

COLLEGE OF ENGINEERING THALASSERY
Department of Electrical and Electronics Engineering
Purchase of 100 MHz, two-channel Digital Storage Oscilloscope

Sl No	Parameter	Minimum requirement
1	Type and channels	Bench-top digital storage oscilloscope with at least two analogue input channels.
2	Bandwidth	At least 100 MHz.
3	Sampling rate	At least 1 GSa/s in single-channel operation and 500 MSa/s per channel in dual-channel operation. Supplier shall confirm simultaneous-channel performance.
4	Rise time	≤ 3.5 ns.
5	Memory depth	At least 25 kpoints acquisition memory. Supplier shall state memory available per channel and any shared-memory limitations.
6	Acquisition rate	Maximum waveform acquisition rate of at least 20,000 waveforms/s, with operating conditions stated.
7	Vertical sensitivity	Range covering 1 mV/div to 20 V/div at 1 M Ω input impedance.
8	Time base	Range covering 2 ns/div to 50 s/div.
9	Display	Colour TFT LCD, at least 8 inches, with resolution of at least 800 × 480 pixels.
10	Trigger functions	Edge, pulse width, runt, over-amplitude, slope and video triggering.
11	Acquisition triggering	Auto, normal and single acquisition modes.
12	Pulse width trigger	Pulse width range covering 100 ns to 10 s.
13	Video triggering	Support for NTSC and PAL video signals with line and field selection.
14	Automatic measurements	At least 34 parameters, including maximum, minimum, peak-to-peak, amplitude, mean, RMS, frequency, period, rise/fall time, pulse width, duty cycle and phase.
15	Waveform recording	At least 10 Mpoints waveform recording capacity. Supplier shall explain recording mode, capacity allocation and replay facilities.
16	Storage and export	Save and recall instrument setups and waveforms; bitmap capture and CSV waveform export to USB storage. At least 20 internal and 200 USB setup/waveform records, with allocation clarified.
17	Interfaces	USB OTG and Pass/Fail interfaces, with compatible PC connectivity and application software.
18	Calibration output	Selectable calibration signal frequencies of 10 Hz, 100 Hz, 1 kHz, 10 kHz and 100 kHz. Supplier shall state signal amplitude and intended use.
19	Power input	100–240 V AC RMS, 50/60 Hz, suitable for operation from a 230 V, 50 Hz supply.
20	Input ratings	Supplier shall declare maximum input voltage, measurement category, probe ratings, input capacitance and grounding arrangement in the technical offer.

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Purchase of Function Generator

SI No	Parameter	Minimum requirement
1	Type	Bench-top, microcontroller-controlled Direct Digital Synthesis (DDS) function generator.
2	Waveforms	Sine, square, triangle and pulse waveforms, with a separate TTL output.
3	Frequency range	Sine, square and pulse: 0.3 Hz–3 MHz. Triangle: 0.1 Hz–1 MHz. Selectable ranges with variable frequency control.
4	Resolution	Frequency setting resolution of 0.1 Hz or better.
5	Display and controls	LCD displaying frequency and amplitude; menu keys and variable controls for parameter adjustment.
6	Main output	BNC connector; adjustable amplitude up to at least 20 V peak-to-peak into open circuit. Supplier shall state amplitude available into a 50 Ω load.
7	Output impedance	50 $\Omega \pm 10\%$.
8	Attenuation	Selectable 0 dB, 20 dB and 40 dB settings, with variable amplitude control.
9	DC offset	Continuously adjustable over ± 5 V before step attenuation. Supplier shall state offset limits versus load and output amplitude.
10	Modulation	AM, FM, PWM and sweep functions; external modulation bandwidth covering DC–20 kHz. Supplier shall specify supported ranges and input limits.
11	Level flatness	Amplitude variation not exceeding 0.2 dB over 10 Hz–1 MHz, under stated load conditions.
12	Frequency accuracy	± 20 ppm or better; supplier shall state reference conditions.
13	Frequency stability	± 20 ppm or better
14	Sine distortion	Maximum 0.5% at 20 V peak-to-peak and 0.1% at 2 V peak-to-peak, at 20 kHz.
15	Square and pulse edges	Rise and fall times less than 50 ns at full rated output, under stated load conditions.
16	Pulse adjustment	Adjustable duty cycle. Brochure range: 0–100% at 10 Hz–1 MHz and 25–75% above 1 MHz. Supplier shall confirm usable limits versus frequency.
17	Minimum pulse width	75 ns or better. Supplier shall confirm compatibility with the offered duty-cycle and frequency ranges.
19	TTL output	Separate BNC output, amplitude at least 3 V peak-to-peak; rise and fall times ≤ 25 ns under specified loading.
20	Output protection	Short-circuit protection and protection against externally applied +15 V overload, as declared by the manufacturer.
21	Power supply	Suitable for 230 V AC, 50 Hz. Proposed input tolerance: $\pm 10\%$. Supplier shall confirm tolerance and power consumption;

Supply and acceptance requirements

Accessories: Mains cord, one BNC-to-BNC cable, one BNC-to-crocodile lead, operating manual, and manufacturer's test or calibration report.

Warranty: Minimum one-year comprehensive warranty from satisfactory installation and acceptance.

Acceptance: Demonstrate waveforms, frequency and amplitude adjustment, DC offset, attenuation, TTL output and modulation/sweep functions. Verify key performance values using suitable laboratory instruments.

COLLEGE OF ENGINEERING THALASSERY
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Purchase of DC Regulated Dual Power Supply

Sl No	Parameter	Minimum requirement
1	Type	Bench-top DC regulated power supply with two independently adjustable output channels.
2	Input supply	230 V AC $\pm 10\%$, 50 Hz, single phase.
3	Output voltage	0–30 V DC continuously adjustable on each channel, with coarse and fine voltage controls.
4	Output current	0–2 A adjustable current limit on each channel, with independent current controls.
5	Output capacity	Both channels capable of delivering 30 V at 5 A simultaneously and continuously; total output capacity at least 300 W.
6	Operating modes	Constant Voltage (CV) and Constant Current (CC) operation on each channel, with automatic crossover and status indication.
7	Digital displays	Separate voltage and current displays for each channel; four displays in total, each with four-digit LED indication or better.
8	CV line regulation	$\leq \pm(0.01\% \text{ of output voltage} + 2 \text{ mV})$ for $\pm 10\%$ variation in input voltage.
9	CV load regulation	$\leq \pm(0.01\% \text{ of output voltage} + 2 \text{ mV})$ for load variation from no load to full load.
10	Ripple and noise	$\leq 1 \text{ mV RMS}$ in CV mode over a measurement bandwidth of 20 Hz–20 MHz.
11	CC performance	Supplier shall declare CC line regulation, load regulation and current ripple, including units and measurement conditions.
12	Output isolation	Outputs shall be floating with respect to earth. Supplier shall declare channel-to-channel isolation and permissible output-to-earth voltage.
13	Protection	Short-circuit and continuous overload protection, adjustable current limiting, and overtemperature protection.
14	Terminals and enclosure	Clearly marked positive and negative terminals for each channel, earth terminal, and sturdy enclosure with adequate cooling.

Supply, installation, testing and demonstration of a bench-top DC regulated dual power supply with two independent 0–30 V, 0–5 A outputs, simultaneous full-rated output, CV/CC operation, four digital displays, low ripple, short-circuit and overload protection, complete with accessories and minimum two-year warranty