Maulana Azad

National Institute of Technology Bhopal- 462 003

No. MANIT/ ESE/2025-26/21: Date: __16/12/2025__

NOTICE INVITING QUOTATON

To,

M/s_____

_____

Dear Sir/ Madam

Sealed quotations are invited for the supply of below mentioned goods/ item. The quotation in the prescribed proforma should reach in hard copy to the office of undersigned on or before 23-12-2025 up to 15.00 hours.

SN	Description of Material	Unit Price	Qty	Basic Price	GST Amount	Total Price
1	2	3	4	5 (3x4)	6	7(5+6)
1	**Micro Hydro Power Generation (As per Annexure-1)**		01 no.			
					TOTAL	
In words:						

Terms & Conditions:

1 The Seller should quote the rate F.O.R. Bhopal/ Institute Stores. The minimum period of delivery of the goods and Guarantee/ Warranty should be mentioned on the quotation.

2 The Envelope should be super-scribed as:

Email enquiry No: MANIT/ ESE/2025-26/21 Due on 23/12/2025 up to 15.00 hours

Quotation for supply of Micro Hydro Power Generation

3 The rate quoted above shall be inclusive of basic Price, applicable Taxes, Transportation, Insurance, Loading/ Unloading, Installation etc.) at site.

4 Offered rate shall be valid for a period of 60 days from the date of opening of quotation.

5 Name of manufacturer, their make and model should invariably be mentioned in the quotation. Technical broucher should also be attached with the quotation if possible.

6 The seller should avoid the use of vague terms such as “extra applicable”.

7 Seller should mention Name of the contact person and his/ her mobile Number in the quotation.

8 Any other specific terms may also be mentioned by seller depending upon the nature of Goods.

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Annexure-1

Technical Specifications

Technical Specifications

S.no	Technical Parameter	Compliance (Yes/No)
1	**Design data (primary)** • **Rated electrical power (P_e):** 1.0-2KW kW • **Design head (H):** recommended nominal heads: **8- 10 m** . • **Design flow (Q):** depends on head we have storage of 2000L water Tank. • **Rated speed (synchronous for generator):** supplier to confirm. • **Electrical output type:** 3-phase AC or single-phase AC (model recommendation: **3-phase, 400 V (or 230 V low-voltage lab config)** with appropriate protection and load bank).	
2	**Turbine selection** *Cross-flow (Banki) turbine* or *small Kaplan/propeller* for low-head setups (3–10 m **Turbine specifications (example for H = 5 m)** • Turbine type: Cross-flow • Nozzle/guide vanes: adjustable to demonstrate flow control	
3	**Generator & Drive** **Generator type:** Permanent Magnet Synchronous Generator (PMSG) or small synchronous alternator / cage induction generator with inverter and control.PMSG 1 kW, 3-phase, rated voltage configurable (230/400 V), rated speed determined by turbine + gearbox. **Generator specs (example):** • Rated output: 1.0 -2.0 kW • Rated voltage: 3-phase 230 V line-to-neutral (or 400 V line-to-line for 3-phase) OR single-phase 230 V option for bench tests • Rated current: ~2.9-5.8 A (3-phase at 230 V phase) • Power factor: 0.8–1.0 (unity preferred for demonstration) • Cooling: air-cooled • Mounting: foot-mounted to powerhouse skid **Drive/gearbox:** If turbine runner speed is much lower/higher than generator rated speed, include a small gearbox.	
4	**Penstock & Hydraulic Accessories** • **Intake:** small trash rack (removable), coarse screen, gravel trap in forebay • **Forebay:** small settling chamber (0.1–0.5 m^3	

	depending on flow), overflow weir • **Penstock:** modular steel or PVC pipe sections with flanged joints; recommended internal diameters per earlier table (for 5 m head ~170 mm). • **Material:** Schedule 40 PVC (for low pressure) or mild steel with internal coating; pressure rating greater than maximum static head + surge margin. • **Valves:** air/vacuum valves at high points; shutoff gate valve or butterfly valve upstream of turbine; bypass/discharge valve for safe shutdown. • **Supports & anchors:** supports at regular intervals, thrust block at turbine inlet.	
5	**Civil & Mechanical Structure** • **Powerhouse skid:** steel frame baseplate sized to hold turbine, gearbox, generator, control panel; baseplate with mounting holes for anchor bolts. • **Enclosure:** weatherproof steel sheet or plexiglass panels for demonstration; transparent viewing panels to observe turbine runner. • **Foundations:** small concrete pads recommended when installed outdoors. • **Access & safety:** guards for rotating parts, emergency stop accessible, signage.	
6	**Electrical control & protection** • **Control panel functions:** start/stop, breaker, voltmeter, ammeter, frequency meter, power meter (kW), power factor, generator protection relays. • **Protection:** overcurrent/short-circuit breaker, earth leakage protection (RCD), surge arrestor, under/over voltage, under/over frequency trips. • **Power conditioning:** if output is variable-speed or DC (PMSG with rectifier), include inverter/AC converter to produce 50 Hz AC. Optionally a battery bank (for off-grid demo) with charge controller/MPPT. • **Load bank:** resistive load bank (adjustable) up to 1.5 kW for performance testing.	
7	**Instrumentation & Data Acquisition** • Flow meter (electromagnetic or ultrasonic clamp-on) or calibrated weir for flow measurement • Pressure gauges at penstock upstream/downstream and at turbine inlet • Tachometer for runner speed • Temperature sensors on bearings/generator	

	• Digital data logger / small PLC with SCADA for plotting head, flow, speed, voltage, current, power and efficiency in real time	
8	**Performance & Testing** **Factory acceptance / Lab tests:** 1. No-load generator test and insulation resistance test 2. Hydrostatic test of penstock at 1.5× maximum operating pressure 3. Mechanical run-in at no-load, check vibration and alignment 4. Load tests at 25%, 50%, 75%, 100% load — record voltage, current, frequency, speed, flow, head, and efficiency 5. Safety trips and protection functional testing	
9	**Bill of Materials (high level)** • Cross-flow turbine runner + casing + nozzle + mounting hardware • Generator (1 kW PMSG) with coupling • Gearbox / coupling / shafts / bearings • Penstock sections (PVC or MS) with flanges & gaskets • Intake trashrack and forebay construction materials • Valves: gate/butterfly, air release valve, bypass valve • Powerhouse skid, enclosures, guards • Control panel: breakers, meters, relay protections, inverter/rectifier, MPPT (if used) • Instrumentation: flow meter, pressure gauges, tachometer, temp sensors, data logger • Load bank (adjustable resistive) • Cabling, earthing rods, lightning arrestor	
10	**Safety & Maintenance** • Provide lock-out/tag-out procedures for maintenance • Guards on rotating parts and high-voltage panels with interlocks • Routine maintenance schedule: monthly inspection, lubrication of bearings, annual alignment check, 3-year overhaul	
11	**Drawings & Deliverables** • GA drawing of model (plan & elevation) • Turbine sectional drawings and runner detail • Penstock layout with supports • Electrical single-line diagram and control panel layout • Instrumentation wiring and data-acquisition schematic • Installation & commissioning manual	

	• Operation & maintenance manual	
12	**Estimated cost (indicative, laboratory model)** • Materials & fabrication (turbine + penstock + small civil + skid): • Generator & electrical control: • Instrumentation & data acquisition: • Total (approx): 2.5**/3.5L INR**. Note: price ranges are indicative for a university teaching model and will vary widely by country, vendor, and specification detail. Provide local procurement preferences to refine the estimate.	
13	**Options & Extensions (for expanded experiments)** • Variable-speed drive with inverter for generator to study asynchronous operation • Automated load-following control and MPPT for turbine • Transparent turbine housing for flow visualization (use acrylic windows) • Multiple interchangeable runners/nozzles to show effect of geometry on efficiency	