CSIR-CENTRAL GLASS & CERAMIC RESEARCH INSTITUTE

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Testing Schedule and Charges for utilization of Testing & Analysis Facility of CSIR-CGCRI, Kolkata

(With effect from 01.04.2025)

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TESTING OF ADVANCED CERAMICS & COMPOSITES

Sl. No.	Name of the Test(s)	Sample Specification	Rate(s) per Samples (Rs.)
1)	**Control atmosphere Sintering,** Atmosphere: Argon/ Nitrogen/ Vacuum: 10- 3 torr **Basic charge up to 1500ºC** for 1 hr.	Maximum Sample size: 50mm dia. x 100 mm height	21340.00
2)	**Extra. Charge per hour** for above mentioned Test in '**Sl. No. 1**'		1730.00
3)	**Control atmosphere Sintering,** Atmosphere: Argon/ Nitrogen/ Vacuum: 10- 3 torr **Basic charge between 1500ºC-1800ºC** for 1 hr.		26740.00
4)	**Extra.** Charge per hour for the test mentioned in '**Sl. No. 2**'		2300.00
5)	**Control atmosphere sintering,** Atmosphere: Argon/Nitrogen/ Vacuum: 10- 3 torr **Basic charge between 1800ºC-2000ºC** for 1 hr.		32030.00
6)	**Extra. Charge** per hour for the test mentioned in '**Sl. No. 5**'		2650.00
7)	**Control atmosphere sintering,** Atmosphere: Argon/Nitrogen/ Vacuum: 10- 3 torr **Basic charge between 2000ºC-2200ºC**, for Max. of 30 min holding		4140.00
8)	**Hot Pressing at Temperature: 1700ºC**, Presser: 5 Mpa, Atmosphere: Argon/ Nitrogen/ Vacuum: (10-3 torr)	Maximum Sample size: 70mm dia. x 50mm height	34680.00
9)	**Extra. Charge per hour** for the Test, mentioned in '**SL. No. 8'** and the Cost of Graphite die will be extra as per design		2820.00
10)	**Hot Pressing** at Presser of 35 MPa with Atmosphere: Argon/ Nitrogen **Basic charge up to 1500ºC** for 1 hr.	Maximum Sample size: 170 mm dia. X 100 mm height	87860.00
11)	**Extra. Charge per hour** for the test. mentioned in '**SL. No. 10'**		6790.00
12)	**Hot pressing** at Presser of 35 MPa with Atmosphere: Argon/ Nitrogen **Basic charge between 1500ºC-1800ºC** for 1 hr.		10470.00
13)	Extra. Charge per hour for the test mentioned in '**SL. No. 12**'		8110.00
14)	**Hot pressing** at Presser of 35 MPa with Atmosphere: Argon/ Nitrogen **Basic charge between 1800ºC-2000ºC** for 1 hr.		146460.00
15)	**Extra. Charge per hour** for the test, mentioned in '**SL. No. 14'**		13400.00
16)	**Hot pressing** at Presser of 35 MPa with Atmosphere: Argon/ Nitrogen **Basic charge between 2000ºC-2200ºC,** for 1 hr.		175670.00
17)	**Extra. Charge per hour** for the test, mentioned in '**SL. No. 16'**		26740.00
18)	**Spark Plasma Sintering Furnace** with Pressure of 35MPa and Atmosphere of Argon/Nitrogen/Vacuum for **Sample Dia.** 20-30 mm **Basic charge for up to 1500ºC** for 5 min.	Maximum Sample size: dia. 80 mm and height 10 mm	15670.00
19)	**Spark Plasma Sintering Furnace with** Pressure of 35MPa and Atmosphere of Argon/Nitrogen/Vacuum for **Sample Dia.** 20-30 mm		18290.00

	Basic charge for between 1500°C-2000°C for 5 min.		
20)	**Spark Plasma Sintering Furnace with** Pressure of 35MPa and Atmosphere of Argon/Nitrogen/Vacuum for **Sample Dia.** 20-30 mm **Basic** charge for >2000°C for 5 min.		19840.00
21)	**Extra. Charge per 5 min** for holding for the above-mentioned tests, as mentioned in '**Sl. Nos. 18-20'**		1610.00
22)	**Spark Plasma Sintering Furnace with** Pressure of 35MPa and Atmosphere of Argon/Nitrogen/Vacuum for **Sample Dia.** 60-80 mm **Basic charge up to 1500°C** for 5 min.		15670.00
23)	**Spark Plasma Sintering Furnace with** Pressure of 35MPa and Atmosphere of Argon/Nitrogen/Vacuum for **Sample Dia.** 60-80 mm **Basic charge between 1500°C-2000°C** for 5 min.		18290.00
24)	**Spark Plasma Sintering Furnace with** Pressure of 35MPa and Atmosphere of Argon/Nitrogen/Vacuum for **Sample Dia.** 60-80 mm **Basic charge between >2000°C** for 5 min.		19840.00
25)	**Spark Plasma Sintering Furnace with** Pressure of 35MPa and Atmosphere of Argon/Nitrogen/Vacuum for **Sample Dia.** 60-80 mm **Extra. Charge per 5 min** of holding for the tests as mentioned in '**Sl. Nos. 22-24'**		1610.00
26)	**Thermal Conductivity** (per run)	Dia 12.4-12.6 mm Thickness 2-2.5 mm	5750.00

TESTING OF MECHANICAL PROPERTIES

Sl. No.	Name of the Test(s)	Sample type/nature	Sample Specification	Rate(s) per Samples (Rs.)
27)	**Determination of Glass to Resin Ratio** (Glass/Ash content) as per IS:10182	FRP/Composite materials	○ Laminated Sheet: size 150 mm x 150 mm (No. of sample: 1 pc per Set) **OR** ○ Corrugated Sheet: of size 20-22 mm x 20-22 mm (No. of sample: 6 pc per Set)	1730.00
28)	**Density/Specific Gravity** for Composites (FRP/Plastics) as per ASTM:0792, IS: 10182, D4762-11a	FRP/Composite materials	For IS: Standards: ○ Laminated Sheet of size 25 mm x 12.7 mm (No. of sample: 3 pc per Set) **OR** ○ **Corrugated Sheet:** 25 mm x 12.7 mm No. of sample: 3 pc per Set)	1730.00
29)	**Viscosity** as per D2857-95 (2007)	Liquid Resin/ Finical	Minimum quantity of sample: 500 ml	2820.00
30)	Monomer Content/**Solid Content** as per D3749-08	Liquid Resin	Minimum quantity of sample: 100 ml.	1500.00
31)	**Determination of Gel Time**, as per ASTM:2471	Liquid Resin	Minimum quantity of sample: 500 ml.	1730.00
32)	Determination of **Gel Time with Peak** Exothermic Temperature as per ASTM D2471	Liquid Resin	Minimum quantity of sample: 500 ml.	2820.00
33)	TEX MEASUREMENT ISO	Glass Roving	Quantity of sample require: 10 Meters	1210.00
34)	**Barcol Hardness** ASTM: D2583, IS:12866 & BS:4994	Plastic/FRP Composite	○ **Laminated Sheet**: size 50 mm x 50 mm (No. of	1210.00

		material	sample: 2 pc per Set) **OR** o **Corrugated Sheet**: size 100 mm (L) x 30 mm (W) (No. of sample: 2 pc per Set)	
35)	**Water Absorption** as per ASTM: D570, IS: 10182	FRP Composite/ Plastics materials	o **Laminated Sheet**: size for ASTM: 76 mm (L)x 25 mm (W) OR Size for IS: 38 mm (L) x 38 mm(W) (No. of sample: 3 pc per Set) **OR** o **Corrugated Sheet**: size 50 mm x 50 mm (No. of sample: 3 pc per Set)	1730.00
36)	**Tensile Test for metals** as per ASTM: E8 with Crosshead (Loading) speed **<0.5 mm/min** (for **1 Pc. of sample**)	Metal	Sample shall be provided by the Party as per requirement of Standards	1730.00
37)	**Tensile Test for metals** as per ASTM: E8 with Crosshead (Loading) speed **<0.5 mm/min** (for **5 Pcs. of sample**)			7020.00
38)	**Tensile Test for metals** as per ASTM: E8 with Crosshead (Loading) speed **>0.5 mm/min** (for **1 Pc. of sample**)			980.00
39)	**Tensile Test for metals** as per ASTM: E8 with Crosshead (Loading) speed **>0.5 mm/min** (for **5 Pcs. of sample**)			4260.00

40)	**Flexural strength** (Cross- breaking)/ Bending Strength / Modulus of Rupture: **For Advance Ceramics** as per ASTM: C1341-06;	Ceramic & Advanced ceramics	Need ready-to-test samples shall be provided for testing as per specifications for respective samples.
			For Bar type sample:
			o **Glass**: 250 mm (L) x 40 mm (W) x 10 mm (T) - 10 pcs per Set;
			o **Ceramic**: 130-150 mm (L) x 10-25 mm (W) x 5-10 mm (T) – 10 Pcs samples per Set;
			o **Cement/Plaster of paris**: 250 mm (L) x 12.7 mm (W) x 25 mm (T) - 10 pcs. samples per Set;
			For Rod type Sample:
			o **Glass:** 6- 8 mm (dia.) x 120mm(L) - 10 pcs sample per Set;
			o **Ceramics**: 4 mm (dia.) x 120 mm(L) - 10 Pcs. samples per Set;
			o **Composites**: dimensions to be confirmed from testing in-charge (as per type of material)
				2820.00

41)	**Flexural strength** (Cross- breaking)/ Bending Strength / Modulus of Rupture: For **Glass** as per ASTM: C158	Glasses		2820.00
42)	**Flexural strength** (Cross- breaking)/ Bending Strength / Modulus of Rupture: For **Ceramic** as per ASTM: C674 & C689	Ceramic		2820.00
43)	**Flexural strength** (Cross- breaking)/ Bending Strength / Modulus of Rupture: For **FRP/Plastics** as per ASTM: D790 / BS: 2782 or IS: 10182	FRP / Plastics / Composite		2820.00
44)	**Measurement of Young's Modulus** for **Glasses** as per ASTM: C158	Glass/ Ceramic/ FRP/ Composites/ Plastics	**A) For Ceramic**: o Size:60mm(L)x6mm(W) x 5mm(T) **OR** o Size: 50mm(L)x5mm (W) x 4mm(T)	2820.00
45)	**Measurement of Young's Modulus** for **Ceramic** as per ASTM: C674 & ASTM: C689			2820.00

46)	**Measurement of Young's Modulus for FRP/ Plastics** as per ASTM: D790 & IS: 10182		o No. of sample: 5 Pcs/Set **B) <u>Composite</u>:** o sample dimensions to be confirmed by testing in-charge according for respective type of material	2820.00
47)	**Tensile Strength**/ Test for **Composites, Rubbers & Polymers**	Composites, Rubbers & Polymers	Finished sample with following dimensions must be provided by the Party a) Laminated Sheet of thickness range of >3mm to <10mm for as per IS & ASTM Standards b) No. of samples: 5 Pcs. sample per Set	2820.00
48)	**Young's modulus /E-modulus** for Composites, Rubber & Plastics	Composites, Rubber & Plastics		2820.00
49)	**Percent Elongation** for **FRP/Plastic** samples as per standards: for **Polymer-Composites:** ASTM: D638- 10	Composites, Plastics etc.	Finished sample with following dimensions must be provided by the Party a) Laminated Sheet: thickness of >3mm to <10mm for as per IS and b) b) No. of samples: 5 Pcs. sample per Set	2820.00
50)	**Percent Elongation** for **FRP/Plastic samples** as per standards: for FRP/Plastics: ASTM: D638, BS: 2782 & IS: 10182.			2820.00
51)	**Tensile Strength** of **Single Fiber** as per ASTM: D3379	Single Fiber (Glass/Carbon/ Jute/ Coir)	a) Specimen must be provided by the Party as per requirement of Standards b) No. of sample: 10 pcs. samples per Set	4260.00
52)	**Impact Test** (Charpy & Izod) as per ASTM: D256, BS: 2782 & IS: 10182	Glass, Ceramic, Composites & Plastics / FRP/ Plastics	o Specimen must be provided by the Party as per requirement of respective Standards o No. of sample: 10 pcs sample per Set	2820.00
53)	**Load Deflection Test** for **FRP Corrugated Sheets** as per IS:12866, BS: 4154	FRP Corrugated Sheet	o Sample dimensions: min. of 5-ft (L)x3.6 ft (W) or 5 ft 6 inch (L) x 4 ft(W) o No. of sample: 3 pcs /set	2820.00
54)	**Bolt-Shear Test** for **FRP Corrugated Sheet** as per IS:12866, BS: 4154	FRP Corrugated Sheet	Specimen size: 150 mm (L) x 30 mm (W) as per Standards requirement o No. of sample: 6 pcs. per set	2820.00
55)	**Shear Bond Strength** for **Resin-Zirconia/ Dental Cement base sample**	Resin-Zirconia/ Dental Cement base sample	o A batch of five nos. test samples must be provided by the Party	2820.00
56)	**Young's Modulus by Resonance**/ Elastosonic method as per ASTM: C1259-21	Ceramic and Metal	o Finished sample must be provided by the Party as per requirement Standard o No. of sample: 5 Nos./set (Parallel Surface)	4660.00
57)	**Compressive Strength/ Crushing Load** as per ASTM:C1424-10	Ceramic/ Composite/ Refractory	o Finished sample should be provided by party as per requirement of Standard o No. of sample: 5 Nos. (Parallel Surface)	2820.00
58)	**Vicker's Micro Hardness** as per ASTM:C1327- 08 / **Knoop Hardness**	Ceramic/ Glass/ Metal Ceramic/ Glass/ Metal	o **<u>For Cubic sample</u>**: 5 mm x 5mm x 5mm o **<u>For Disc sample</u>**:5~10 mm (dia.) x 4 mm (Thick) o No. of sample: 6 pcs/set o Surface finish: Flat-Parallel surface and One surface must be polished	3630.00
59)	**Vicker's Macro hardness** by using **Macro**		o Sample size: 20mm x 20mm x 5mm parallelo-	5870.00

	indenter (100-300 N load) (data only)		piped samples **OR** 25mm(dia.) x 8-12 mm (Thickness)	
60)	**Vicker's Macro hardness** by using Macro indenter (100-300 N load) **with data and indent's optical picture with scale bar**,			7020.00
61)	**Vicker's Micro hardness** Data using Micro indenter (10-30 N load) (data only)			4660.00
62)	**Vicker's Micro hardness** Data using Macro indenter (10-30 N load) with data and indent's optical picture with scale bar,			5870.00
63)	**Fracture Toughness** for **Glass and Ceramics** by the Single Edge Notched Beam (SENB) Technique (data only)	Glass and Ceramics	o Sample size: 50mm(L)x5mm(W)x4 mm(T) parallelopiped samples o No. of sample: 5 Nos.	9320.00
64)	**Fracture Toughness** for **Glass and Ceramics** by the Single Edge Notched Beam (SENB) Technique (data only) along with load displacement plots			11680.00
65)	**Fracture Toughness** for **bulk glass and Ceramics** by Indentation Method using Macro-indenter (load: 100-300N) (**data only**)	Bulk Glass and Ceramics	o Sample size (mm): 25x25x10 parallelepiped samples or Discs of 25 mm (dia.) x 10 mm (thickness) o No. of sample: 5 Nos.	7020.00
66)	**Fracture Toughness** for **bulk glass and Ceramics** by the Indentation Method using Macro indenter (100-300 N load) **with indent's optical pictures with scale bar**			9260.00
67)	**Fracture Toughness** for **Glass and Ceramics** by the Indentation Method using Macro indenter (100-300 N load) with optical pictures with scale bar and crack length & hardness data	Glass and Ceramics	o Sample size (mm): 25x25x10 parallelepiped samples or Discs of 25 mm (dia.) x 10 mm (thickness) o No. of sample: 5 Nos. per set	11680.00
68)	**Fracture Toughness** for **Glass and Ceramics** by the Indentation Method using Micro indenter (10-30 N load) (data only)			5870.00
69)	**Fracture Toughness** for **Glass and Ceramics** by the Indentation Method using Micro indenter (10-30N load) with optical image with scale bar.			7020.00
70)	**Fracture Toughness** for **Glass and Ceramics** by the Indentation Method using Micro indenter (10-30 N load) with optical pictures with scale bar and crack length and hardness data			9260.00
71)	**Nano-hardness of Glass** by Nano-indentation method (0.01 μN- 12,000 μN) (**data only**)	Glasses	o Sample size: 25x25x10 mm	17480.00
72)	**Nano-hardness of Glass** by Nanoindentation method at load range of (0.01 μN- 12,000 μN) with indent's **Scanning Probe image**,			20930.00
73)	**Nano-hardness of Glass** by Nanoindentation method at load range of (0.01 μN- 12,000 μN) with indent's **Scanning Probe image and load vs. depth plots**			23180.00
74)	**Nano-hardness of Bulk ceramics** by Nanoindentation method at **load range (0.01 μN-12,000 μN) (data only),**	Bulk ceramics	o Sample size: 25x25x10 mm	17480.00
75)	**Nano-hardness of Bulk ceramics** by Nanoindentation method at load range (0.01 μN 12,000 μN) with **indent's Scanning Probe image**			20930.00
76)	**Nano-hardness of Bulk ceramics** by Nanoindentation method at load range (0.01 μN 12,000 μN) with indent's **Scanning Probe image and load vs. depth plots**			23180.00
77)	**Nano-hardness of thin films** by Nanoindentation method at load range (0.01 μN 12,000 μN) (**data only**),	Thin films / coatings	o Sample size: 25x25x10 mm	17480.00

78)	**Nano-hardness of thin films** by Nanoindentation method at load range (0.01 μN 12,000 μN) with indent's **Scanning Probe image**			20930.00
79)	**Nano-hardness of thin films** by Nanoindentation method at load range (0.01 μN 12,000 μN) with indent's Scanning Probe image and load vs. depth plots			23180.00

CHEMICAL ANALYSIS / CHARACTERISATION

Sl. No.	Name of the Test(s)	Sample Specification	Rate(s) per Samples (Rs.)
80)	**Quantitative chemical analysis of ceramic raw materials**, finished products and industrial waste for determination of **09 constituents**: SiO_2, Al_2O_3, Fe_2O_3, TiO_2, CaO, MgO, Na_2O,K_2O and loss on ignition	Minimum 100g powdered sample	16050.00
81)	**Quantitative chemical analysis by wet-chemical method** for determination of **each** of the following constituents SiO_2, Fe_2O_3, TiO_2, CaO, MgO, PbO, BaO, SrO, ZnO, CdO, CuO, MnO2, Li_2O,CoO, NiO, B_2O_3, SO_3, Na_2O & K_2O)	Minimum 50g powdered sample	3340.00
82)	**Quantitative chemical analysis by Wet-chemical method** for determination of each of the following constituents (Al_2O_3, ZrO_2,Cr_2O_3, P_2O_5)	Minimum 50g powdered sample	5700.00
83)	**Quantitative chemical analysis by ICP AES** for determination of each element (Si, Al, Fe, Ti, Ca, Mg,Na, K, Li, Sr, Ba, Mn, Zn, Zr, Cu, Cr, Ni, Co, Mo, Pb, Cd, Pt, Pd, As, Sb, S, P, Ag)	Minimum 50g powdered sample	4660.00
84)	**Quantitative chemical analysis** by AAS (**Atomic Absorption Spectroscopy)** for determination of each element **(Pb, Cd, As)**	Minimum 50g powdered sample	3340.00
85)	**Quantitative chemical analysis** by **UV-VIS Spectrophotometer** for determination of each element **(Fe, Ti)**	Minimum 50g powdered sample	3340.00
86)	**Quantitative chemical analysis** by **Flame photometer** for determination of each element **(Na_2O, K_2O, Li_2O)**	Minimum 50g powdered sample	3340.00
87)	Quantitative chemical analysis of **Fluoride / Chloride** by **Ion selective electrode**	Minimum 50g powdered sample	3340.00
88)	Determination of **loss on ignition / ash content** of carbonaceous material / graphite	Minimum 50g powdered sample	3340.00
89)	Grading of glass for **Alkalinity** as per IS : 2303-1994	Minimum 500g solid sample (not powdered)	4660.00
90)	Determination of **Lead and Cadmium** extracted from Glazed Ceramic surfaces as per ASTM C 738-94 **(Each element)**	Minimum 6 pieces of sample	4660.00
91)	**Acid Resistance of bricks** as per IS:4860-1968	Minimum 500g solid sample (not powdered)	4660.00
92)	**Chemical Analysis of Water:** pH measurement	Minimum quantity of sample require: 1 liter	1730.00
93)	**Chemical Analysis of Water:** Hardness test		7420.00
94)	**Chemical Analysis of Water:** TDS test		3740.00
95)	**Chemical Analysis of Water:** Arsenic by FI-HG-AAS		4660.00
96)	**Chemical Analysis of Water:** Fluoride / Chloride		1730.00
97)	**Chemical Analysis of Water:** ICP-AES analysis of each element (Si, Al, Fe, Ca, Mg, Na, K, Sr, Ba, Mn,		2300.00

	Zn, Cu, Cr, Ni, Co, Mo, Pb, Cd, S, P)		
98)	**Chemical analysis of castable** (Al_2O_3, Fe_2O_3, TiO_2, CaO)	Minimum 100g powdered sample	9430.00
99)	**Quantitative chemical analysis of Glass & Frit** for following constituents: For SiO_2 (wet chemical method) :	Minimum 100g	3340.00
100)	**Quantitative chemical analysis of Glass & Frit** for following constituents: For B_2O_3 (wet chemical method)		3340.00
101)	**Quantitative chemical analysis of Glass & Frit** for following constituents: Al_2O_3, Fe_2O_3, TiO_2, CaO, MgO, Na_2O, K_2O (ICP-AES Method, 7 x Rs. 2300.00)		16100.00
102)	**Quantitative chemical analysis of Glass & Frit** for the constituents mentioned in **Sl. Nos. 99-101**: **Total cost of tests, mentioned in Sl. Nos. 99-101)**		**22780.00**
103)	**Quantitative chemical analysis** of Silica Ramming mass and Rice Husk Ash for following constituents: **SiO_2 (by wet chemical method) :**	Minimum quantity of sample require: 100g	3340.00
104)	**Quantitative chemical analysis** of Silica Ramming mass and Rice Husk Ash for following constituents: Loss of Ignition, LOI (by wet chemical method) :		3340.00
105)	**Quantitative chemical analysis** of Silica Ramming mass and Rice Husk Ash for following constituents: Al_2O_3, Fe_2O_3, TiO_2, CaO, MgO, Na_2O, K_2O (by ICP-AES Method, 7 x Rs. 2300.00)		16100.00
106)	**Quantitative chemical analysis** of Silica Ramming mass and Rice Husk Ash for the constituents, mentioned in **Sl. Nos. 103-105**: **Total cost (for testes mentioned in Sl. Nos. 103-105)**		**22780.00**
107)	**Quantitative chemical analysis of Fly Ash** for following constituents/components: For SiO_2 (wet chemical method) :	Minimum quantity of sample require: 100g	3340.00
108)	**Quantitative chemical analysis of Fly Ash** for following constituents/components: For Loss of Ignition, LOI (by wet chemical method) :		3340.00
109)	**Quantitative chemical analysis of Fly Ash** for following constituents/components: For Al_2O_3 (wet chemical method) :		5700.00
110)	**Quantitative chemical analysis of Fly Ash** for following constituents/components: For Fe_2O_3, TiO_2, CaO, MgO, Na_2O,K_2O (by ICP AES Method, 6 x Rs.2300.00)		13800.00
111)	**Quantitative chemical analysis of Fly Ash** for following /components, mentioned in **Sl. Nos. 107-110**: **For Total cost of tests, mentioned in Sl. Nos. 107-110**		**26180.00**
112)	**Quantitative chemical analysis of Magnesite** for following constituents: For SiO_2 (wet chemical method) :	Minimum 100g	3340.00
113)	**Quantitative chemical analysis of Magnesite** for following constituents: For Loss of Ignition, LOI (by wet chemical method) :		3340.00
114)	**Quantitative chemical analysis of Magnesite** for following constituents: For MgO (wet chemical method) :		3340.00
115)	**Quantitative chemical analysis of Magnesite** for following constituents: For Al_2O_3, Fe_2O_3, TiO_2, CaO, Na_2O, K_2O		13800.00
116)	**Quantitative chemical analysis of Magnesite** for following constituents: By ICP AES Method, 6 x Rs. 2300.00)		13800.00
117)	**Quantitative chemical analysis of Magnesite** **For Total cost of tests, as mentioned in SL. Nos. 112-1116**		**23820.00**

118)	Determination of % Sodium dichromate ($Na_2Cr_2O_7$) as per IS:249- 1979	Minimum 50g powdered sample	7310.00
119)	**Sample preparation charges** for chemical analysis		1500.00

TESTING & ANALYSIS OF ENERGY MATERIALS & DEVICES

Sl. No.	Name of the Test(s)	Sample Specification	Rate(s) per Samples (Rs.)
120)	**Li-ion coin cell fabrication** (2032 type) **without powder processing or casting**		2130.00
121)	**Li-ion coin cell fabrication** (2032 type) **including powder processing and casting**	○ Minimum quantity of sample require: 1 gm	4140.00
122)	**Galvanostatic charge-discharge cycling** (Range: 6 V, 500 mA): **Up to 3 cycles**	Ready-to-test sample	2130.00
123)	**Galvanostatic charge-discharge cycling** (Range: 6 V, 500 mA): up to **10 cycles**		6100.00
124)	**Galvanostatic charge-discharge cycling** (Range: 6 V, 500 mA): **up to 50 cycles**		10070.00
125)	**Galvanostatic charge-discharge cycling** (Range: 6 V, 500 mA): **up to 300 cycles**		20240.00
126)	**Cyclic voltammetry** (Limit: 6 V & 1 A) At Normal Scan (**scan rate: ≥ 1 m V/s**)		4140.00
127)	**Cyclic voltammetry** (Limit: 6 V & 1 A) At slow Scan (**scan rate: < 1 m V/s**))		6100.00
128)	**Electrochemical impedance spectroscopy** (Range: **1 mHz to 100 kHz**)		2130.00
129)	Other electrochemical tests		Rate as per request

CHARACTERIZATION OF THERMAL & OTHER PHYSICAL PROPERTIES

Sl. No.	Name of the Test(s)	Sample type/nature	Sample Specification	Rate(s) per Samples (Rs.)
130)	**Co-efficient of linear Thermal Expansion** and supply of data with Curve, **Glass transition**, **Softening point**, etc. [DIN:51045, ASTM E 831-86], **RTE, TDA-Thermal Dilatometer Analysis, INST.**: NETZSCH make Dilatometer 402C For **Test Temperature Up to 1200°C** (with only heating curve)	**Solid cylindrical**	○ Sample size: 25 mm (L) x 6-8 mm (dia) ○ No. of sample: 3 identical specimens for each set	3970.00
131)	**Co-efficient of linear Thermal Expansion** and supply of data with Curve, **Glass transition**, **Softening point**, etc. For **Test Temperature Up to 1500°C** (with only heating curve)			5870.00
132)	**Extra charge for cooling curve** for above mentioned Tests in **Sl. Nos. 130-131**, if required			1500.00
133)	**Co-efficient of linear Thermal Expansion** and supply of data with Curve, **Glass transition**, **Softening point**, etc. For **Test Temperature - 40°C to 400°C**		○	5500.00
134)	**Differential thermal** analysis **(DTA):** [DIN: 51007, ASTM E 473-85] for Temperature **up to 1200°C** (only heating curve)	**Powder**	○ 200 mg /10 micron (approxly)	5470.00
135)	**Differential thermal** analysis **(DTA):** [DIN: 51007, ASTM E 473-85]			6790.00

	For **Temperature up to 1500°C** (only heating curve)			
136)	Extra charge for cooling curve for the Tests as mentioned in '**Sl. No. 134-135**', if required			1500.00
137)	**Thermo-gravimetric** analysis **(TGA):** [DIN: 51006, ASTM E 914-83] For **Temperature upto 1200°C (only heating curve)**	**Powder**	○ 200 mg /10 micron (approxly)	5470.00
138)	**Thermo-gravimetric** analysis **(TGA):** [DIN: 51006, ASTM E 914-83] For **Temperature Up to 1500°C (only heating curve)**			6790.00
139)	Extra charge for cooling curve for the tests as mentioned in **Sl. Nos. 137-138**, if required			1500.00
140)	**Determination of Specific heat: [ASTM E 1269]; DSC**-Differential Scanning Calorimetry For **Temperature Up to 1000°C (only heating curve)**	**Powder/ Bulk**	Powder**:** 200 mg /Bulk: 5.2 mm dia/0.25 - 0.5mm thick	6790.00
141)	**Determination of Specific heat: [ASTM E 1269]; DSC**-Differential Scanning Calorimetry For **Temperature Up to 1400°C (only heating curve)**			8110.00
142)	**Extra charge** for cooling curves the tests as mentioned in **Sl. Nos. 140-141**, if required			1500.00
143)	Determination of **Thermal Conductivity** (within 80°C) at single temperature point; **(a) Solid Sample only RT;** (b) Liquid/Paste sample at any temperature within 80°C	**Solid/ Liquid/ Paste**	○ For Bulk sample (Dia: 50mm. x 20.5 mm (H) No. of sample: 2 nos. of identical samples) ○ For Liquid/paste sample: 80 cc/ ○ for Powder samples: 25cc	10990.00
144)	Determination of **Thermal Conductivity** up to 400°C			14550.00
145)	Determination of **Thermal Conductivity** up to 1000°C			31740.0
146)	**Particle Size** Analysis (**micron range**) using LASER Diffraction System [ISO:13320-1]	**Powder**	○ Sample quantity: 1 gm	6100.00
147)	**Nano particle size** analysis by **DLS** (Dynamic Light scattering) method	**Dispersion**	○ Sample: 20 ml dispersed sol.	5290.00
148)	**Zeta potential Measurement**			5290.00
149)	**Isoelectric point** determination			7020.00
150)	**Surface area** measurement by **BET** method [ASTM B 922-10]	**Powder**	○ Power sample of ~30 cc	5470.00
151)	**Measurement of Pore volume** and **Pore size** by **N_2** gas adsorption (if surface area >20 m^2/gm)			8110.00
152)	Measurement of **Density** of sample (any shape) by Gas Pycnometry`	**Solid / powder**	○ 100 cm^3 volume / 3-5 mm	1730.00
153)	**Pore size distribution** by **Mercury Porosimeter:**[ASTM D 4284-07]	**Solid**	○ Powder sample: 15 cc or ○ Solid sample: 6mm x 3mm x 4 mm ○ Quantity: 10 -15 pieces.	5075.00
154)	**Porosity** measurement (Bulk Density to be provided by user)			5075.00
155)	Determination of **carbon content** in sample (Carbon Analyser C 600 LECO, USA)		○ For liquid sample: 4 ml ○ For Powder sample: 5-10 cc	2420.00
156)	Determination of **Nitrogen** content in sample by LECO TC 600 O_2/N_2 determinator		○ 4 ml for liquid sample/ 4mm x 4 mm x 10 mm for solid sample	2420.00
157)	Determination of **Oxygen** content in sample		○ 4 ml for liquid sample/ 4mm x 4 mm x 10 mm for solid sample	2420.00
158)	Evaluation of **Rheological Properties** of gels, pastes and other viscous substances.	Slurry	Sample require: 50 ml	3630.00

	For **Flow characterization**			
159)	Evaluation of **Rheological Properties** of gels, pastes and other viscous substances. For **Creep and relaxation analysis**		Sample require: 50 ml	3630.00
160)	Evaluation of **Rheological Properties** of gels, pastes and other viscous substances. For **Thixotropic analysis**		Sample require: 50 ml	3630.00
161)	Evaluation of **Rheological Properties** of gels, pastes and other viscous substances. For **Oscillation**		Sample require: 50 ml	3630.00
162)	**Magneto-Rheology** (at 3 magnetic field values)	**Slurry**	50 ml	4950.00
163)	**Fourier-Transform Infrared (FTIR) Spectroscopy, absorption/emission spectra**	**Powder/Film**	500 mg	1000.00
164)	**Sample preparation** charge as applicable			1210.00

XRD/ XRF / XPS

Sl. No.	Name of the Test(s)	Sample Specification	Rate(s) per Samples (Rs.)
165)	**XRD Diffractogram without** any analysis Basic charge	Sample type: Powder or Solid; Sample Qty. require: 5 g. per sample Sample type: Thin Film Sample size: 2.5cm (L) x1.5cm (W) x 0.5cm (T min.) or 6 cm (L) x 3cm (W) 1cm(T-Max.)	2130.00
166)	**Extra charges** for results in Soft Copy for the test mentioned in **Sl. No. 165**		180.00
167)	**XRD Diffractogram with qualitative** phase analysis	**-do-**	3630.00
168)	**XRD Diffractogram with quantitative** phase analysis with sample containing **less or equal to three phases** (multiphase	**-do-**	7020.00
169)	XRD Diffractogram with **quantitative** phase analysis with sample containing **more than three phases** (multi- phase)	**-do-**	11680.00
170)	**XRD Diffractogram with only amorphous phase** quantification	Minimum 10 gms powder	7020.00
171)	**Semi-Quantitative elemental analysis** by X-Ray Florescence (XRF)	Minimum 8 gms powder	8580.00
172)	**To Study the materials interaction** at atomic level by using **XPS (X-ray photo-electron spectroscopy)**	50 mg powder of Pellet of 5mm diameter sample	10570.00

Scanning Electron Microscopy (FESEM) and EDAX analysis

Sl. No.	Name of the Test(s)	Sample Specification	Rate(s) per Samples (Rs.)
173)	**High Resolution Micro-structural analysis** by FESEM (Field Emission Scanning Electron Microscopy) including **conducting coating and 6 micrographs**). (FS)	Sample size for Bulk: 2 mm x 2mm x 0.5 mm (min), or 10mm x10mm x 5 mm (max) For powder sample: 100 mg (min) ~ 1 g (max)	7080.00
174)	**Extra** for FESEM Micrograph in SOFT COPY (as mentioned in **Sl. No. 173**)		180.00
175)	**Additional** charges for FESEM Micrographs (**a package of 4**) (FS-A) (as mentioned in **Sl. No. 173**)		980.00

176)	**Elemental Analysis** by **Energy Dispersive X-Ray** Analysis (**EDX**) in FESEM (including conductive coating).	For Bulk: 2 x 2 x 0.5mm(min); 10 x 10 x 5mm (max): For Powder: 100 mg.(min) 1gm.(max)	8230.00
177)	**Extra Charge for Soft copy for the test, as mentioned in Sl. No. 176**		180
178)	**Elemental Distribution Analysis EDX Line Scanning/ Dot Mapping in FESEM** (including conductive coating) (EDX- LS)	For Bulk: 2 x 2 x 0.5mm (min); 10 x 10 x 5 mm (max): For Powder: 100 mg.(min) 1gm.(max)	10760.00

Transmission Electron Microscopy (TEM) and EDAX Analysis

Sl. No.	Name of the Test(s)	Sample Specification	Rate(s) per Samples (Rs.)
179)	**Transmission Electron Microscope (TEM)** studies (Includes powder sample preparation only and 6 micrographs)	Powder:100mg(min) 1gm(max)	9040.00
180)	**Charges for additional Micrographs** (a package of 4)	------	1500.00
181)	**Sample Preparation charges for TEM Study:** For bulk sample	Sample size: min. 3mm (dia.) x 10mm (L) or Max. 10mm (L) x 10mm(W) x 20mm(H)	5470.00
182)	**Sample Preparation charges for TEM Study:** For Cross-sectional view of thin films/layers on substrates	Sample size: min. 2.5mm(W) x 10mm(L) x 0.2mm(T) or max. 2.5mm(W)x x 10mm(L) x 1mm(T)	8230.00
	EDAX analysis		
183)	**Elemental Analysis** by **Energy Dispersive X-Ray Analysis (EDX)** in SEM/FESEM/TEM (Including conductive coating).	Same as TEM sample	8230.00
184)	**Elemental Distribution Analysis EDX** Line Scanning in SEM / FESEM/TEM (Including conductive coating) (EDX-LS)	Same as TEM sample	10760.00
185)	**Elemental Distribution Analysis EDX Dot Mapping** in SEM / FESEM/TEM (Including conductive coating) (EDX-DM)	Same as TEM sample	10760.00

ELECTRICAL & SURFACE PROFILE OF THIN FILMS & COATINGS

Sl. No.	Name of the Test(s)	Sample Specification	Rate(s) per Samples (Rs.)
186)	**Current- Voltage property** of some films using I-V Source measuring unit	Films	1210.00
187)	**Determine the surface profile of coating** & Thin films by Profilometer	Thin Films	390.00

TESTING OF GLASSES & RELATED MATERIALS

Sl. No.	Name of the Test(s)	Sample Specification	Rate(s) per Samples (Rs.)
188)	Generation of **Glass Annealing Curve** including **Co- efficient of linear thermal expansion**, **Dilatometric Softening Point**, **Strain Point** and **Annealing Point**.	6-8 mm (dia) x 25 mm length	80040.00
189)	**Co-efficient of linear thermal expansion** of Glass and supply of data with Curve including	6-8 mm (dia) x 25 mm length	6270.00

	Dilatometric Softening Point.		
190)	**Spectroscopic measurement** of overall transmission in **UV/Visible/NIR**	25mm x 25mm x at actual thickness	1570.00
191)	**Determination of Glass Type:** Whether Sheet Glass or Float Glass	100mm x 100mm x at actual thickness	7190.00
192)	**Determination of Glass Thickness**	At actual size and thickness. Sample should be flat	1900.00
193)	Determination of **Density** of Glass	10mm cube – 20mm cube /rectangular block	2650.00
194)	**Measurement of Refractive index (n)** at one **wavelength of light**	20mm x 20mm x 2mm	3630.00
195)	**Extra for measurement of Refractive index (n)** at each additional Wavelength	20mm x 20mm x 2mm	1500.00
196)	**Measurement of Refractive index** (n_d) and **Abbe number** (V_d) at standard wavelength	20mm x 20mm x 2mm	3090.00
197)	**Determination of Abbe number** (V_d) only at standard wavelength	20mm x 20mm x 2mm	3090.00
198)	**Polarization** test for toughened window glasses	100mm-200mm x 100mm- 200 mm x at actual thickness	6270.00
199)	**Softening Point** Test	5mm x 5mm x 3mm	7710.00
200)	**Optical microscopic** observation of Glass	20 -25mm x 20 -25mm x 2-5mm thick parallel optical polished surfaces	9260.00
201)	**Residual Stress test** (for Glasses)	50 – 150 mm x 50 – 150 mm x 50 – 150 mm	9660.00
202)	**Expert opinion on the overall result on Glass** (for 5 samples Max.)		13400.00
203)	**Samples for Tempered or Toughening of opal glass** articles/transparent glass articles	As such product	25820.00
204)	**Fabrication/ Sample preparation charge** wherever applicable		2000.00
205)	**Thermal Shock Resistance/** Thermal durability	As such product (1 ft x 1 ft)	25820.00
206)	**Young's modulus, Poisson's Ratio and Bulk Density**		5470.00
207)	**Viscosity Measurement** using FRS 1800 High temperature Viscometer (Anton Paar, Austria)	100g powder sample	29510.00
208)	**Glass Melting in Platinum crucible**		19225.00
209)	**Glass Melting in Refractory crucible**		11730.00
210)	**Raman Spectroscopy**	Powder, bulk samples, thin films Range: 50 – 3000 cm-1: Laser Sources: (i) 488nm Argon ion laser (20mW) 785nm diode laser (100mW). Detector: TE cooled CCD detector; Additional: Equipped with LINKAM temperature controller (- 150°C to 600°C)	1620.00
211)	**Vicker's/Knoop Micro** Hardness only data	10mm x 10mm x actual thickness	4660.00
212)	**Vicker's/Knoop** Micro Hardness data with optical picture	1" x 1" X actual thickness	5870.00
213)	**Detection of defects** like cracks, bubbles, scratches, un- melted particles in Glass lenses of glass blocks samples by shadow technique		25300.00
214)	**Expert Opinion** on above -mentioned Test (Sl No. 204)		5470.00
215)	**Measurement of Contact Angle** (at SGD)	Coated or uniform shaped flat sample dimension (Sample size Minimum 1" x1" to Maximum 4 " x 4")	1380.00
216)	**Fragmentation Test**	Min 600mm x 600mm	31000.00

REFRACTORY & TRADITIONAL CERAMICS				
Sl. No.	**Name of the Test(s)**	**Sample Type**	**Sample Specification**	**Rate(s) per Sample (Rs)**
217)	**Sieve Analysis** as per IS: 1528 (Part – XIV): Dry	Refractory Sample	1 kg material (minimum)	2300.00
218)	**Sieve Analysis** as per IS: 1528 (Part – XIV): Wet (single sieve)			3220.00
219)	**Size tolerance** as per IS: 1528 (Part – X)	Brick	Minimum 30 nos. of sample or as desired by the party	810.00
220)	PCE/Refractoriness (Pyrometric Cone Equivalent) as per IS:1528 (Part-I)		1 kg material (-72 BS)	6250.00
221)	RUL (Refractoriness Under Load) as per IS:1528 (Part-II)		50mm dia x 50mm height (2 nos.)	6250.00
222)	**PLCR (Permanent Linear Change after Reheating)** as per IS:1528 (Part-VI: **Up to 1400°C for 5 hours**		50 x 50 x 60 mm / 50 mm dia 60 mm height (5 nos. of samples)	10760.00
223)	**PLCR (Permanent Linear Change after Reheating)** as per IS:1528 (Part-VI: Above 1400°C and up to 1600°C for 5 hrs			13920.00
224)	**Spalling resistance test** as per IS:1528 (Part-III) Prism method by air quenching up to 1000°C (Thermal Shock Resistance)		3" x 2" x 2" or 50 mm (dia) x 50mm (H) (3 nos. of samples)	15360.00
225)	**CCS (cold Crushing Strength)** as per IS:1528(Part- IV) (Sample preparation charge extra)		3" cube or std. size bricks (5nos. of samples)	2300.00
226)	**Hot MOR** (upto 1400°C) IS : 1528 (Part XX)	Brick/Preferred Castable	150 mm x 25 mm x 25 mm (5 nos. of samples)	10320.00
227)	**CMOR (Cold Modulus of rupture)** as per IS: 1528 (Part-V) (Sample preparation charge extra)	Standard Brick/ Castable	160 x 40 x 40 mm or std. size bricks (5 nos. of samples)	2300.00
228)	**Water Absorption/Apparent Porosity/ Bulk density/ Apparent Specific gravity** as per IS : 1528 (Part- VIII) (**Sample preparation charge extra**)	Brick	65 x 65 x 40mm or std. size bricks (5nos. of samples)	2300.00
229)	**True density/Specific gravity** as per IS:1528 (Part- IX) (Sample preparation charge extra)	Brick/Castable	500 gm powder (150 micron)	2650.00
230)	**True porosity / Closed Porosity** as per IS:1528 (Part XV) (Sample preparation charge extra)		Standard Bricks (5 nos. of samples)	4370.00
231)	**Compressive strength/ modulus of rupture** as per IS:10570: **after 24 hrs. curing**	Monolithic /Castable	6 kg sample for a particular temperature	3220.00
232)	**Compressive strength/ modulus of rupture** as per IS:10570: **after 72 hrs. curing**			3740.00
233)	**Compressive strength/ modulus of rupture** as per IS:10570: after **firing at temp upto 1000°C** (3 hrs.)			8630.00
234)	**Compressive strength/ modulus of rupture** as per IS:10570: after **firing at temp upto 1400°C** (3 hrs)			12310.00
235)	**Compressive strength/ modulus of rupture** as per IS:10570: after **firing at temp upto 1550°C** (3 hrs)			13920.00
236)	**Firing** in electric furnace: **upto 1000°C (5 hrs.)**		As desired by the party	7190.00
237)	**Firing** in electric furnace: **upto 1500°C (5 hrs.)**			10760.00
238)	**Firing** in electric furnace: **upto 1700°C (5 hrs.)**			15000.00
239)	**Abrasion Resistance**/Abradability index as per B.S. 1902 Part-1A By Morgan Marshal	Refractory sample	3" x 2" x 1" ; 4nos. of samples	4370.00

	Index Method			
240)	**Static Cup Slag Resistance**		Sample details	15360.00
241)	**MOHS' Scale Hardness**		Regular shape sample with smooth surface (Defect Free)	1730.00
242)	**Dry & Fired Shrinkage** (each) (firing Charge extra)			2300.00
243)	**Creep Test upto 1500°C:** for **5 to 25 h**	Pre fired Refractory Sample	50 mm dia x 50 mm height; 10-12 mm dia (two identical sample)	17410 .00
244)	**Creep Test upto 1500°C:** for **5 to 50 h**			34500.00
245)	**Thermal Diffusivity** up to 1000°C for Ceramic Sample			4220.00
246)	Sample preparation charge as applicable			1610.00
247)	Sample preparation charge for **Fabrication of Castable Samples** (per sample)			2650.00
248)	**Expert Opinion**			5470.00

TESTING OF TRADITIONAL CERAMICS

Sl. No.	Name of the Test(s)	Sample Type	Sample Specification	Rate(s) per Sample (Rs)
249)	**Water Absorption** as per IS 13630 (Pt 2) /Apparent Porosity/ Bulk density	Fired samples	Minimum. 5 nos	2300.00
250)	**Firing Between 1000°C to 1350°C** in electric furnace (one firing) and examination of fired characteristics like: Colour, Shrinkage, Water Absorption, Apparent Porosity and Bulk density		Size of the tiles: 6'x 6' and 8' x 8' (No of tiles max. four) on each cycle	13920.00
251)	**Determination of Moisture Expansion** using boiling water- unglazed tiles as per IS:13630 (Pt 3) - 1992	Unglazed tiles	Minimum. 5 nos	2820.00
252)	**Determination of Thermal shock resistance of tiles** as per IS: 3630 (pt %)-1992 +	Tiles	Minimum. 5 nos	2420.00
253)	**Determination of Water Absorption** is must for the tests, mentioned in **SL. Nos. 250-251**)			2300.00
254)	**Determination of modulus of rupture** as per IS:13630 (part 6)-2006	Tiles	Minimum. 7 nos./ As per IS 13630 (part 6): 2006	800.00
255)	**Burnt Clay Building Bricks** as per IS-3495:1992 for **Water Absorption** (Pt - 2)		Minimum. 5 nos. /As per IS 5454 (1978)	2420.00
256)	**Burnt Clay Building Bricks** as per IS-3495:1992 for Efflorescence (Pt - 3)		Minimum. 5 nos.	4140.00
257)	**Burnt Clay Building Bricks** as per IS-3495:1992 for Warpage (Pt - 4)			4140.00

TESTING OF VARIOUS TYPES OF CERAMIC BODIES				
Sl. No.	**Name of the Test(s)**	**Sample Type**	**Sample Specification**	**Rate(s) per Sample (Rs)**
258)	Grit Content	Clay sample		980.00
259)	Water of Plasticity	Clay sample		1610.00
260)	Plasticity By Hand Feel	Clay sample		340.00
261)	Atterbeg Number	Clay sample		1100.00
262)	Slaking test	Clay sample		340.00
263)	Dry Liner Shrinkage			530.00
264)	Dry/Green/Fired MOR (without firing)	Clay sample		800.00
265)	FIRED Color	Clay sample		340.00
266)	Water Absorption, Apparent Volume Porosity, bulk density	Clay sample		2300.00
267)	Total Linear Shrinkage	Clay sample		530.00
268)	Water Absorption, Apparent Porosity, Bulk density with fabrication of bar and one firing upto 1300^0C (Max) (Single mix up to 24 hrs. grinding/ max. ten samples or 1 kg. batch)	Clay sample	Single mix upto 24 hrs. grinding/ max. ten samples or 1 kg. batch	11390.00
269)	Dry & Firing Shrinkage with fabrication of bar and one firing upto 1300^oC (Max)		Single mix upto 24 hrs. grinding/ max. ten samples or 1 kg. batch	10870.00
270)	Sample preparation Charges	Clay sample		1060.00
271)	**Expert Opinion on types of Tiles/Bricks**			**5470.00**

MEMBRANE AND SEPARATION TECHNOLOGY RELATED				
Sl. No.	**Name of the Test(s)**	**Sample Type**	**Sample Specification**	**Rate(s) per Sample (Rs)**
272)	Liquid permeability of water through porous samples	Sintered porous ceramic / metallic material	i. Sample shape & size: (a) Flat sample: φ 5 mm – 50 mm, sample thickness: 2 mm-10 mm (max) (b) Hollow tube of single channel / multichannel configuration: Outer dia.- 6mm, 10mm, 25mm & 34mm; Sample length- 200 mm to 1000 mm ii. Operating water pressure: up to 10 bar. Sample information needed: material of composition, sintering temperature, total porosity (approx.), toxicity (if any), any special instruction.	2000.00

SAMPLING & ANALYSIS FOR WATER AND WASTEWATER			
Sl. No.	**Name of the Test(s)**	**Sample volume /Quantity**	**Rate(s) per Sample (Rs)**
273)	Sample Processing / Pre-treatment Charge		1150.00
274)	pH	500 ml	190.00
275)	Temperature	500 ml	120.00
276)	**Conductivity**	500 ml	190.00
277)	**DO** (Dissolved Oxygen)	500 ml	460.00
278)	**BOD**	1 ltr	1840.00
279)	**Oil & Grease**	500 ml	690.00
280)	**Turbidity**	500 ml	190.00
281)	**COD** (Chemical Oxygen Demand)	1 ltr	920.00
282)	Total Kjeldal Nitrogen	500 ml	1150.00
283)	**Total Dissolved Solid**	500 ml	350.00
284)	Determination of Fluoride, Chloride, Bromide, Nitrate, Sulphate, Phosphate: Ion Chromatography analysis	500 ml	4030.00
285)	Determination of Lithium, Sodium, Potassium, Calcium, Magnesium, Copper, Nickel, Zinc, Cobalt, Cadmium, Iron: Ion Chromatography analysis	500 ml	4030.00
286)	**Total Suspended Solids**	500 ml	690.00
287)	**Total Organic Carbon**	500 ml	1150.00
288)	Through pore size measurement: by bubble point method Measurable data: (i) Min. pore size (ii) Max. pore size (iii) Mean Flow Pores size (iv) Bubble point flow & Pressure	i) Sintered porous ceramic / metallic material ii) Sample shape & size: (a) Flat sample: φ 2.5 cm ± 0.1 mm, sample thickness: 0.5 mm – 1.0 mm (b) Hollow tube of single channel / multichannel configuration: Outer dia.- 10 mm, 25 mm & 34 mm; Sample length- 110 mm (min) to 1000 mm (max) iii) Pore size range: 0.15 µm (min.) to 100 µm iv) Wetting liquid: water. v) Sample information: material of composition, sintering temperature, total porosity (approx.), toxicity (if any), Mercury Intrusion Pore size measurement data (optional), any special instruction.	2600.00

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