

**Department of Physics
University of Rajasthan, Jaipur**

No *PHY/2020/619*

Date: 29/01/2020

TENDER NOTICE

Sealed quotations with terms and conditions* are invited for the purchase of items mentioned below in the Department of Physics, University of Rajasthan, JAIPUR-302004. Interested Firms are requested to give full detail of the specifications, delivery and availability of the quoted on the forwarding basis etc.

1	<p><u>Transistor Biasing Techniques and Stability</u> To study different biasing techniques for transistor amplifier</p> <p>(a) Fixed-bias circuit. (b) Collector to base bias circuit. (c) Self bias (Emitter bias) circuit. (d) Self bias (Emitter bias) in addition to voltage divider bias circuit. (e) Comparison of the effect of temperature on bias stability of the above four biasing circuits.</p> <p>Technical specifications: The board consists of the following built-in parts: Two germanium NPN transistors one having low β and the other having high β. +12V DC at 100mA, IC regulated Power Supply. 1 KHz Sine Wave signal generators having 0-1 volt variable output level. Electric oven for heating up the transistor. Thermometer clamp for holding a thermometer. A Thermometer of 0-100°C provided along with the unit.</p>
2	<p><u>Decade Resistance Box</u> Technical specifications: Range-0.1 Ω to 100 MΩ, Type of resistance-Wire wound, Decades-9. Accuracy-\pm10 % or less, minimum resolution 0.1 Ω, Wattage -5 W</p>
3	<p><u>100MHz 2-Channel Digital Storage Oscilloscopes</u> Technical specifications: ACQUISITION Sample Rate Real-Time Sample: 1GS/s; Equivalent Sample: 25GS/s. Acquisition Modes Normal data only. Peak Detect High-frequency and random glitch capture. Average Waveform Average, selectable 4, 8, 16, 32, 64, 128. Inputs Input Coupling AC, DC, GND Input Impedance 1M \pm2%, 20pF \pm3pF. Probe Attenuation 1X, 10X. Supported Probe Attenuation 1X, 10X, 100X, 1000X. Factor Max. Input Voltage CAT I and CAT II : 300V RMS (10X); HORIZONTAL Waveform Interpolation (sin x) / x. Record Length 24K. SEC/DIV Range 2ns/div to 40s/div, in a 2, 4, 8 sequence, Sample Rate and \pm50ppm (at over any =1ms time interval). Delay Time Accuracy: 20ns/div to 80us/div; (-8div x s/div) to 40ms; 200μs/div to 40s/div; (-8div x s/div) to 400s; VERTICAL Vertical Resolution 8-bit resolution, all channel sampled simultaneously. Volts/Div Range 2mV/div ~ 5V/div. Position Range 2mV/div to 200mV/div; \pm2V; 200mV/div to 5V/div; \pm50V. Bandwidth: 100MHz; Rise Time at BNC (Typical) : 3.5ns; Analog Bandwidth in Normal and 2mV/div to 20mV/div, \pm400mV; Average Modes at BNC or with 50mV/div to 200mV/div, \pm2V; probe, DC Coupled 500mV/div to 2V/div, \pm40V; 5V/div, \pm50V. Math +, -, *, \div, FFT. FFT Windows : 1024 sample point. Bandwidth Limit 20MHz. Low Frequency Response (-3dB) <10Hz at BNC. DC Gain Accuracy \pm3% for Normal or Average acquisition mode, 5V/div to 10mV/div; \pm4% for Normal or Average acquisition mode, 5mV/div to 2mV/div. DC Measurement Accuracy, When vertical displacement is zero, and N > 16 : \pm(3% x reading + 0.1 div + 1mV) only. Average Acquisition Mode 10mV/div or greater is selected; When vertical displacement is not zero, and N > 16 : \pm [3% x (reading + vertical position) + 1% of vertical position + 0.2div]; Add 2mV for settings from 2mV/div to 200mV/div; add 50mV for settings from 200mV/div to 5V/div.</p>

	Volts Measurement Repeatability, Delta volts between any two averages of ≥ 16 waveforms acquired under same setup and ambient Average Acquisition Mode conditions. TRIGGER Trigger Types Edge, Video, Pulse, Slope, Over time, Alternative Trigger Source CH1, CH2, EXT, EXT/5, AC Line Trigger Modes Auto, Normal Coupling Type DC, AC, Noise Reject, HF Reject, LF Reject
4	Multi-Waveform Signal Generator-2 MHz Technical specifications: Frequency range -2 MHz, Output Impedance 50 ohms Frequency Output Waveforms Sinusoidal, Triangle, Square, Ramp, Pulse, TTL (Sync) & DC Outputs. Sine Distortion <1% (typical). Square Wave Rise / Fall Time <75nsec. Frequency Stability <0.5% of the set frequency. Duty Cycle 10% to 90% variable. Maximum Output Voltage a) Into 50 ohms 10V p-p output. b) Open Circuit 20V p-p output. Amplitude Indication 3 digit seven segment display (Vp-p) $\pm 5\%$. Amplitude Flatness $\pm 0.5\text{dB}$ upto 100KHz range / $\pm 1.0\text{dB}$ for 1MHz range. Attenuator Two step attenuators of 20dB & 40dB. Fine attenuation of 20dB through vernier control. (Total 80 dB attenuation). Attenuator Accuracy $\pm 0.5\text{dB}$ per 20dB at 1KHz. DC Offset $\pm 10\text{V} \pm 5\%$ (DC + AC peak) in open circuit $\pm 5\text{V} \pm 5\%$ (DC + AC peak) in 50 ohms. GENERAL Standard Accessories Instruction Manual 1 No. BNC(M) to Alligator Clip 1 No. Mains Cord 1 No. Accessory 50 ohms Termination.

Last date of quotation submission: 10th February, 2020 upto 2:00PM.

Quotations will be opened on 10th February, 2020 upto 3:00PM

***Terms and conditions**

1. Quotation should be on the name of the Head, Department of Physics, University of Rajasthan Jaipur 302004 and reach this office on time.
2. Quotation received after due date will not be considered in any case.
3. The rate should be C.I.F./F.O.R. Jaipur inclusive of all charges and taxes etc.



HEAD OF DEPARTMENT
Department Of Physics
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University of Rajasthan, JAIPUR

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