BMS COLLEGE OF ENGINEERING

TENDER SPECIFICATION – PROFESSIONAL PA / SOUND REINFORCEMENT SYSTEM

Technical Specifications and Bill of Quantities

1. Scope of Work

Supply, delivery, installation, integration, testing, commissioning and demonstration of a complete professional PA system comprising main and delay loudspeakers, subwoofers, amplifiers, DSP, digital mixer and stage box, microphones, cables, connectors, racks, flight cases and accessories. The system shall support speech, presentations and live events.

2. General Technical Requirements

- All equipment shall be brand new, current production, genuine and sourced through authorised channels. Refurbished or used equipment is not acceptable.
- Models named in the BOQ column are reproduced from the attached Waveguide Systems quotation. Equivalent models are permitted only if the bidder submits OEM datasheets and a point-by-point compliance statement demonstrating equal or better performance.
- Bidder shall submit a complete system design, loudspeaker coverage plan, amplifier-to-speaker matching calculations, DSP signal flow, cable schedule, mixer/stage-box I/O schedule and wireless frequency coordination plan.
- All components, connectors, cables, mounting hardware, power supplies and accessories required for a complete operational system shall be included, even if not individually itemised.
- Bidder shall inspect the site and identify any additional civil, electrical, conduiting or structural work separately before submission.

3. Detailed BOQ with BOQ Models and Equivalent Makes

The original make/model entries from the attached Waveguide Systems quotation (Option 2, Quote No. WGS280-27102026 dated 27/10/2026) are expressly retained below. Alternatives are indicative equivalent models and remain subject to technical compliance.

Item	Description	Qty	Unit	BOQ make/model and acceptable equivalents	Remarks
1.1	2-way full-range loudspeaker, 12-inch	2	Nos.	Val Audio QX12HP; JBL JRX212; Yamaha CBR12; Electro-Voice ELX200-12 or equivalent	Main PA
1.2	Flight case for 12-inch loudspeaker	2	Nos.	Custom reputed road-case manufacturer / Penn Elcom hardware or equivalent	
1.3	2-way full-range loudspeaker, 12-inch – Delay 1	2	Nos.	Val Audio QX12HP; JBL JRX212; Yamaha CBR12; Electro-Voice ELX200-12 or equivalent	
1.4	Speaker stands	2	Nos.	Hawk; Hercules; K&M; Gravity or equivalent	
1.5	2-way full-range loudspeaker, 12-inch – Delay 2	2	Nos.	Val Audio QX12HP; JBL JRX212; Yamaha CBR12; Electro-Voice ELX200-12 or equivalent	Optional
1.6	Speaker stands for Delay 2	2	Nos.	Hawk; Hercules; K&M; Gravity or equivalent	Optional
1.7	Vented 18-inch subwoofer	4	Nos.	Val Audio SW118HP; JBL JRX218S; Yamaha CXS18XLF; Electro-Voice ELX200-18S or equivalent	
1.8	Flight case for subwoofer	4	Nos.	Custom; reputed road-case manufacturer / Penn Elcom hardware or equivalent	
1.9	Professional 4-channel power amplifier	1	No.	Val Audio X4.14; Lab Gruppen E-Series 4-channel; Powersoft Quattrocanali; QSC CX-Q or equivalent	Confirm power/load matching
1.10	Professional power amplifier	1	No.	Val Audio X4.6; Crown XLS Drive Core 2; Yamaha PX; QSC GX or equivalent	Confirm exact model and power ratings
1.11	Flight case for amplifier	1	No.	Custom 19-inch shock-protected ventilated rack case	
1.12	Digital signal processor	1	No.	Val Audio SP48; dbx Drive Rack VENU360; Xilica XP series; BSS Soundweb or equivalent	Minimum 4 inputs / 8 outputs
1.13	12-inch active stage monitor	2	Nos.	Val Audio X12A; JBL PRX912; Yamaha DHR12M; EV PXM-12MP; RCF	Optional

				ART 912-A or equivalent	
1.14	Flight case for stage monitors	1	No.	Custom padded road case suitable for offered monitor	Optional
1.15	Digital mixer with stage box	1	Set	Soundcraft Impact; Allen & Heath SQ-6; Yamaha TF5 or equivalent, with compatible stage box	Exact stage-box model and I/O to be stated
1.16	Flight case for digital mixer	1	No.	Custom flight case suitable for offered console	
1.17A	Wireless handheld microphone – standard	4	Sets	Shure SLX-D/SLX-D+ with SM58; Sennheiser EW-D/EW-DX with e835; Audio-Technica 3000 Series or equivalent	Added requirement
1.17B	Wireless handheld microphone – colour-coded	2	Sets	Shure SLX-D/SLX-D+; Sennheiser EW-D/EW-DX; Audio-Technica 3000 Series or equivalent	Distinct colour identification
1.17C	Wired podium gooseneck microphone	2	Sets	Shure MX418D/C or MX412D/C; Audio-Technica U857QL; Sennheiser MEG 14-40 B or equivalent	48V phantom power
1.17D	Wireless microphone RF accessories	1	Lot	OEM-compatible antenna distribution, antennas, RF cables, rack kit and battery/charging accessories	For six simultaneous wireless channels
2.1	2.5 sq. mm speaker cable	400	Metres	Krystal / BAS equivalent professional 2-core copper OFC cable	
2.2	4 sq. mm speaker cable	100	Metres	Krystal / BAS equivalent professional 2-core copper OFC cable	Optional
2.3	20 m, 16-channel sub-snake	1	No.	Krystal / BAS Proel; Cordial; Klotz or equivalent	Optional
2.4	5 m XLR-to-XLR cable	5	Nos.	Custom Cordial; Klotz; Proel; Mogami or equivalent	
2.5	3 m TS-to-XLR cable	6	Nos.	Custom Cordial; Klotz; Proel or equivalent	Optional
2.6	Balanced signal cable	50	Metres	Krystal / BAS equivalent shielded low-noise professional audio cable	
2.7	Audio connectors	1	Lot	Amphenol / BAS Neutrik; Amphenol; Switchcraft or equivalent	
2.8	12U equipment rack	1	No.	Custom equivalent 19-inch ventilated, lockable rack	
2.9	Cable laying, conduiting and termination	As reqd.	Lot	Service / site-condition based	Quote itemised rates
2.10	System programming	1	Job	Service	DSP, crossover, EQ, delay and presets
2.11	Commissioning and training	1	Job	Service	Include testing and staff training
2.12	Transportation	1	Lot	Service	Delivery to BMSCE, Bengaluru

4. Minimum Technical Performance Requirements

- 12-inch passive full-range loudspeaker: two-way design, compression-driver HF section, professional enclosure, nominal 8-ohm impedance, protective grille and pole-mount provision. Bidder shall state continuous/programme power, frequency response, sensitivity and maximum SPL from OEM datasheet.
- 18-inch passive vented subwoofer: professional low-frequency enclosure, high-excursion 18-inch driver, protective grille and professional speaker connectors. Bidder shall state impedance, continuous/programme power, frequency response and maximum SPL.
- Power amplifiers: professional multi-channel amplifiers with thermal, short-circuit, DC and overload protection, balanced inputs, professional speaker outputs and rack-mounting. State output power at 8-ohm and 4-ohm loads with all channels driven. Amplifiers shall be matched to the offered loudspeakers.
- Digital signal processor: minimum 4 analogue inputs and 8 analogue outputs, 24-bit conversion, 48 kHz or better, EQ, crossover, delay, polarity, compressor/limiter, metering, presets and configuration software. Separate processing for main, delay and subwoofer zones.
- Digital mixer: minimum 32 input processing channels, minimum 16 mix buses, stereo main output, scene memories, EQ, dynamics, effects and USB recording/playback. Compatible stage box shall be supplied; bidder shall specify exact model, protocol and I/O count.

5. Microphone Requirements – Mandatory

The source quotation does not specify microphone makes, models or quantities. The following eight microphones are added as requested and shall be included in the tender BOQ.

Microphone type / quantity	Minimum specification	Indicative equivalent models
4 wireless handheld microphones	Digital UHF; handheld dynamic cardioid capsule; diversity receiver; frequency scan; balanced XLR; battery/rechargeable option.	Shure SLX-D/SLX-D+ with SM58; Sennheiser EW-D/EW-DX with e835; Audio-Technica 3000 Series

	Six wireless channels to work simultaneously.	
2 colour-coded wireless handheld microphones	Same technical performance as standard handheld; each unit distinctly colour identified by factory finish, colour ring or coloured windscreen.	Shure SLX-D/SLX-D+; Sennheiser EW-D/EW-DX; Audio-Technica 3000 Series
2 podium gooseneck microphones	Wired condenser, cardioid/speech pickup, suitable podium length, shock-isolated base/mount, XLR, windscreen and 48V phantom-power compatibility.	Shure MX418D/C or MX412D/C; Audio-Technica U857QL; Sennheiser MEG 14-40 B

Include OEM-compatible antenna distribution/combining, antennas, RF cables, rack mounting, power supplies and batteries or charging solution for six simultaneous wireless channels. Bidder shall verify locally permitted frequency bands and comply with applicable WPC/DoT requirements in India.

6. Cables, Connectors, Rack and Flight Cases

- Speaker cables shall be copper OFC or equivalent, 2-core, 2.5 sq. mm for the specified 400 m and 4 sq. mm for the optional 100 m. Balanced signal cables shall be shielded and low-noise.
- Connectors shall be professional metal-bodied locking type. XLR and speaker connectors shall be from the quoted makes or equivalent professional brands.
- 12U rack shall be 19-inch, lockable, ventilated, with front/rear access and cable management.
- Flight cases shall be roadworthy, padded, reinforced and sized to the supplied equipment.

7. Installation, Commissioning and Acceptance

- Installation shall include cable routing, termination, equipment mounting, DSP configuration, gain structure, crossover, equalisation, delay alignment and zone tuning.
- Carry out polarity, continuity and load checks; verify microphone RF operation and all mixer inputs/outputs.
- Demonstrate clear and even speech coverage in the intended audience area without hum, buzz, clipping or unwanted noise.
- Submit block diagram, cable schedule, amplifier/speaker calculations, DSP backup, mixer scenes, equipment serial numbers, OEM datasheets, warranty documents and as-built drawings.
- Provide hands-on operation and troubleshooting training for at least two nominated BMSCE staff.

8. Warranty and Service

- Proposed tender condition: minimum 3-year onsite warranty for electronic equipment and microphones; minimum 3 year for passive speakers, cables, connectors, racks and flight cases, or longer if OEM warranty applies.
- Warranty shall cover parts and labour for manufacturing defects under normal use. Bidder shall state Bengaluru service response time and escalation contacts.
- Submit OEM/dealer authorisation where applicable and confirm availability of spares and service support in India.

9. Bidder Eligibility

- Minimum three years' experience in professional audio / PA system integration.
- At least three comparable completed installations with client references / work orders / completion certificates.
- Submit GST, PAN, business registration, OEM/channel authorisations for major equipment and genuine-new-product undertaking.
- Submit point-by-point technical compliance statement and clearly identify all deviations.

10. Commercial BOQ Submission

Bidders shall quote item-wise make/model offered, basic unit rate, GST rate and total amount. Optional items shall be priced separately and excluded from the mandatory subtotal. No lump-sum consolidation of BOQ lines is permitted.

Sl.	Description	Qty	Unit	Make/model offered	Unit rate ₹	Total ₹
1.1	2-way full-range loudspeaker, 12-inch	2	Nos.			
1.2	Flight case for 12-inch loudspeaker	2	Nos.			
1.3	2-way full-range loudspeaker, 12-inch – Delay 1	2	Nos.			
1.4	Speaker stands	2	Nos.			
1.5	2-way full-range loudspeaker, 12-inch – Delay 2	2	Nos.			
1.6	Speaker stands for Delay 2	2	Nos.			
1.7	Vented 18-inch subwoofer	4	Nos.			
1.8	Flight case for subwoofer	4	Nos.			
1.9	Professional 4-channel power amplifier	1	No.			
1.10	Professional power amplifier	1	No.			
1.11	Flight case for amplifier	1	No.			
1.12	Digital signal processor	1	No.			
1.13	12-inch active stage monitor	2	Nos.			
1.14	Flight case for stage monitors	1	No.			
1.15	Digital mixer with stage box	1	Set			
1.16	Flight case for digital mixer	1	No.			
1.17A	Wireless handheld microphone – standard	4	Sets			
1.17B	Wireless handheld microphone – colour-	2	Sets			

	coded					
1.17C	Wired podium gooseneck microphone	2	Sets			
1.17D	Wireless microphone RF accessories	1	Lot			
2.1	2.5 sq. mm speaker cable	400	Metres			
2.2	4 sq. mm speaker cable	100	Metres			
2.3	20 m, 16-channel sub-snake	1	No.			
2.4	5 m XLR-to-XLR cable	5	Nos.			
2.5	3 m TS-to-XLR cable	6	Nos.			
2.6	Balanced signal cable	50	Metres			
2.7	Audio connectors	1	Lot			
2.8	12U equipment rack	1	No.			
2.9	Cable laying, conduiting and termination	As reqd.	Lot			
2.10	System programming	1	Job			
2.11	Commissioning and training	1	Job			
2.12	Transportation	1	Lot			
Mandatory subtotal						
GST (item-wise)						
Grand total – mandatory items						
Optional items total (separate)						

11. Tender Conditions and Source Notes

- Equivalent models shall be accepted only when supported by manufacturer datasheets and demonstrated compliance. BMSCE may call for product demonstration.
- All necessary accessories for a complete operational system shall be included. Any deviation or exclusion shall be stated clearly in the bid.
- Optional BOQ items are Delay Zone 2 loudspeakers and stands, 4 sq. mm speaker cable, 16-channel sub-snake, TS-to-XLR cables and active monitors with flight case.

Model clarification: The bidder shall furnish an official manufacturer datasheet confirming the exact model designation and ratings. The source quotation specifies minimum 3-year warranty; the longer warranty above is a proposed BMSCE tender requirement and may be finalised by the competent authority.