



Government College of Engineering

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"In Pursuit of Technical Excellence"

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Repeat Enquiry

No. GECCS/Electrical/2023-24/ 478

Date

12 FEB 2024

To,

Sub: Quotation for purchase of equipment-Analog Electronics Experimental Training Board

(Due Date: 26 / 02 / 2024)

Sealed Quotations are from eligible and interested manufacturers/ dealers/distributors/ for the following items on the terms and conditions mentioned below.

Sr. No.	Item with Specification (Brand Name should be mentioned compulsory)	Rate Per Unit Including GST
01	<p>Experimental Training Board Designed for the Study of the Junction Diode Rectifier and Filter Characteristics.</p> <p>01 Study of Junction Diode Rectifier output and ripple content for different resistive loads for :</p> <p>1.1 Half wave. 1.2 Full wave (Center Tap). 1.3 Full wave (Bridge). 1.4 Voltage Doublers Circuit.</p> <p>02 Study of filter and load regulation characteristics for half wave and full wave rectifier having different resistive loads and filters of the type :</p> <p>2.1 Capacitor filter. 2.2 Capacitor Filter with capacitor value doubled. 2.3 Inductor filter. 2.4 Capacitor input L section filter. 2.5 Capacitor input pi section filter.</p> <p>The kit shall consists of the given built-in parts :-</p> <p>01 Mains transformer, secondary center tap 10V-0-10V at 100 mA. 02 Digital DC Ammeter 3½ Digit range 0-200 mA . 03 Digital DC Voltmeter, 3½ Digit range 0-20V/200V. 04 Four Silicon Junction Diodes. 05 Filter choke. 06 Mains ON/OFF switch, Fuse and Jewel light. 07 The unit shall be operative on 230VAC ±10% at 50Hz. 08 Adequate no. of patch cords stackable from rear both ends 4mm spring loaded plug length 50cm. 09 Good quality, reliable terminal/sockets are to be provided at appropriate places on panel for connections/ observation of waveforms. 10 Kits should be strongly supported by detailed Operating Instructions, giving details of Object, Theory, Design procedures etc. with appropriate additional number of separate circuit components Kits should be provided with suitable AC milli voltmeter</p>	

2	<p>Experimental Training Board designed for the study of transistorized series and shunt voltage regulated power supplies</p> <p>01 To study a transistor-shunt voltage regulator with fixed current limiting. 02 To study a transistor-shunt variable regulator with fixed current limiting. 03 To study a transistor-shunt voltage regulator with variable current limiting. 04 To study a transistor-series variable voltage regulator. 05 To study a transistor-series voltage regulator. 06 To study a transistor-series voltage regulator with fixed current limiting. 07 Measurement of Line Regulation</p> <p>The kit shall consists of the given built-in parts : 01 12.5V D.C. $\pm 10\%$ at 50mA, unregulated Power Supply. 02 Digital Voltmeter DC $3\frac{1}{2}$ Digit Having range of 0- 20V. 03 Digital Current meter DC $3\frac{1}{2}$ Digit Having range of 0- 200mA 04 Two NPN and one PNP medium current transistors. 05 Zener diode. 06 Two wire wound potentiometers and one carbon potentiometer.</p> <p>. 06 Mains ON/OFF switch, Fuse and Jewel light. 09 The unit shall be operative on 230VAC $\pm 10\%$ at 50Hz. 10 Adequate no. of patch cords stackable from rear both ends 4mm spring loaded plug length 50cm. 11 Good Quality, reliable terminal/sockets are to be provided at appropriate places on panel for connections/ observation of waveforms. 12 Strongly supported by detailed Operating Instructions, giving details of Object, Theory, Design procedures etc. with appropriate additional number of separate circuit components</p>	
3	<p>Experimental Training Board designed specifically for the</p> <p>Comparative study of Common Emitter (CE), Common Base (CB) and Common Collector (CC) Transistor Amplifiers.</p> <p>Study of Common Emitter (CE) transistor amplifier circuit and evaluation of its input & output resistance, voltage gain, current gain and power gain.</p> <p>02. Study of Common Base (CB) transistor amplifier circuit and evaluation of its input and output resistance, voltage gain, current gain and power gain.</p> <p>03. Study of Common Collector (CC) transistor amplifier circuit and evaluation of its input and output resistance, voltage gain, current gain and power gain.</p> <p>The kit shall consist of given built-in parts : 01. $\pm 9V$ D.C. at 100mA, IC Regulated Power Supply internally connected. 02. All the three circuits i.e. CE, CB and CC built separately.</p> <p>. 03. Sine Wave Signal Generator of 1KHz, with variable level, low distortion, based on IC. 05. Mains ON/OFF switch, Fuse and Jewel light. The unit shall be operative on 230V $\pm 10\%$ at 50Hz A.C. Mains. Adequate no. of patch cords stackable from rear both ends 4mm spring loaded plug Good Quality, reliable terminal/sockets are to be provided at appropriate places on panel for connections/observation of waveforms, supported by detailed Operating Instructions, giving details of Object, Theory, Design procedures with appropriate additional number of separate circuit components</p>	
4	<p>Experimental Training Board designed for the study of Single and Two Stage R-C Coupled Transistor Amplifier.</p> <p>01 To Study of common emitter (CE) single stage transistor amplifier circuit and to measure its voltage gain (A). 02 To plot the frequency response characteristics of the single stage CE Amplifier 03 To find out the input-impedance of the single stage CE Amplifier 04 To find out the 'output impedance' of the single stage CE Amplifier 05 To find out the current gain of the single stage CE Amplifier 06 To find out the power gain of the single stage CE Amplifier 07 To study of the characteristics of two stage R-C Coupled Amplifier 08 Study of the frequency response of the two stage R-C Coupled Amplifier 09 To find out the 'input impedance' of two stage R-C Coupled Amplifier 10 To find out the 'output impedance' of two stage R-C Coupled Amplifier</p> <p>The kit shall consists of the given built in parts: 01 Sine Wave Oscillator 15Hz to 150KHz in four ranges with amplifier & amplitude adjustable. 02 Three decade resistances bank in steps of 1K, 10K & 100K per steps total step 30. 03 -12V D C IC regulated Power Supply internally . . connected. 04 Two PNP transistors. 05 Mains ON/OFF switch, Fuse and Jewel light. 06 The unit is operative on 230V $\pm 10\%$ at 50Hz A C Mains . . . 07 Good Quality, reliable terminal/sockets are provided at appropriate places on panel for connections/observation of waveforms. 09 Strongly supported by detailed Operating Instructions, giving details of Object, Theory, Design procedures with appropriate additional number of separate circuit components</p>	

5	<p>Experimental Training kit designed for the study of Two Stage Transformer Coupled Amplifier.</p> <p>To study the performance characteristics of a Two Stage Transformer Coupled Amplifier : 01 To plot frequency response characteristics. 02 To find the lower & upper cut-off frequency & find out the band-width of the amplifier. 03 To compare the frequency response characteristics of two stage transformer coupled amplifier with that of two stage R.C. Coupled amplifier</p> <p>The kit shall consists of the following built-in parts : 01 -12V D.C. at 50mA, IC Regulated Power Supply internally connected. 02 Two transistors, 03 Set of Audio Transformer. 04 Mains ON/OFF switch, Fuse and Jewel light. 06 The unit shall be operative on 230VAC $\pm 10\%$ at 50Hz. 07 patch cords stackable from rear both ends 4mm spring loaded plug length 50cm. 08 Good Quality, reliable terminal/sockets are to be provided at appropriate places on panel for connections / observation of waveforms. 09 Strongly supported by detailed Operating Instructions, giving details of Object, Theory, Design procedures etc.</p> <p>with appropriate additional number of separate circuit components like resistances etc. With suitable millivoltmeter</p>	
7	<p>Experimental Training Board designed specifically to study the various types of Passive Filters and to determine the different constants as well as cut-off frequency of that particular passive filter.</p> <p>To study different types of passive filters and determine the different constants and cut-off frequency of the following passive filters : 01 Low-Pass constant-K filter. 02 High-Pass constant-K filter. 03 Band-Pass constant-K filter. 04 Low-Pass M-Derived filter. 05 High-Pass M-Derived filter.</p> <p>The kit shall consists of the following built-in parts : 01 Different types of Passive Filters. 02 Adequate no. of other electronic components. 03 Good Quality, reliable terminal/sockets are to be provided at appropriate places on panel for connections/ observation of waveforms. 04 Supported by detailed Operating Instructions, giving details of Object, Theory, Design procedures .</p>	
8	<p>Experimental Training Board designed for the study of OP-AMP IC's applications.</p> <p>To study the following applications of Op-Amp 741 : 01 Integrating Amplifier for DC input signals 02 Integrating Amplifier for AC input signals 03 Differentiator Amplifier 04 Non-inverting differentiator</p> <p>The board shall consist of the following built-in parts</p> <ol style="list-style-type: none"> 1. $\pm 15V$ D.C. at 100mA, IC Regulated Power Supply 2. OP-AMP IC 741 3. Square Wave Generator of 1 KHz, using IC 4. Adequate no. of other electronic components 5. Mains ON/OFF switch, Fuse and Jewel light 6. The unit is operative on 230V $\pm 10\%$ at 50Hz A.C. Mains 7. Adequate no. of patch cords stackable 4 mm spring loaded plug length 50cm <p>Good Quality, reliable terminal/sockets are to be provided at appropriate places on panel for connections & observation of waveforms.</p> <p>2. Strongly supported by detailed Operating Instructions, giving details of Object, Theory, Design procedures etc.</p> <p>with appropriate additional number of separate circuit components like resistances, ICs</p>	
09	<p>Experimental Training Board designed for the study of Bistable, Astable and Monostable Multivibrators using IC 555.</p> <ol style="list-style-type: none"> 01 To study Bistable Multivibrator using IC 555 and output throw LED 02 To study Astable Multivibrator using IC 555 and output throw LED 03 To study Monostable Multivibrator using IC 555 and output throw LED. 04 The kit shall consist of the following built-in parts : <ol style="list-style-type: none"> 01 +10V D.C. at 100mA, IC Regulated Power Supply internally connected. 02 1 KHz Square Wave Generator 03 IC 555 04 LED for observing the output 5 Mains ON/OFF switch, Fuse and Jewel light 6 The unit is operative on 230V $\pm 10\%$ at 50Hz A.C. 7 Adequate no. of patch cords stackable from rear both ends 4mm spring loaded plug length 50cm 	

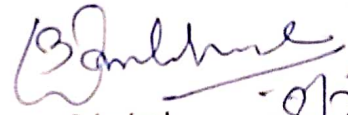
	<p>8 Good Quality, reliable terminal/sockets are to be provided at appropriate places on panel for connections / observation of waveforms</p> <p>9 Strongly supported by detailed Operating Instructions, giving details of Object, Theory, Design procedures etc.</p> <p>with appropriate additional number of separate circuit components like resistances, ICs</p>	
10	<p>Experimental Training Board designed for the study of an Inverting and Non-Inverting Amplifier</p> <p>1 To study Inverting Operational Amplifier</p> <p>2 To study Non-Inverting Operational Amplifier</p> <p>3 To study frequency response of Inverting A.C. Operational Amplifier</p> <p>4 To study frequency response of Non-Inverting A.C. Operational Amplifier</p> <p>5 To study High Input Impedance of Inverting Amplifier</p> <p>6 To study High Input Impedance of Non-Inverting Amplifier</p> <p>The board shall consist of the following built-in parts:</p> <p>1 $\pm 15V$ D.C. at 25mA, IC Regulated Power Supply</p> <p>2 0 - 2V D.C. at 50mA, continuously variable regulated Power Supply.</p> <p>3 OP-AMP IC 741</p> <p>4 Adequate no. of other electronic components</p> <p>5 Mains ON/OFF switch, Fuse and Jewel light</p> <p>6 The unit shall be operative on 230VAC $\pm 10\%$ at 50Hz</p> <p>7 Adequate no. of patch cords stackable from rear both ends 4mm spring loaded plug length 50cm</p> <p>8 Good Quality, reliable terminal/sockets are to be provided at appropriate places on panel for connections / observation of waveforms</p> <p>9 Supported by detailed Operating Instructions etc.</p> <p>with appropriate additional number of separate circuit components like resistances, ICs</p>	
11	<p>Experimental Training Board designed specifically for the study of OP-AMP and to carry out its Mathematical Operations.</p> <p>01. Study of Operational Amplifier in the given modes:</p> <p>1.1 Inverting Amplifier.</p> <p>1.2 Non-inverting Amplifier</p> <p>1.3 Frequency Response of Inverting A.C. Amplifier</p> <p>1.4 Frequency Response of Non-inverting A.C. Amplifier</p> <p>1.5 High Input Impedance Inverting Amplifier</p> <p>02. To study the given Mathematical Operations :</p> <p>2.01 Inverting Summing Amplifier.</p> <p>2.02 Subtractor & Differential Amplifier.</p> <p>2.03 A.C. Differential Amplifier</p> <p>2.04 Adder Subtractor</p> <p>2.05 Multiplication by a Constant</p> <p>2.06 Division by a Constant</p> <p>2.07 Integrating Amplifier for D.C. Input Signals</p> <p>2.08 Integrating Amplifier for A.C. Input Signals</p> <p>2.09 Differentiation Amplifier</p> <p>2.10 Non-Inverting Differentiation</p> <p>2.11 Voltage follower or buffer amplifier using D.C. voltage</p> <p>2.12 Voltage follower or buffer amplifier using A.C. voltage</p> <p>The board shall consist of the given built-in parts :</p> <p>01 $\pm 15V$ D.C. at 50mA, IC Regulated Power Supply.</p> <p>2 Three 0-2V D.C at 100mA, variable regulated Power Supplies.</p> <p>03 OP-AMP IC 741</p> <p>04 Two to three SPST switches and adequate no. of other electronic components</p> <p>05 Mains ON/OFF switch, Fuse and Jewel light</p> <p>06 The unit shall be operative on 230VAC $\pm 10\%$ at 50Hz</p> <p>07 Adequate no. of patch cords stackable from rear both ends 4mm spring loaded plug length 50cm</p> <p>08 Good Quality, reliable terminal/sockets are to be provided at appropriate places on panel for connections/ observation of waveforms.</p> <p>09 Strongly supported by detailed Operating Instructions etc. giving details of Object, Theory, Design procedure etc.</p> <p>with appropriate additional number of separate circuit components like resistances, ICs</p>	

12	<p>Experimental Training Board designed for the study of electrical parameters of OP-AMP IC 741</p> <p>To measure the given parameters on OP-AMP IC 741</p> <ol style="list-style-type: none"> 01 Measurement of quiescent supply current of OP-AMP 02 To null the offset voltage of an OP-AMP 03 To measure open loop voltage gain under closed loop condition 04 To measure output resistance 05 To measure differential input resistance 06 To measure unity gain bandwidth 07 To measure the rated output 08 To measure the slew rate 09 To measure the full power response 10 To measure the input offset voltage 11 To measure the input bias currents and offset current 12 To measure the common mode rejection ratio (CMRR) 13 To measure the common mode input resistance. <p>The Kit shall consists of the given built-in parts:</p> <ol style="list-style-type: none"> 01 $\pm 12V$ D.C. at 100mA, IC regulated Power Supply 02 OP-AMP IC-741 03 Digital DC Voltmeter $3\frac{1}{2}$ Digit Range 0-20 V 04 Digital DC Ammeter $3\frac{1}{2}$ Digit Range 0-20 mA 05 Adequate no. of other electronic components 06 Mains ON/OFF switch and Fuse 07 The unit shall be operative on 230VAC $\pm 10\%$ at 50Hz 08 Adequate no. of patch cords stackable from rear both ends 2mm spring loaded plug length 50cm 09 Good Quality, reliable terminal/sockets are to be provided at appropriate places on panel for connections & observation of waveforms 10 Strongly supported by detailed Operating Instructions, giving details of Object, Theory, Design procedures etc. <p>with appropriate additional number of separate circuit components like resistances, ICs</p>	
13	<p>Experimental Training Board designed for the study of Input bias current, output-offset voltage & slew rate in case of Op-Amp IC 741</p> <p>To study the following experiments :</p> <ol style="list-style-type: none"> 01 To measure input-bias current. 02 To measure output-offset voltage. 03 To measure slew rate. <p>The board shall consists of the following built-in parts :</p> <ol style="list-style-type: none"> 01 $\pm 12V$ D.C. at 100mA, IC Regulated Power Supply. 02 OP-AMP IC 741. 03 Two to four SPDT switches. 04 Potentiometer. 05 Adequate no. of other electronic components. 06 Mains ON/OFF switch, Fuse and Jewel light. 07 The unit shall be operative on 230V $\pm 10\%$ at 50Hz A.C. Mains. 08 Adequate no. of patch cords stackable 4 mm spring loaded plug length 50 cms 09 Good Quality, reliable terminal/sockets are to be provided at appropriate places on panel for connections & observation of waveforms. 10 Strongly supported by detailed Operating Instructions, giving details of Object, Theory, Design procedures etc. <p>with appropriate additional number of separate circuit components like resistances, ICs</p>	
14	<p>Experimental Training Board designed for the study of OP-AMP Comparator.</p> <p>01 Study of OP-AMP Comparator and its Characteristics:</p> <p>(a) Non-Inverting Comparator (b) Inverting Comparator (c) Fast Precision Voltage Comparator. (d) Comparator for signals of opposite polarity. (e) Single ended comparator with Hysteresis and clamped feedback. (f) Comparator for A.C. Coupled signals.</p> <p>(b) Applications of Comparator :</p> <p>(a) Zero Crossing Detector. (b) Schmit Trigger. (C) Voltage Limiter</p>	

	<p>The board shall consist of the following built-in parts :</p> <p>01 $\pm 15V$ D.C. at 50mA, IC Regulated Power Supply. 02 +5V DC at 50mA, IC Regulated Power Supply. 03 0-5V D.C. at 100mA, continuously variable Power Supply. 04 Two OP-AMP ICs 741 05 Linear Potentiometer and</p> <p>adequate no. of other electronic components</p> <p>06 Mains ON/OFF switch, Fuse and Jewel light 07 The unit shall be operative on 230VAC $\pm 10\%$ at 50Hz. 08 Adequate no. of patch cords stackable from rear both ends 4mm spring loaded plug length 50cm. 09 Good Quality, reliable terminal/sockets are to be provided at appropriate places on panel for connections/ observation of waveforms. 10 Strongly supported by detailed Operating Instructions, giving details of Object, Theory, Design procedures etc.</p> <p>With suitable no. of separate circuit components like resistances</p>	
15	<p>Experimental Training Board designed to study sinusoidal Oscillators. In this training board all the basic sinusoidal oscillators are to be provided.</p> <p>01 To study R.C. Phase Shift Oscillator of phase advance type. 2 To study R.C. Phase Shift Oscillator of phase retard type. 03 To study Wien-Bridge Oscillator 04 To study Hartely's Oscillator. 05 To study Colpitt's Oscillator. 06 To study Pierce (X-Tal) Oscillator 07 To study method of frequency measurement using a CRO.</p> <p>The board shall consists of the following built-in parts:</p> <p>01 +9V D.C at 100mA, IC Regulated Power Supply. 02 Two stage buffer/amplifier using PNP transistors and controllable A.C. gain 03 NPN Transistor biased in Class A common emitter configuration. 04 Wien-bridge network 05 R.C. Phase Shift network (advance type & retard type) 06 Tank circuits for Hartley's & Colpitt's Oscillators 07 3.579 MHz X-tal with series trimmer 08 Adequate no. of other electronic components 09 Mains ON/OFF switch, Fuse and Jewel light 10 The unit shall be operative on 230V $\pm 10\%$ at 50Hz A.C. Mains. 11 Adequate no. of patch cords stackable from rear both ends 4mm spring loaded plug length 50 cms 12 Good quality, reliable terminal/sockets are to be provided at appropriate places on panel for connections & observation of waveforms. 13 Strongly supported by detailed Operating Instructions, giving details of Object, Theory, Design procedures etc.</p> <p>With suitable no. of separate circuit components like resistances , ICs</p>	
16	<p>Experimental Training Board designed for the Comparative study of Bridge Rectifier and Precision Rectifier using OP-AMP ICs 741</p> <p>01 Comparative Study of Bridge Rectifier & Precision Rectifier. The board shall consist of the following built-in parts:</p> <p>01 5V p-p and 10V p-p fixed A.C. at 50 Hz 02 $\pm 15V$ D.C. at 50mA, IC regulated power supply internally connected. 03 0-10V D.C. at 50mA continuously variable power supply 04 Digital Voltmeter DC $3\frac{1}{2}$ Digit range of 0-20V 05 Three OP-AMP ICs 741 06 Adequate no. of Electronic Components. 07 Mains ON/OFF switch, Fuse and Jewel light 08 The unit shall be operative on 230V $\pm 10\%$ at 50Hz A.C. Mains. 09 Adequate no. of patch cords stackable from rear both ends 4 mm spring loaded plug length 50cm. 10 Good Quality, reliable terminal/sockets are to be provided at appropriate places on panel for connections & observation of waveforms. 11 Strongly supported by detailed Operating Instructions, giving details of Object, Theory, Design procedures etc.</p>	

Terms & Conditions –

- 1 Rates quoted should be FOR AURANGABAD or free delivery at the Institute inclusive of all lead and Lift.
- 2 Detailed specifications of the articles you intend to supply should be given. If not according to the specification, laid above.
3. The material should be supplied within (07) days from the date of order. List of material is given above.
4. The earliest delivery period should be quoted if you cannot supply within the period mentioned above.
5. Quotation should be in sealed cover and superscripted as "Quotations for Electrical Department"
Due on : - -2024, at 5 P.M.
6. Quotation should be valid for 31/03/2024.
7. Right to reject any or all quotations are reserved with the under signed.
8. Rates quoted must be inclusive of All applicable Taxes.
9. Delivery of the material will be carried out free of cost at our institute in Electrical Department by the supplier
10. No advance shall be paid and No part payment shall be made.
11. Detail Specification including make of material should be mentioned in Quotation. If the ` quoted Item/Peripheral is available with you in different brands/makes, the rates should be mentioned separately brand wise/specification wise. **If the Make/Brand/Manufacturer name is not mentioned in the quotation will be rejected without giving any information to the supplier.**
12. Material will be inspected by the concerned department. If the material found correct subject to the required specifications, bill will be passed, otherwise returned as it is at your cost.
13. Quotation not complying with the above conditions and incomplete once will not be considered



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