7.20 ANNEXURE H: DETAILED TECHNICAL SPECIFICATIONS OF CCTV SYSTEM & PERIPHERALS EVALUATION CRITERIA

CCTV System & Peripherals Configuration

4MP or above fixed IP dome network camera.	
Feature	**Minimum Specification**
Image Sensor	1/2.9" 4MP Progressive Scan CMOS
Effective Resolution	≥ 2560 (H) × 1440 (V)
Minimum Illumination	≤ 0.06 lux (Color), ≤ 0.006 lux (B/W), 0 lux with IR
Angle Adjustment	Pan: 0°–360°, Tilt ≥ 75°, Rotation: 0°–360°
Shutter Speed	Auto/Manual, 1/3 s – 1/100,000s
White Balance	Auto, Natural, Outdoor, Manual, Regional Custom.
DORI Distance	Detect / Observe / Recognize / Identify as per IEC 62676
Gain Control (AGC)	Auto / Manual
Lens Type	Fixed focal
Maximum Aperture	F1.6 or better
Day/Night Function	Auto (ICR) / Color / B/W
Lens Focal Length	3.6 mm standard, 2.8 mm optional
Signal-to-Noise Ratio	≥ 56 dB
Angle of View	H ≥ 78°, V ≥ 40°, D ≥ 93° (3.6 mm lens)
Backlight Compensation	BLC / HLC / WDR ≥ 120 dB
IR Illumination	Dual IR LEDs, ≥ 30 m range
Smart IR	Supported
Stream Capability	Dual Stream or Multi-stream
Frame Rate	Main stream: 4M (2560 × 1440)@1–25/30 fps,
	Sub stream: D1 (704 × 576)@1–25 fps/ (704 × 480)@1–30 fps
Video Compression	H.265 / H.264 / H.264+ / H.264H / H.264B / MJPEG
Supported Resolutions	4M (2560 × 1440), 3M (2304 × 1296), 2M (1920 × 1080), 1.3M (1280 × 960), 720p (1280 ×720), D1 (704 × 576/704 × 480), VGA (640 × 480), CIF (352 × 288/352 × 240)
Noise Reduction	3D NR
Motion Detection	Minimum 4 configurable zones
Video Format	PAL / NTSC
Privacy Masking	Minimum 4 areas
Region of Interest (ROI)	Minimum 4 areas
On-Screen Display (OSD)	Camera title, Date & Time
Audio Compression	G.711a / G.711Mu / PCM / G.726
Network Protocols	SFTP, IPv4, IPv6, TCP/IP, UDP, HTTP, HTTPS, RTSP/RTSPS, RTP, RTCP, DNS, DHCP, NTP, ICMP, SMTP, PPPoE, SNMP V1/V2/V3, NFS, ONVIF (Profile S/G/T), unicast/multicast
SDK / API	Supported
Ethernet Interface	RJ-45(10/100 Base-T)

7.20 ANNEXURE H: DETAILED TECHNICAL SPECIFICATIONS OF CCTV SYSTEM & PERIPHERALS EVALUATION CRITERIA

CCTV System & Peripherals Configuration

Alarm Events	Motion detection, Video tampering, Network disconnection, IP conflict, Audio detection, Security exception
Cyber Security	AES-256 bit encryption, HTTPS, Secure Boot, Signed Firmware, IP/MAC filtering
Audio	Built-in Microphone
Image Rotation	0° / 180°
Bit Rate Control	CBR / VBR
Bit Rate	H.265: 12 kbps–4096 kbps, H.264: 32 kbps–4096 kbps
Browser Support	IE / Chrome / Firefox
Edge Storage	Micro SD / NAS / SFTP up to 512 GB
Weatherproof Standard	IP67 or better
Power Supply	12 VDC and/or PoE (802.3af)
Power Consumption	Minimum 4.7 W (PoE), H.265 with intelligence, WDR, IR/Warm light intensity)
Operating Temperature	–40 °C to +60 °C (–40 °F to +140 °F)
Operating Humidity	≤ 95% RH, non-condensing
Storage Temperature	–40 °C to +60 °C
Storage Humidity	≤ 95% RH
Housing / Casing	Metal + Plastic
Certifications	BIS, CE, FCC, RoHS, ISO/IEC 27032 or 27400 (OWASP) & STQC (ER)

7.20 ANNEXURE H: DETAILED TECHNICAL SPECIFICATIONS OF CCTV SYSTEM & PERIPHERALS EVALUATION CRITERIA

CCTV System & Peripherals Configuration

4MP or above fixed IP bullet network camera.	
Feature	**Minimum Specification**
Image Sensor	1/2.9" 4MP PS CMOS Image Sensor
Effective Pixels	2560 (H) × 1440 (V)
Minimum Illumination	0.06 lux@F1.6 (Color), 0.006 lux@F1.6 (B/W), 0 lux (IR on)
Angle Adjustment	Pan: 0–360°, Tilt: 0–90°, Rotation: 0–360°
Shutter Speed	Auto/Manual 1/3 s–1/100,000 s
White Balance	Auto, Natural, Street lamp, Outdoor, Manual, Regional custom
DORI Distance	Lens 3.6 mm: Detect 85.4 m, Observe 34.2 m, Recognize 17.1 m, Identify 8.5 m; Lens 2.8 mm: Detect 64 m, Observe 25.6 m, Recognize 12.8 m, Identify 6.4 m
Gain Control (AGC)	Auto/Manual
Lens Type	Fixed-focal
Max. Aperture	F1.6
Close Focus Distance	3.6 mm: 1.7 m, 2.8 mm: 1.1 m
Lens	3.6 mm fixed (2.8 mm optional)
S/N Ratio	>56 dB
Angle of View	3.6 mm: H 78°, V 40°, D 93°; 2.8 mm: H 94°, V 51°, D 110°
Back Light Compensation	BLC/HLC/WDR (120 dB)
IR Number	Dual IR
IR Range	30 m
IR Control	Auto / Manual
Smart IR	Supported
Video Resolution	4M (2560 × 1440), 3M (2304 × 1296), 2M (1920 × 1080), 1.3M (1280 × 960), 720p (1280 ×720), D1 (704 × 576/704 × 480), VGA (640 × 480), CIF (352 × 288/352 × 240)
Video Compression	Instastream, H.265, H.264+, H.264, H.264H, H.264B, MJPEG (Only supported by sub stream)
Frame Rate	Main: 2560×1440 @1–30 fps; Sub: 704×576/704×480
Stream Capability	Dual stream
Noise Reduction	3D NR
Motion Detection	4 areas or more
Video Format	PAL/NTSC
Privacy Mask	4 areas
ROI	4 areas or more
OSD	Camera title, Date & Time
Audio	Built-in Microphone

7.20 ANNEXURE H: DETAILED TECHNICAL SPECIFICATIONS OF CCTV SYSTEM & PERIPHERALS EVALUATION CRITERIA

CCTV System & Peripherals Configuration

Audio Compression	G.711a / G.711Mu / PCM / G.726
Bit Rate Control	CBR/VBR
Bit Rate	H.265: 12 kbps–4096 kbps, H.264: 32–4096 kbps
Protocols	Minimum IPv6, IPv4, DNS, RTCP, NTP, RTP, HTTP, HTTPS, TCP/IP, NFS, UDP, ICMP, SSL, DHCP, RTSP/RTSPS, ONVIF (Profile-S/G/T), SFTP, unicast
SDK/API	Supported
Ethernet	RJ-45 (10/100 Base-T)
Alarm Event	Network disconnection, IP conflict, illegal access, Motion/video tampering, Audio detection, Security exception
Cyber Security	AES 256-bit, config encryption, trusted execution, digest, syslog, IP/MAC filtering, HTTPS, trusted upgrade/boot
Image Rotation	0°/180°
User/Host	Min. 6 (Total bandwidth: 24 M)
Browser	IE, Chrome, Firefox
Storage	SFTP, NAS, Micro SD card (Max 512GB)
Iris Control	Fixed
Power Source	12 VDC / PoE (802.3af)
Power Consumption	Min 1.6 W / Max 4.7 W
Weatherproof Standard	IP67 or
Operating Temperature	–40 °C to +60 °C
Operating Humidity	≤95% RH, non-condensing
Storage Temperature	–40 °C to +60 °C
Storage Humidity	≤95% RH
Casing	Metal + Plastic
Certificates	BIS, CE, FCC, RoHS & ISO/IEC 27032 or ISO/IEC 27400 (OWASP Application Security verification stand. V4.0) Certified with ER (STQC).

7.20 ANNEXURE H: DETAILED TECHNICAL SPECIFICATIONS OF CCTV SYSTEM & PERIPHERALS EVALUATION CRITERIA

CCTV System & Peripherals Configuration

8-Channel 4K Network Video Recorder (NVR)	
Feature	**Minimum Specification**
Processor	Dual-core embedded processor
IP Camera Input	8 channels
Operating System	Embedded Linux
Two-way Talk	1 channel Input, 1 channel Output, RCA/3.5 mm Jack
User Interface	GUI
Video Output	1 HDMI, 1 VGA
Compression	Instastream / H.265 / Smart H.264+ / H.264
Video Resolution	HDMI and VGA
Network Bandwidth	Min. 160 Mbps for access, 160 Mbps for storage
Decoding Capacity	8 channels @1080P (30 fps)
Recording Resolution	8MP / 6MP / 5MP / 4MP / 3MP / 1080P / 1.3MP / 720P
Video Display Split	1 / 4 / 8 / 9
Motion Detection	MD Zones: 396 (22×18)
Video Loss Detection	Supported
Alarm Input	4 channels
Alarm Output	2 channels
Audio Input	1 channel, RCA / 3.5 mm Jack
Audio Output	1 channel, RCA / 3.5 mm Jack
Hard Disk Support	2 × SATA III, up to 10TB each
Smart Mobile Phone Access	iOS / Android App
Trigger Events	Recording, PTZ, Tour, Video Push, Email, Snapshot, Buzzer, Screen Tips
Recording Mode	Manual, Schedule, Motion Detection (MD), Stop
Search Mode	Time/Date, Alarm, MD & Exact Search, Smart Search
Disk Group Support	Yes
General Alarm	Motion Detection, Privacy Masking, Video Loss, PIR Alarm, IPC Alarm
Anomaly Alarm	Camera Offline, Storage Error, Full Storage, IP/MAC Conflict, Login Lock, Network Security Anomaly
Intelligent Alarm	Perimeter Protection, SMD, People Counting, Heat Map
Alarm Linkage	Record, Snapshot, IPC External Alarm Output, Buzzer, Log, Preset, Email
Playback Function	Play, Pause, Stop, Rewind, Fast Play, Slow Play, Next/Previous File, Next/Previous Camera, Full Screen, Repeat, Shuffle, Backup Selection, Digital Zoom
Backup Mode	USB Device / Network
Interface Ports	2 × USB (1 USB2.0, 1 USB3.0)

7.20 ANNEXURE H: DETAILED TECHNICAL SPECIFICATIONS OF CCTV SYSTEM & PERIPHERALS EVALUATION CRITERIA

CCTV System & Peripherals Configuration

Max Remote Access	128 users
Record Interval	1–120 min (default 60 min), Pre-record 1–30 sec, Post-record 10–300 sec
Ethernet	1 × RJ-45 (10/100/1000 Mbps)
Protocols	HTTP, HTTPS, TCP/IP, IPv4/IPv6, UDP, RTSP, RTP, ARP, SSL, DHCP, NTP, ONVIF 2.4, SDK, DNS, PPPoE, FTP, SMTP, IGMP, QoS, IP Filter, SNMP, CGI Conformant
Power Supply	DC12V / 4A
Power Consumption	<6.9 W (Without HDD)
Operating Temperature	−10 ~ +55°C / 10~90% RH / 86~106 kPa

7.20 ANNEXURE H: DETAILED TECHNICAL SPECIFICATIONS OF CCTV SYSTEM & PERIPHERALS EVALUATION CRITERIA

CCTV System & Peripherals Configuration

10 Ports Switch with 8 Gigabit PoE Ports & 2 Gigabit Uplink Ports, 2 SFP Ports	
Feature	**Minimum Specification**
Uplink Ports	2 x 1000Mbps RJ45 ports + 2 x 1000Mbps SFP ports
Network Standard	IEEE802.3i/802.3u/802.3x/802.3af/802.3ab/ IEEE 802
Switch Capacity	24Gbps Full duplex
Packet Forwarding Rate	1.488Mpps/port
PoE Ports	8, 1000Mbps; RJ45 ports; Max. 30W Output of Single PoE Port
Network Ports	10 ports
Transmission Distance	0-100m/1000Mbps or Port 7-8 Max. 250m/10Mbps via Cat.5e or more under Extend mode
MAC Address List	2k
PoE Feature	All ports support MDI/MDI
PoE Standard	IEEE802.3af, IEEE802.3at
PoE watchdog	Supported
PoE Power Supply	1/2(+),3/6(-)
PoE Power Budget	96W
Ethernet Port Light	Green light off: Link is disconnected Green light on: Link is connected Green light flash: Data Transmitting
Surge Protection	Common mode/RJ45 port: 4KV Differential mode/RJ45 port: 2KV Common mode/Power board: 2K Differential mode/Power board: 2KV
Forwarding Mode	Store-and-forward
Power Source	Input: 100-240V AC, 50/60Hz, Built-in Power Supply
Operating Temperature	-10°C ~50°C
Power Consumption	<5W
LEDs Indicator	Light on: Power On Light off: No Power
Storage Temperature	-40°C ~70°C
ESD	Air discharge: 8KV Contact discharge: 6KV
Humidity	10%-95% , non-condensing