

The following testing facilities of fibrous, non-fibrous raw materials, Pulp, Paper, Black Liquors & Effluent Samples can be availed on payment basis:-

| S.No                            | Test                                                                                                           | Charges (Rs) | Method            |
|---------------------------------|----------------------------------------------------------------------------------------------------------------|--------------|-------------------|
| <b>ANALYSIS OF RAW MATERIAL</b> |                                                                                                                |              |                   |
| 1.                              | Hot water solubility                                                                                           | 605          | TAPPI T 207 cm-99 |
| 2.                              | N/10 NaOH solubility                                                                                           | 605          | APPITA P5M-61     |
| 3.                              | Alcohol – Benzene solubility                                                                                   | 605          | TAPPI T 204 cm-97 |
| 4.                              | Holocellulose (chloride)                                                                                       | 2,200        | Wise et.al. 1946  |
| 5.                              | Total lignin                                                                                                   | 2,200        | TAPPI T 222 om-02 |
| 6.                              | Pentosan                                                                                                       | 2,200        | UV Method         |
| 7.                              | Ash                                                                                                            | 605          | TAPPI T 211 om-02 |
| 8.                              | Silica                                                                                                         | 2,200        | CPPRI             |
| 9.                              | Determination of useful fibre in bagasse                                                                       | 2,750        | TAPPI UM 3        |
| 10.                             | Photomicrograph from Compound Microscope                                                                       | 2,200        | IS:5285-1998      |
| <b>PULPING &amp; BLEACHING</b>  |                                                                                                                |              |                   |
| 1.                              | Raw material evaluation – pulping, bleaching & pulp evaluation (optimization of cooking & strength properties) | 66,000       |                   |
| 2.                              | Pulping optimization (Soda or Kraft)                                                                           | 33,000       |                   |
| 3.                              | Bleaching optimization (CEH or ECF or TCF)                                                                     | 33,000       |                   |
| 4.                              | Oxygen delignification ( per experiment)                                                                       | 8,250        |                   |
| 5.                              | Oxygen delignification followed by CEH or ECF or TCF bleaching optimization                                    | 44,000       |                   |
| <b>ANALYSIS OF PULP</b>         |                                                                                                                |              |                   |
| 1.                              | N/10 NaOH solubility                                                                                           | 605          | APPITA P5M-61     |
| 2.                              | Alpha cellulose                                                                                                | 2,200        | TAPPI T 203 cm-99 |
| 3.                              | Klason lignin                                                                                                  | 2,200        | TAPPI T 222 om-02 |
| 4.                              | Pentosan                                                                                                       | 2,200        | UV Method         |

|     |                                                       |       |                   |
|-----|-------------------------------------------------------|-------|-------------------|
| 5.  | Ash                                                   | 605   | TAPPI T 211 om-02 |
| 6.  | Silica                                                | 2,200 | CPPRI             |
| 7.  | Copper Number                                         | 605   | TAPPI T 430 cm-99 |
| 8.  | CED viscosity                                         | 1,100 | SCAN C 15:62      |
| 9.  | Kappa No.                                             | 1,100 | TAPPI T 236 om-99 |
| 10. | Soda Loss                                             | 1,100 | TAPPI UM 212      |
| 11. | Hexouronic acid in pulp                               | 3,300 | CPPRI             |
|     | <b>PULP EVALUATION</b>                                |       |                   |
| 1.  | Beating & Sheet formation (PFI mill or Valley Beater) | 9,900 | ISO 5364          |
| 2.  | Bauer McNett Fibre Classification                     | 3,300 | TAPPI T 233 cm-82 |
| 3.  | Filler & Fines retention                              | 6,600 | CPPRI             |
| 4.  | Freeness (CSF)                                        | 1,100 | ISO DP 5269       |
| 5.  | Shive analysis of high yield pulp                     | 3,300 | CPPRI             |
| 6.  | Water retention value (WRV) in pulp                   | 5,500 | Jayme's met       |
| 7.  | Zero Span Tensile Strength (ZSTS) of Pulp             | 2,200 |                   |
|     | <b>PAPER TESTING - PHYSICAL PROPERTIES</b>            |       |                   |
| 1.  | Abrasion resistance (Taber)                           | 1,650 | CPPRI             |
| 2.  | Air resistance (Gurley)                               | 605   | ISO 5636          |
| 3.  | Ash content                                           | 605   | ISO 2144/1762     |
| 4.  | Bursting strength                                     | 605   | ISO 2758          |
| 5.  | Cobb sizing test                                      | 605   | ISO 535           |
| 6.  | Concora Medium Test (CMT)                             | 1,100 | SCAN P 27-69      |
| 7.  | Grammage                                              | 605   | ISO 536           |
| 8.  | Folding Endurance                                     | 605   | ISO 5626          |
| 9.  | In plane tear test                                    | 1,100 | CPPRI             |
| 10. | Klemm absorbency                                      | 605   | SCAN P 13-64      |
| 11. | Moisture                                              | 605   | ISO 287           |
| 12. | Paper dimensional stability                           | 3,300 | SCAN P 28-69      |
| 13. | pH (Hot Extract)/(Aq.Extract)                         | 605   | ISO 6588-2/6588   |
| 14. | Porosity (Bendtsen)                                   | 605   | ISO 5636-3        |
| 15. | Ring crush test                                       | 1,100 | SCAN P 34-71      |

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| 16. | Roughness (Parker print surf)                                                                                             | 605    | ISO 8791-4      |
| 17. | Sp. Scattering Coefficient                                                                                                | 605    | SCAN C 27-69    |
| 18. | Bending resistance                                                                                                        | 605    | ISO 2493-1      |
| 19. | Tearing strength                                                                                                          | 605    | ISO 1974        |
| 20. | Tensile energy absorption (TEA)                                                                                           | 1,650  | ISO 1924-2      |
| 21. | Tensile strength                                                                                                          | 605    | ISO 1924-2      |
| 22. | Thickness (Micron)                                                                                                        | 605    | ISO 534         |
| 23. | Water absorptivity (Blotter)                                                                                              | 605    | ISO 5269        |
| 24. | Wax pick strength                                                                                                         | 825    | CPPRI           |
| 25. | Wet tensile strength                                                                                                      | 605    | ISO 3781        |
| 26. | Tensile stiffness orientation (TSO) in Paper                                                                              | 2,200  | L & W           |
| 27. | Static & Dynamic Friction in paper                                                                                        | 2,200  | TAPPI 549/om-90 |
| 28. | Z Direction Tensile Strength                                                                                              | 2,200  | ISO 15754       |
| 29. | Short Span Compression Test (SCT)                                                                                         | 2,200  | ISO 9895        |
| 30. | Crumpling Test                                                                                                            | 4,400  | IGT             |
| 31. | Particle size Distribution Analysis (Using Horiba Laser Scattering Analyser)                                              | 4,400  | Horiba LA - 920 |
| 32. | Calendering (Soft/Hard Nip) Experiment for one Paper Sample                                                               | 2,200  | CPPRI           |
| 33. | Coating trail with one coating chemical & coated paper evaluation                                                         | 22,000 | CPPRI           |
| 34. | Fracture Toughness of paper                                                                                               | 1,100  | Scan P 77       |
| 35. | Bursting Energy of paper                                                                                                  | 1,100  | ISO 2758        |
| 36. | Water retention tester of coating color                                                                                   | 2,200  |                 |
| 37. | Wet end chemical evaluation on one type of pulp                                                                           | 27,500 | CPPRI           |
| 38. | Evaluation of filler for optical characteristics, Particle size distribution & Paper characteristics for one type of pulp | 22,000 | CPPRI           |
| 39. | Comparitive calibration check of paper testing instruments                                                                | 2,200  | CPPRI           |
| 40. | Formation index of paper (Look Through)                                                                                   | 2,200  | CPPRI           |

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|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|--------------------------------|
| 41. | Surface Topography analysis of paper                                                                                                                                                                          | 2,750                                                                | CPPRI                          |
| 42. | Equivalent Black Area (EBA) By<br>Paprican Micro Scanner                                                                                                                                                      | 1,100                                                                | TAPPI                          |
|     | <b>OPTICAL PROPERTIES</b>                                                                                                                                                                                     |                                                                      |                                |
| 1.  | Brightness                                                                                                                                                                                                    | 605                                                                  | ISO 2470                       |
| 2.  | CIE, colour coordinates                                                                                                                                                                                       | 1,100                                                                | CIE 1967                       |
| 3.  | Dominant wave length                                                                                                                                                                                          | 1,100                                                                | CPPRI                          |
| 4.  | Opacity                                                                                                                                                                                                       | 605                                                                  | ISO 2471                       |
| 5.  | Transparency                                                                                                                                                                                                  | 605                                                                  | DIN 5033                       |
| 6.  | Whiteness                                                                                                                                                                                                     | 605                                                                  | -                              |
| 7.  | Yellowness                                                                                                                                                                                                    | 605                                                                  | -                              |
| 8.  | Gloss                                                                                                                                                                                                         | 605                                                                  | ISO 8254-1                     |
|     | <b>PRINTING PROPERTIES</b>                                                                                                                                                                                    |                                                                      |                                |
| 1.  | Fluff testing                                                                                                                                                                                                 | 3,300                                                                | -                              |
| 2.  | <b>IGT Printability Test SS</b><br>- Oil absorbency<br>- Picking velocity<br>- Print Density<br>- Print gloss<br>- Printing smoothness<br>- Printing through<br>- Gravure printing<br>- Covering power of ink | 1,650<br>1,650<br>2,475<br>1,100<br>2,475<br>1,650<br>1,650<br>1,650 | ISO DIS-3783                   |
| 3.  | Flexo Printing                                                                                                                                                                                                | 1,650                                                                |                                |
|     | <b>OTHER TESTS</b>                                                                                                                                                                                            |                                                                      |                                |
| 1.  | <b>Carbon paper</b><br>- Durability<br>- Manifolding                                                                                                                                                          | 605<br>605                                                           | IS: 9055/1979<br>IS: 9055/1979 |
| 2.  | Amount of carbon                                                                                                                                                                                              | 1,100                                                                |                                |
| 3.  | <b>Pulmac Zero span test</b><br>- Fibre strength<br>- Orientation index                                                                                                                                       | 2,200<br>2,200                                                       |                                |
| 4.  | Grease proof testing                                                                                                                                                                                          | 1,100                                                                | IS:6622/1972                   |
| 5.  | <b>Stencil paper</b><br>- Moisture resistance<br>- Keeping quality                                                                                                                                            | 605<br>605                                                           | IS:5086/1981<br>IS:5086/1981   |

|     |                                                                                                                      |                |                                 |
|-----|----------------------------------------------------------------------------------------------------------------------|----------------|---------------------------------|
|     | - Performance on duplicating machine                                                                                 | 1,100          | IS:5086/1981                    |
| 6.  | <b>Tissue paper</b><br>- Rate of absorption<br>- Disintegration capability                                           | 1,100<br>1,100 | TAPPI 432 om-87<br>PIRA<br>PIRA |
| 7.  | <b>Paprican Image Analyser Test</b><br>- Dirt and Speck<br>- Formation                                               | 6,600<br>6,600 |                                 |
| 8.  | Particle Charge of solution ( Mutek )                                                                                | 6,600          |                                 |
| 9.  | Chemical sensitivity of MICR cheque paper per chemical                                                               | 1,100          |                                 |
| 10. | UV light exposure test of MICR cheque paper                                                                          | 1,210          |                                 |
|     | <b>CHEMICAL ANALYSIS OF PAPER</b>                                                                                    |                |                                 |
| 1.  | Rosin                                                                                                                | 2,200          | TAPPI T 408 om-88               |
| 2.  | Wax                                                                                                                  | 1,100          | TAPPI T 405 om-85               |
| 3.  | Starch                                                                                                               | 1,100          | TAPPI T 419 om-97               |
| 4.  | Casein                                                                                                               | 1,100          | TAPPI UM 490                    |
| 5.  | Water soluble sulphates                                                                                              | 1,100          | TAPPI T 255 om-89               |
| 6.  | Titanium pigments                                                                                                    | 1,100          | TAPPI T 627 om-92               |
| 7.  | Amount of coating                                                                                                    | 1,100          | TAPPI UM-542                    |
| 8.  | Water soluble chloride                                                                                               | 1,100          | TAPPI T-256-cm-85               |
| 9.  | pH (Hot water extract)                                                                                               | 605            | TAPPI T 435 om-88               |
| 10. | Ash content                                                                                                          | 605            | ISO 2144                        |
|     | <b>MICROSCOPIC ANALYSIS</b>                                                                                          |                |                                 |
| 1.  | Mechanical pulp content in paper, paper board and pulp sample                                                        | 3,850          | IS:5285/1998                    |
| 2.  | Fibre furnish analysis (Qualitative)                                                                                 | 5,500          | IS:5285/1998                    |
| 3.  | Fibre furnish analysis (Quantitative)                                                                                | 11,000         | IS:5285/1998                    |
| 4.  | Fibre dimensions (Fibre Length & Distribution, Fibre Width & Distribution, Fibre Curl & Fibre Kink Fibre Coarseness) | 5,500          | IS:5285/1998                    |
| 5.  | Scanning Electron Microscopy (Per Sample)                                                                            | 5,500          | -                               |

| <b>NON-FIBROUS MATERIAL TESTING</b> |                                                                                                                         |        |                               |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------|-------------------------------|
| 1.                                  | Alum                                                                                                                    | 2,200  | TAPPI T-614 os-44             |
| 2.                                  | Soda ash                                                                                                                | 605    | TAPPI T-612 om-89             |
| 3.                                  | Rosin                                                                                                                   | 2,200  | TAPPI T-628 cm-82             |
| 4.                                  | Starch                                                                                                                  | 605    | TAPPI T-638 cm-85             |
| 5.                                  | Lime stone                                                                                                              | 1,100  | TAPPI T 618 cm-84             |
| 6.                                  | Titanium                                                                                                                | 2,200  | TAPPI T-627 om-92             |
| 7.                                  | Available lime index                                                                                                    | 605    | TAPPI T-617 cm-84             |
| 8.                                  | Calcium carbonate in soap stone                                                                                         | 1,320  | CPPRI                         |
| 9.                                  | Viscosity of starch at one concentration and temperature                                                                | 1,320  | CPPRI                         |
| 10.                                 | Characterization of starch (Includes pH, Conductivity, Charge, Charge Demand, Nitrogen content, Degree of substitution) | 11,000 |                               |
| 11.                                 | Magnesium Silicate in soap stone                                                                                        | 2,200  | CPPRI                         |
| 12.                                 | Molecular weight distribution of water soluble polymer                                                                  | 2,750  | Gel Filtration Chromatography |
| 13.                                 | Anthraquinone (Purity)                                                                                                  | 2,200  | IS:6259-1971                  |
| 14.                                 | Titanium Dioxide (Purity)                                                                                               | 2,200  | TAPPI 627 om 97               |
| 15.                                 | Abrasion value in filler                                                                                                | 2,750  |                               |
| <b>BLACK LIQUOR ANALYSIS</b>        |                                                                                                                         |        |                               |
| 1.                                  | pH at 30 <sup>0</sup> C                                                                                                 | 605    | CPPRI                         |
| 2.                                  | Total solids                                                                                                            | 660    | CPPRI                         |
| 3.                                  | Specific gravity at 30 <sup>0</sup> C                                                                                   | 605    | CPPRI                         |
| 4.                                  | Suspended solids                                                                                                        | 1,100  | CPPRI                         |
| 5.                                  | Conductivity                                                                                                            | 660    | CPPRI                         |
| 6.                                  | Residual active alkali                                                                                                  | 1,100  | TAPPI T-625 cm-85             |
| 7.                                  | Total alkali                                                                                                            | 1,100  | TAPPI T-625 cm-85             |
| 8.                                  | Silica Content (SiO <sub>2</sub> )                                                                                      | 1,650  | TAPPI T-625 cm-85             |
| 9.                                  | Sulphate Ash                                                                                                            | 1,650  | TAPPI T-625 cm-85             |
| 10.                                 | R <sub>2</sub> O <sub>3</sub>                                                                                           | 1,650  | TAPPI T-625                   |
| 11.                                 | Lignin Content (UV Method)                                                                                              | 1,100  | CPPRI                         |
| 12.                                 | Organic Acids                                                                                                           | 2,750  | CPPRI                         |

|     |                                                                            |        |                   |
|-----|----------------------------------------------------------------------------|--------|-------------------|
| 13. | ZETA potential                                                             | 2,750  | CPPRI             |
| 14. | Total Sugar                                                                | 2,750  | CPPRI             |
| 15. | Reducing Sugar                                                             | 2,200  | CPPRI             |
|     | <b>PHYSICO-CHEMICAL PROPERTIES</b>                                         |        |                   |
| 1.  | Viscosity at one temperature and four solid concentrations                 | 5,500  | CPPRI             |
| 2.  | Foaming index                                                              | 1,100  | CPPRI             |
| 3.  | Brookfield viscosity of coating oils & printing inks for each sample       | 1,100  | CPPRI             |
| 4.  | Density of liquid sample by automatic Density meter                        | 1,650  | CPPRI             |
| 5.  | Black liquor density curve at different solids and one temperature         | 5,500  | CPPRI             |
| 6.  | Black liquor density curve at different temperatures and one solid         | 5,500  | CPPRI             |
|     | <b>LIME SLUDGE ANALYSIS</b>                                                |        |                   |
| 1.  | Loss on ignition                                                           | 605    | TAPPI T-618 cm-84 |
| 2.  | Silica as SiO <sub>2</sub>                                                 | 1,650  | TAPPI T-618 cm-84 |
| 3.  | Residual CaO                                                               | 1,320  | TAPPI T-618 cm-84 |
| 4.  | R <sub>2</sub> O <sub>3</sub>                                              | 1,650  | TAPPI T-618 cm-84 |
| 5.  | Magnesium as MgO                                                           | 1,100  | TAPPI T-618 cm-84 |
| 6.  | Calcium carbonate                                                          | 1,320  | TAPPI UM-616      |
| 7.  | Residual alkali as Na <sub>2</sub> O                                       | 1,320  | TAPPI UM-616      |
|     | <b>POLYMER PROPERTIES</b>                                                  |        |                   |
| 1.  | Precipitation point of black liquor during evaporation                     | 1,650  | TAPPI UM-615      |
| 2.  | Polydispersity (TiO <sub>2</sub> ) of black liquor / lignin                | 3,300  | CPPRI             |
| 3.  | Molecular weight distribution of lignin macromolecule in black liquor      | 6,600  | CPPRI             |
| 4.  | Ultrafiltration using lab module of DDS/RO, including analysis of fraction | 49,500 | CPPRI             |
|     | <b>THERMAL PROPERTIES</b>                                                  |        |                   |
| 1.  | Burning properties (SVR)                                                   | 2,750  | CPPRI             |

|     |                                                                                                                                                                                                                                                                                                        |       |                      |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------------|
| 2.  | Weight loss by thermogravimetry (temperature versus weight loss curve)                                                                                                                                                                                                                                 | 3,850 | CPPRI                |
| 3.  | Integral procedural decomposition temperature (IPDT) and activation energy                                                                                                                                                                                                                             | 2,200 | CPPRI                |
| 4.  | Calorific value                                                                                                                                                                                                                                                                                        | 2,200 | TAPPI T-684 om-02    |
| 5.  | Total organic carbon                                                                                                                                                                                                                                                                                   | 2,750 | -                    |
| 6.  | Fixed and volatile carbon                                                                                                                                                                                                                                                                              | 3,300 | CPPRI                |
| 7.  | Temperature of ignition                                                                                                                                                                                                                                                                                | 2,750 | CPPRI                |
|     | <b>INSTRUMENTAL METHODS OF ANALYSIS</b>                                                                                                                                                                                                                                                                |       |                      |
| 1.  | Calcium (Quantitative analysis by flame photometer)                                                                                                                                                                                                                                                    | 1,650 | CPPRI                |
| 2.  | Sodium (flame photometer)                                                                                                                                                                                                                                                                              | 1,650 | CPPRI                |
| 3.  | Potassium (flame photometer)                                                                                                                                                                                                                                                                           | 1,650 | CPPRI                |
| 4.  | Spectrum in range 190-400 nm (UV )                                                                                                                                                                                                                                                                     | 1,650 | CPPRI                |
| 5.  | Spectrum in range 400-850 nm (Visible)                                                                                                                                                                                                                                                                 | 1,650 | CPPRI                |
| 6.  | Colour intensity (chloro platinum)                                                                                                                                                                                                                                                                     | 1,100 | Spectrophotometer    |
| 7.  | Spectrum in range 4000-450 cm <sup>-1</sup> (Infrared)                                                                                                                                                                                                                                                 | 1,650 | CPPRI                |
| 8.  | Carbohydrate composition of wood or pulp                                                                                                                                                                                                                                                               | 2,750 | CPPRI                |
| 9.  | Elemental analysis (C, H, N) each element                                                                                                                                                                                                                                                              | 1,100 | Catalytic Combustion |
| 10. | Iron                                                                                                                                                                                                                                                                                                   | 1,650 | CPPRI                |
| 11. | Trace Metal (Each Element)Al, As, B, Ca, Cu, Cr, Cd, CO, Fe, Hg, K, Mg, Mn, Na, Ni, Pb, Sb, Se, Si, Ti, Zn                                                                                                                                                                                             | 1,100 | AAS                  |
| 12. | Inorganic Anions (Each Anion)Cl <sup>-</sup> , NO <sub>2</sub> <sup>-</sup> , NO <sub>3</sub> <sup>-</sup> , SO <sub>3</sub> <sup>2-</sup> , SO <sub>4</sub> <sup>2-</sup> , S <sub>2</sub> O <sub>3</sub> <sup>2-</sup> , C <sub>2</sub> O <sub>4</sub> <sup>2-</sup> , PO <sub>4</sub> <sup>3-</sup> | 1,100 | HPIC                 |
| 13. | Na <sub>2</sub> SO <sub>3</sub> Purity                                                                                                                                                                                                                                                                 | 1,100 | HPIC                 |
| 14. | Ligno Sulphonate Purity                                                                                                                                                                                                                                                                                | 1,100 | UV Spectroscopy      |
|     | <b>WATER ANALYSIS</b>                                                                                                                                                                                                                                                                                  |       |                      |

|                          |                                                                                               |                |                              |
|--------------------------|-----------------------------------------------------------------------------------------------|----------------|------------------------------|
| 1.                       | Colour                                                                                        | 1,100          | ASTM                         |
| 2.                       | pH                                                                                            | 550            | -                            |
| 3.                       | Silica as SiO <sub>2</sub>                                                                    | 1,320          | TAPPI T-625                  |
| 4.                       | <b>Total hardness</b><br>- Temporary as CaCO <sub>3</sub><br>- Permanent as CaCO <sub>3</sub> | 1,100<br>1,100 | ASTM<br>ASTM                 |
| 5.                       | Sulphates                                                                                     | 1,100          | ASTM                         |
| 6.                       | Chlorides                                                                                     | 660            | ASTM                         |
| 7.                       | Iron                                                                                          | 660            | CPPRI                        |
| 8.                       | Turbidity, NTU                                                                                | 660            | Instrumental                 |
| 9.                       | Residual Free Chlorine, mg/l                                                                  | 660            | Titrimetric                  |
| 10.                      | Dissolved Solids, mg/l                                                                        | 1,100          | Titrimetric                  |
| 11.                      | Magnesium as Mg, mg/l                                                                         | 660            | Titrimetric                  |
| 12.                      | Nitrates as N, mg/l                                                                           | 1,100          | Instrumental                 |
| 13.                      | Nitrites as N, mg/l                                                                           | 1,100          | Instrumental                 |
| 14.                      | Acidity, mg/l                                                                                 | 660            | Instrumental                 |
| 15.                      | Alkalinity, mg/l                                                                              | 660            | Instrumental                 |
| 16.                      | Conductivity, µs/cm                                                                           | 825            | Instrumental                 |
| <b>EFFLUENT ANALYSIS</b> |                                                                                               |                |                              |
| 1.                       | COD                                                                                           | 1,980          | ASTM                         |
| 2.                       | BOD                                                                                           | 3,300          | ASTM                         |
| 3.                       | Oil and Grease                                                                                | 1,100          | ASTM                         |
| 4.                       | Volatile Fatty acids (Titration method)                                                       | 1,100          | *                            |
| 5.                       | Alkalinity as CaCO <sub>3</sub>                                                               | 1,650          | ASTM                         |
| 6.                       | Nitrogen                                                                                      | 2,200          | ASTM                         |
| 7.                       | Phosphorous                                                                                   | 2,200          | ASTM                         |
| 8.                       | Ammonical Nitroge, mg/l                                                                       | 1,100          | Distillation cum Titrimetric |
| 9.                       | Free Ammonia, mg/l                                                                            | 1,100          | Titrimetric                  |
| 10.                      | % Sodium ( on the basis of Cation Na, K, Ca & Mg)                                             | 2,750          | Instrumental                 |
| 11.                      | SAR (Sodium Absorption Ratio) on the basis of Concentration of Na, K, Ca & Mg)                | 3,300          | Instrumental                 |

|     |                                                                                                                     |                                    |                    |
|-----|---------------------------------------------------------------------------------------------------------------------|------------------------------------|--------------------|
| 12. | EOX, mg/l                                                                                                           | 6,600                              | Instrumental       |
| 13. | Sulphide, mg/l                                                                                                      | 550                                | Titrimetric        |
| 14. | Sulfite, mg/l                                                                                                       | 550                                | Titrimetric        |
| 15. | AOX, mg/l                                                                                                           | 6,600                              | Titrimetric        |
| 16. | Suspended Solids, mg/l                                                                                              | 1,100                              | ASTM               |
| 17. | Volatile Solids, mg/l                                                                                               | 1,650                              | ASTM               |
| 18. | Fixed Solids, mg/l                                                                                                  | 1,650                              | ASTM               |
| 19. | Volatile Suspended Solids, mg/l                                                                                     | 1,650                              | ASTM               |
| 20. | Fixed Suspended Solids, mg/l                                                                                        | 1,650                              | ASTM               |
| 21. | TCLP Test                                                                                                           | 27,500                             |                    |
|     | <b>BIOASSAY METHODS</b>                                                                                             |                                    |                    |
| 1.  | Anaerobic bio-degradability                                                                                         | 8,800                              | *                  |
| 2.  | Toxicity assay of effluents                                                                                         | 11,000                             | *                  |
|     | <b>SLUDGE CHARACTERISTICS</b>                                                                                       |                                    |                    |
| 1.  | Volatile suspended solids                                                                                           | 1,650                              | ASTM               |
| 2.  | Methanogenic sludge activity (anaerobic sludge)                                                                     | 5,500                              | *                  |
| 3.  | Stirred specific volume                                                                                             | 2,200                              | WRC method (UK)    |
| 4.  | Filtrability test (capillary suction time)                                                                          | 2,200                              | WRC method (UK)    |
| 5.  | Sludge volume index                                                                                                 | 1,100                              | APHA               |
| 6.  | AOX, mg/kg                                                                                                          | 7,700                              | Titrimetric        |
| 7.  | EOX, mg/kg                                                                                                          | 7,700                              | Titrimetric        |
| 8.  | Toxicity of Environment Sample                                                                                      | 13,200                             | ISO 11348/NVN 6516 |
|     | <b>Parameters</b>                                                                                                   |                                    |                    |
| 1.  | - Air Monitoring (RSPM, SO <sub>x</sub> and NO <sub>x</sub> )<br>- For small Scale Allied Unit (Cottage Industries) | 5,500 Per Point<br>4,400 Per Point |                    |
| 2.  | Stack Monitoring (SPM, H <sub>2</sub> S, SO <sub>x</sub> and NO <sub>x</sub> )                                      | 5,500 Per Point                    |                    |
| 3.  | Noise Monitoring                                                                                                    | 550 per Point                      |                    |
| 4.  | - Non Condensable Gases (H <sub>2</sub> S, Methyl Mercaptans, Di                                                    | 82,500 for four                    |                    |

|    |                                                                                                                                                                                                                                                    |                                                    |                                       |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|---------------------------------------|
|    | Methyl Di Sulfide, Di methyl Sulfide)                                                                                                                                                                                                              | sampling points (11,000 per each Additional point) |                                       |
| 5. | Volatile Organic Compounds                                                                                                                                                                                                                         | 11,000                                             |                                       |
| 6. | PM-10 (Instrumental)                                                                                                                                                                                                                               | 5,500                                              |                                       |
| 7. | PM 2.5 (Instrumental)                                                                                                                                                                                                                              | 5,500                                              |                                       |
|    | <b>RECYCLED FIBRE</b>                                                                                                                                                                                                                              |                                                    |                                       |
| 1. | Macro Stickies Counts in Pulp (>100)                                                                                                                                                                                                               | 1,650                                              | Pulmac Master Screen & Image Analyser |
| 2. | Macro/Micro Stickies Concentration in pulp, gm/kg                                                                                                                                                                                                  | 5,500                                              | Solvent Extraction                    |
| 3. | Evaluation of Stickies Control Agent                                                                                                                                                                                                               | 11,000                                             | CPPRI                                 |
| 4. | Evaluation of Deinking Chemical including dosage optimization and testing of yield, deinking efficiency, brightness, residual ink concentration, residual ink size distribution, sludge volume, consistency and inorganic content.                 | 27,500                                             | CPPRI                                 |
| 5. | Estimation of dissolved colloidal material in paper machine back water based on Total Organic Carbon (TOC) analysis                                                                                                                                | 11,000                                             | CPPRI                                 |
| 6. | Analysis of RCF market pulp (include Filterability by Schopper Riegler ( <sup>0</sup> SR), Ash content, Alkali solubility in 1% NaOH solution at 100 <sup>0</sup> C, Tensile strength, Burst factor, Fibre length by Bauer McNett Classifier etc.) | 11,000                                             | -                                     |
| 7. | Bleaching of recycled fibre for Quality Upgradation                                                                                                                                                                                                | 33,000                                             | -                                     |
| 8. | Acid/Neutral/Alkaline/sizing optimization studies of RCF                                                                                                                                                                                           | 55,000                                             | -                                     |
| 9. | Residual Ink concentration in deinking pulp                                                                                                                                                                                                        | 5,500                                              | PAPRICAN                              |

|                      |                                                                                                                                                                       |        |                          |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------------------|
| 10.                  | Macro(> 100μ) / Micro(< 100μ) Stickies Profiling across the process line for 10 locations, gm/kg. (if exceeded Rs. 3,000/- per location will be charged additionally) | 55,000 | Solvent Extraction       |
| 11.                  | Estimation of micro Stickies Concentration in back water sample, gm/kg.                                                                                               | 2,200  | Extraction Method        |
| 12.                  | Evaluation of deinking enzymes                                                                                                                                        | 55,000 | -                        |
| 13.                  | Repulpability of splices/splicing tape                                                                                                                                | 11,000 | TAPPI-UM-213             |
| 14.                  | Macro stickies concentration in pulp, gm/kg                                                                                                                           | 2,200  | Solvent Extraction       |
| 15.                  | Micro stickies concentration in pulp, gm/kg                                                                                                                           | 2,200  | Solvent Extraction       |
| <b>BIOTECHNOLOGY</b> |                                                                                                                                                                       |        |                          |
| 1.                   | Estimation of Xylose sugar (Spectrophotometer method)                                                                                                                 | 1,650  | Parabromo Aniline Method |
| 2.                   | Estimation of Ethanol Content (Spectrophotometer method)                                                                                                              | 1,100  | Caputi et.al.            |
| 3.                   | Estimation of Dietary fibre- TDF, IDF, SDF (Enzymatic-Gravimetric)                                                                                                    | 3,300  | AOAC International       |
| 4.                   | Evaluation of Xylanase Enzyme Activity                                                                                                                                | 2,750  | Bailey's                 |
| 5.                   | Evaluation of Xylanase Enzyme Activity, pH & Temperature Profile                                                                                                      | 11,000 | Bailey's                 |
| 6.                   | Total Microbial Count (CFU, Plate Count)                                                                                                                              | 1,100  | APHA                     |
| 7.                   | Estimation of Coliform Bacteria                                                                                                                                       | 550    | APHA                     |
| 8.                   | Estimation of Coliform & Faecal Coliform (E.Coli)                                                                                                                     | 1,100  | APHA                     |
| 9.                   | Estimation of Reducing Sugars (Spectrophotometric method)                                                                                                             | 1,100  | Miller et.al.            |
| 10.                  | Estimation of Total Sugars (Spectrophotometric method)                                                                                                                | 1,100  | Dubois et.al.            |
| 11.                  | Evaluation of enzyme- Enzymetic Pre-Bleaching response (complete Evaluation, optimization of enzyme dose & pulp evaluation)                                           | 55,000 | CPPRI                    |

|                                                                                                                                                                                    |                                                                                                               |        |                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------|-------------------|
| 12.                                                                                                                                                                                | Evaluation of enzyme- Enzymetic deinking (complete Evaluation, optimization of enzyme dose & pulp evaluation) | 33,000 | CPPRI             |
| 13.                                                                                                                                                                                | Evaluation of enzyme- Enzymetic refining (complete Evaluation, optimization of enzyme dose & pulp evaluation) | 22,000 | CPPRI             |
| 14.                                                                                                                                                                                | Evaluation of Slimicide (Efficacy & relative Population density Test)                                         | 16,500 | CPPRI             |
| 15.                                                                                                                                                                                | Estimation of Glucan content                                                                                  | 1,650  | NREL/TP-510-42618 |
| 16.                                                                                                                                                                                | Estimation of Xylan content in raw material                                                                   | 1,650  | TAPPI             |
| 17.                                                                                                                                                                                | Estimation of Escherichia coil (MPN Method)                                                                   | 550    | APHA              |
| 18.                                                                                                                                                                                | Estimation of faecal streptococcus (MPN)                                                                      | 550    | APHA              |
| 19.                                                                                                                                                                                | Estimation of Enterococcus group (MPN)                                                                        | 1,100  | APHA              |
| 20.                                                                                                                                                                                | Removal of coating through enzymatic approach                                                                 | 1,650  | CPPRI             |
| <b>EVALUATION OF LIGNIN/LIGNOSULPHATES</b>                                                                                                                                         |                                                                                                               |        |                   |
| 1.                                                                                                                                                                                 | Lignin/Lignosulphonate purity %                                                                               | 1,100  | CPPRI             |
| 2.                                                                                                                                                                                 | Ash %                                                                                                         | 660    | CPPRI             |
| 3.                                                                                                                                                                                 | Element Composition (CHNS Analysis)                                                                           | 2,200  | CPPRI             |
| 4.                                                                                                                                                                                 | Methoxyl Group %                                                                                              | 3,300  | CPPRI             |
| 5.                                                                                                                                                                                 | Total & Phenolic Hydroxyl Group %                                                                             | 2,200  | CPPRI             |
| 6.                                                                                                                                                                                 | Silica %                                                                                                      | 1,650  | CPPRI             |
| 7.                                                                                                                                                                                 | Chloride %                                                                                                    | 1,100  | CPPRI             |
| 8.                                                                                                                                                                                 | Sulphate %                                                                                                    | 1,100  | CPPRI             |
| 9.                                                                                                                                                                                 | Sodium %                                                                                                      | 1,100  | CPPRI             |
| 10.                                                                                                                                                                                | Potassium %                                                                                                   | 1,100  | CPPRI             |
| <p>- * Method developed by Agricultural University of Wageningen, Netherland (Dutch Method)</p> <p>- Member Mill of CPPRI will get a discount of 25% on the testing charges on</p> |                                                                                                               |        |                   |

the normal approved rates for tests/analysis other than paper & board upon mentioning of their member number assigned by the Institute.

- GST @ 18 % will be extra.

**- Priority Charges:-100% priority charges on testing fees will be added to provide out of turn service on urgent basis.**