suitable to the terminals are supplied with the board for easy inter – connections and longer working life of the terminals. • For generating different frequency three inductors are provided on the panel.						
17	STUDY OF TRANSISTORISED COLPITTS OSCILLATORS, **Study of Frequency variation in Colpitts Oscillator with the change in Capacitance** • Circuit is engraved and components are mounted on the top of the bakelite sheet to facilitate better and clear understanding. • I.C. Regulated and short circuit proof 15 Volt Power Supply suitable to the • experimental board is builtin. • A complete working manual containing theory, circuit details and operating instruction provided. • Stackable type connecting leads suitable to the terminals are supplied with the board for easy inter – connections and longer working life of the terminals. • For generating difference frequency three capacitors are provided on the panel.	1	27-08-2019	BIO/19-20/00046	2489.80	2489.80	UGC-CPE Grant
18	STUDY OF A TRANSISTOR AMPLIFIER (RC COUPLED) CUM-FEED-BACK AMPLIFIER, Study of basic circuit of a R.C.	1	27-08-2019	BIO/19-20/00046	10,472.50	10,472.50	UGC-

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	Coupled Amplifier. 2. Its frequency response. 3. Effect of negative feedback on the gain and frequency response of the amplifier. 4. Effect of positive feedback on the gain and frequency response of the amplifier. 5. Verification of the condition of oscillation. 6. Study of different classes of amplifier. 7. Current – Shunt Negative Feedback Amplifier 1. True R.M.S. A.C. Millivoltmeter, 2. Audio Frequency Oscillator,						CPE Grant
19	STUDY OF I-V CHARACTERISTICS OF UJT **Objective**: To plot V-I Characteristics of UJT. **Features**: Instrument comprises of Two DC Regulated Power supplies 0-15VDC/ 150mA & 0-30VDC/150mA, three round meters for voltage & current measurement, one UJT 2N2646 mounted behind the panel, connections of Supplies, Meters & UJT brought out at 4mm Sockets.	2	27-08-2019	BIO/19-20/00046	3363.00	3363.00	UGC-CPE Grant
20	**CRO (Analog)** Dual Trace Measuring CRO DC to 30 MHz with coarse and fine control for voltage and time/base BNC Connector	4	27-08-2019	BIO/19-20/00046	29,205.00	116820.00	UGC-CPE Grant
21	Hot plate		27-08-2019	BIO/19-20/00046			UGC-CPE Grant
22	**To Determine the Focal Length of Two Lenses by Nodal Slide and Locate the Position of Cardinal Point** The experiment consists of the following (a) Nodal slide assembly complete (b) One set of lens (c) Optical bench 50 cm twin bar type made of SS with 4 uprights (two variable & two fixed) **Complete in all respect**	1	18-09-2019	100	11210.00	11210.00	UGC-CPE Grant

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23	**Determine the Wavelength of Monochromatic Light by Newton's Ring** The **apparatus** consists of the following (a)Special Newton's ring mi30 mhz scope with X-Y-Z motion (b)Newton's ring assembly fixed with microscope with set of glass plate and lens ***Accessories Required:*** (i)Sodium vapour lamp 35 watts with transformer with housing and stand (ii)Spherometer double disc type (brass) with one glass plate **Complete in all respect**	1	18-09-2019	100	15,960.00	15,960.00	UGC-CPE Grant
24	**Thermal conductivity 'K' of Copper by using Searles Apparatus** **Complete with 1" size Copper Bar** fitted with four thermometer, Jointless copper Steam chamber, Beaker 250 cc and Rubber tube **except heating system** ***Accessories required*** (i) Digital Stop Clock with LC 1 sec. (table type) **Complete in all respect**	1	18-09-2019	100	6903.00	6903.00	UGC-CPE Grant
25	STUDY OF R – C PHASE SHIFT OSCILLATOR 1. To obtain the Phase Shift Vs. Frequency Characteristics of the feedback Network. 2. To study the Frequency Variation with change in R – C Values. 1. Audio Frequency Oscillator, 2. True R.M.S. A.C. Millivoltmeter, 3. Frequency Counter. (Optional)	1	18-09-2019	100	13128.00	13128.00	UGC-CPE Grant
26	**Analog Multimeter** to measure A.C./D.C.Voltage, D.C.Current and Resistance	2	16-09-2019	079	873.20	1746.40	UGC-CPE Grant
27	**To Study the Variation of Thermo e.m.f. Across Two Junction of a Thermocouple with Temperature D.C.Microvoltmeter** The Set up consists of the following : (a) Cu-Fe thermocouple with stand (b) Ice bath (c) Hot air bath with power supply (d)Thermometer : 0-350 °C (e) **Digital D.C. Microvoltmeter.**	1	16-09-2019	079	11,623.00	11,623.00	

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	Application : For very low D.C. voltage measurement. Range : 1mV, 10mV 100mV, 1V, 10V with 100% over ranging. Resolution : 1μV Accuracy : ± 0.25% ± 1 digit. Stability : + 1 digit Input Impedance : > 1000 MΩ on all ranges (except 10 MΩ at 10 V range) Display : 3 ½ digit, 7-segment LED display with auto-polarity & decimal indication. Power : 220V ± 10% , 50Hz **Complete in all respect**						UGC-CPE Grant
28	**Study of Basic Operational Amplifier (Non-Inverting), Type-741(For DC)** The following studies can be carried out: (a) Working of the basic circuit. (b) Measurement of bias and offset currents. (c) Working as Inverting and Non-Inverting amplifier and Voltage Follower for D.C. (d) Study of Amplifier drift. **Complete in all respect** including two IC regulated power supplies, Multirange electronic voltmeter, set of resistances, Patch chords	1	16-09-2019	079	3805.50	3805.50	UGC-CPE Grant
29	**CRO (Digital)** Dual Trace Measuring CRO DC to 30 MHz with coarse and fine control for voltage and time/base BNC Connector	4	02-08-2019	PCT/19-20/104	26,904.00	107616.00	UGC-CPE Grant
30	**To Verifiy the Truth Table of Full and Half Adder using AND,OR & EX-OR Gates**	2	02-08-2019	PCT/19-20/103	2065.00	4130.OO	UGC-CPE

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	Complete with 5V supply, logic level and logic level indicators, patch chords and manual.						Grant
31	**Coefficient of Thermal conductivity 'K' of Copper by using Angstrom's Method Complete with** Angstrom set-up with copper rod and three thermometers, Angstom Power supply fitted with voltmeter and ammeter and Digital Stop Clock with LC 1 sec. (table type)	1	02-08-2019	PCT/19-20/103	44250.00	44250.00	UGC-CPE Grant
32	**Study of Semiconductor Junction Diodes (Digital), (P-N Junction Diode)** The following studies can be carried out; Forward and reverse characteristics of Silicon, Germanium junction and Zener diode Complete with one IC regulated power supply (0-15V), Digital voltmeter and Milliammeter ,Silicon and Ge junction diode and zener diode (0ne each),patch chords and Manual	1	24-07-2019	HT/19-20/272	3469.20	3469.20	UGC-CPE Grant
33	**LED CHARACTERISTIC APP Zener Diode APP Digital MARS (9027)**	1	24-07-2019	HT/19-20/272	3865.68	3865.68	UGC-CPE Grant
34	**Study of Basic Operational Amplifier (Inverting), Type-741(For DC)** The following studies can be carried out: (a) Working of the basic circuit. (b) Measurement of bias and offset currents. (c) Working as Inverting and Non-Inverting amplifier and Voltage Follower for D.C. (d) Study of Amplifier drift. **Complete in all respect** including two IC regulated power supplies, Multirange electronic voltmeter, set of resistances, Patch chords	2	24-07-2019	HT/19-20/272	4361.28	8722.56	UGC-CPE Grant
35	**To Study the Wein's Bridge Oscillator using IC-741 Complete with** two power supplies, assorted values of capacitors, resistances, one electric bulb fitted on board, potentiometer,patch chords and manual **except CRO**	2	24-07-2019	HT/19-20/272	2874.48	5748.96	UGC-CPE Grant

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36	**Auto range 3 ¾ Digital Multimeter (Hand-Held)** Measure AC/DC Voltages and Current, Resistance, capacitance, diode, continuity, h_{FE}, duty cycle , Frequency and temperature measurement D.C.Voltage : 400 mV,4V,40V,400V ,1000V : Resolution 0.1 at 400 mV A.C.Voltage(TR) : 400 mV,4V,40V,400V ,750V : Resolution 0.1 at 400 mV D.C.Current : 400 uA,4000uA,40mA/400mA,10A : Resolution 0.1 uA at 400 u A.C.Current : 400 uA,4000uA,40mA/400mA,10A : Resolution 0.1 uA at 400 u Frequency Range : 40 Hz to 1KHz Resistance : 400 Ω,4kΩ, 40kΩ, 400kΩ,4M ,40M : Resolution 0.1 Ω at 400 Ω Capacitance : 10nF,100nF,1uF,10uF,100uF, 1mF,10mF,100mF Resolution : 10pf at 10nF Frequency : 100 Hz,100Hz,10 kHz, 100 kHz, 100 kHz,1MHz, 30 MHz Resolution : 0.01 Hz Diode and Continuity Tester	1	24-07-2019	HT/19-20/272	3568.32	3568.32	UGC-CPE Grant
37	STUDY OF BINARY ADDER / SUBSTRACTOR USING I.C. – 7483 (4–BIT) To study operation of Binary Adder / Substractor • The experimental board is designed to study binary addition and SUBSTRACTION of 4 – bits. • The basic circuit has 4 cascaded full adder circuits with one Ex – OR gates as controlled inverter. • The complete Circuit is PRINTED with control	1	24-07-2019	HT/19-20/272	3270.96	3270.96	UGC-CPE Grant

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	switches (as inputs) on the panel of the experimental board. • The Four outputs and one carry (Cyn) are indicated by LED's. • An a another switch is provide for ADD or SUB mode. • A complete working manual giving theory, circuit details and operating instruction supplied with the experimental board. • Builtin I.C. Regulated and short circuit proof ± 5 Volts d.c. Power Supply suitable to the experimental board. • Stackable type connecting leads suitable to the terminals are supplied with the board for easy inter – connections and longer life of the terminals.						
38	**1. Hall Probe (Ge Crystal) or (InAs Crystal):** Contacts : Soldered Hall Voltage : 8 - 10 mV/100 mA/KG 2. Hall Effect Set-up (Digital) (a) Digital Millivolmeter: Range : 0 - 200.0 mV Resolution : 100 µV Accuracy : ±0.1% of reading ±1 digit Impedance : 1 Mohm Special Features : Auto Zero & polarity indicator Overload Indicator : Sign of 1 on the left & blanking of other digits. (b) Constant Current Power Supply Current range : (0 - 20 mA) or as required for the particular Hall Probe Resolution : 10 µA Accuracy : ±0.2% of the reading ±1 digit Load regulation : 0.03% for 0 to full load Line regulation : 0.05%	1	01-12-2020	PCT/20-21/071	79,650.00	79,650.00	RUSA Grant

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	for 10% 3. Electromagnet, Field Intensity : 7.5 K gauss at 10 mm. The air-gap is continuously variable with two way knobbed wheel screw adjusting system. Pole Pieces : 50 mm diameter. Normally flat faced pole pieces are supplied with the magnet. Energising Coils : Two, each coil is wound on non magnetic formers and has a resistance of about 3.0 ohm. Yoke Material : 'U' shaped soft iron Power Requirement : 0 - 30 V @ 4.0 A, if coils are connected in series. 4. Constant Current Power Supply, Current Range : 0 - 4 A (or as desired) Load Regulation : 0.1% for load resistance variation from zero to maximum Line Regulation : 0.1% for ± 10% mains variation Protected : Electronically protected against overload or short circuit Display : 3½ digit, 7 segment LCD DPM 5. Digital Gaussmeter Range : 0 - 2 K gauss & 0 - 20 K gauss Resolution : 1 gauss at 0 - 2 K gauss range Accuracy : ± 0.5% Display : 3½ digit, 7 segment LED Detector : Hall probe with an Imported Hall Element Power : 220V, 50 Hz Special : Indicates the direction of the magnetic field.Digital Gaussmeter,						
39	Electricity lab (Training system) DC Power Supply : 5V, 200mA AC Power Supply : 6V, 1A Relay : 5V Galvanometer : 30 - 0 - 30 Galvanometer Resistance : 80W Light Bulbs : 6V Potentiometers : 25W, 1W, 10kW,	1	01-12-2020	PCT/20-21/071	17,051.00	17,051.00	RUSA Grant

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	1W Switch : 1 Pole, 2 Way Toggle type Core Types : E, I, U Training System Includes Components box with a. Resistors b. Capacitors c. Transistors d. Diode e. Potentiometer E, I, U cores Set of coils Magnetic compass Bar magnets Screw driver Multimeter Connection patch cords CBT covering all the above experiments						
40	Electronic Digital Bread Board (Digital Circuits Development Platform) Size of Breadboard : 172.5 mm x 128.5 mm Tie Points on Breadboard : 1685 nos (solderless) DC Power Supplies : +5V, 1A; -5V, 500 mA (fixed) +3V to +15V, 500 mA (variable) -3V to -15V, 500 mA (variable) Pulser Generator : 1Hz to 1MHz in 6 steps (Variable in between the steps) Amplitude : +3V to +15V (CMOS), 5V (TTL) Duty Cycle : 50 %, TTL/CMOS output Pulser Switches : 2 nos (Push to 'On') Data Switches : 16 nos (Toggle switches) (TTL/CMOS output) Bicolor LED Display : 16 nos (TTL/CMOS input) BCD to 7 Segment Display : 2 nos Logic Probe : Logic level indicator (H/L)for TTL/CMOS mode (7 segment display) Mains Supply : 110-220V ± 10%, 50/60Hz Weight : 3 Kgs. Approximately Dimensions (mm) : W 326 x H 52 x D 252 Product Included Accessories : Breadboards (solderless) : 2 nos Connecting wires : 20 nos 2mm to 1mm Patch cords : 16 nos 2mm to 2mm Patch cords : 16 nos Mains cord : 1 no	1	01-12-2020	PCT/20-21/071	20248.80	20248.80	RUSA Grant
41	Fresnal Biprism Optics Bench Length : 1 m Sodium Lamp Wavelength : 5893Å	1	01-12-2020	PCT/20-21/071	34102.00	34102.00	RUSA Grant

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	Wattage : 35W Biprism Dimension : 50 x 40 mm Material : Glass Refractive Index : 1.54 Convex Lens Type : Double Convex Focal Length : 100 mm Diameter : 50 mm Micrometer Eyepiece Range : 30-0-30 mm Least Count : 0.005 mm Screen Horizontal Scale : 100-0-100 mm Vertical Scale : 85-0-85 mm						
42	Energy band Gap by Four Probe method **Technical Specification** Range : (0-200.0 mV) & (0-2.000 V) Resolution : 100mV at 200mV range Accuracy : ± 0.1% of reading ±1 digit Impedance : 10M Ohm Display : 3 1/2 digit, 7 segment Display (12.5mm height) with auto polarity and decimal Indication.	1	01-12-2020	PCT/20-21/071	26727.00	26727.00	RUSA Grant
43	Manual Hydraulic Press with Die and Agate mortar and pestle diameter 5 inch **Specification** **Hydraulic Press Capacity: up to 20 Tons** **Die : 4mm, 6mm, 8mm, 10mm** **Agate mortar and pestle diameter : 5 inch**	1	09-02-2021	PCT/20-21/141	85,500.00	85,550.00	Research Grant
45	Furnance : Temp. upto 1200^{0}C	1	09-02-2021	PCT/20-21/141	104430.00	104430.00	Research Grant
46	**Ultrasonic Nebulizer** **ECHNICAL SPECIFICATIONS** *** Max nebulizing rate : > 2ml /min** *** Medicine cup capacity: 50 ml** *** Setting of Nebulization time : Continuously or from 0 to 60 min for a time setting**	1	09-02-2021	PCT/20-21/141	7280.00	7280.00	Research Grant

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