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GROUP OF INSTITUTIONS
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# EXPERT COMPUTER COURSE

## MULTIMEDIA

**Topics Covered:**

| # | Topic |
|---|---|
| 1 | Basic Concepts of Multimedia — Definition, History, Applications |
| 2 | Hardware Requirements for a Multimedia Computer |
| 3 | Textual Information in Multimedia |
| 4 | Components of Multimedia — Overview |
| 5 | Images and Their Types — Raster vs Vector, File Formats |
| 6 | Animation — Types, Principles, Software |
| 7 | Digital Audio — Concepts, Formats, Sampling |
| 8 | Digital Video — Concepts, Formats, Compression |
| 9 | Software for Multimedia Creation |
| 10 | Introduction to MS Publisher |
| 11 | Introduction to PhotoDraw (MS PhotoDraw) |
| 12 | Developing Simple Applications and Presentations Using MS Publisher |
| 13 | Quick Revision + Important MCQ Questions |

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# SECTION 1: BASIC CONCEPTS OF MULTIMEDIA

## 1.1 What is Multimedia?

> *Multimedia is the combined use of multiple forms of content — text, graphics/images, audio, video, and animation — to communicate information interactively using computers and digital technology. The word 'Multimedia' comes from 'Multi' (many) + 'Media' (means of communication).*

| Component | Description | Example |
|---|---|---|
| Text | Written words, numbers, symbols — the most basic form of information | Headlines, captions, instructions, scripts |
| Graphics / Images | Still visual content — photographs, illustrations, diagrams, icons | Product photos, infographics, company logos |
| Audio | Sound in digital form — music, narration, sound effects, voice recording | Background music, podcast, voice instructions |
| Video | Moving images with sound — recordings, animations played in sequence | Tutorial videos, news clips, movie trailers |
| Animation | Sequence of images creating illusion of movement — can be 2D or 3D | Cartoon characters, loading spinners, 3D product demos |

## 1.2 Types of Multimedia

| Type | Description | Example |
|---|---|---|
| Linear Multimedia | Content plays in a fixed sequence — user cannot interact or control flow | Traditional film, TV broadcast, pre-recorded video lecture |
| Non-linear / Interactive Multimedia | User controls navigation — can jump between sections, make choices | CD-ROM encyclopaedia, e-learning course with quizzes, video games |
| Online Multimedia | Multimedia delivered over the internet — streaming or downloadable | YouTube, Netflix, Spotify, online courses, webinars |
| Offline Multimedia | Stored on physical media — CD, DVD, HDD | DVD movies, CD-ROM encyclopaedia, portable training material |
| Hypermedia | Extended hypertext — links between different media types (text links to video links to images) | Wikipedia (text + images + links + videos on one page) |

## 1.3 Applications of Multimedia

| Application Area | How Multimedia Is Used | Examples |
|---|---|---|
| Education & e-Learning | Interactive lessons, simulations, animated explanations | DIKSHA, Khan Academy, NPTEL, Coursera — video + text + quiz |
| Entertainment | Movies, music, games, social media content | Netflix, Spotify, YouTube, video games, Instagram reels |
| Business & Advertising | Product demos, multimedia presentations, digital ads | PowerPoint presentations, YouTube ads, website banners |
| Healthcare / Medical | 3D anatomical models, surgical simulations, patient education videos | Medical AR/VR training, patient portal videos |
| Virtual Reality (VR) | Completely immersive digital environment for training/games | VR gaming, pilot training simulators, real-estate virtual tours |
| Augmented Reality (AR) | Digital content overlaid on real world via camera | Snapchat filters, IKEA furniture placement app, Google Lens |
| Museums & Exhibits | Interactive displays, virtual tours, audio guides | National Museum digital exhibits, Louvre virtual tour |
| Publishing | Digital magazines, interactive books, multimedia newspapers | Flipkart digital magazines, iBooks, interactive PDFs |
| Engineering & CAD | 3D modelling, product visualisation, assembly animations | AutoCAD 3D views, SolidWorks product animations |
| Government & e-Governance | Public awareness campaigns, training materials, citizen portals | MyGov.in videos, awareness ads, Digital India campaign |

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## SECTION 2: HARDWARE REQUIREMENTS FOR A MULTIMEDIA COMPUTER

# 2.1 Minimum Hardware for Multimedia

> *A multimedia computer must have sufficient hardware to process, store, and display multiple forms of media (text, images, audio, video) smoothly. Higher-quality multimedia requires more powerful hardware.*

| Hardware Component | Minimum Requirement | Recommended for Professional Multimedia | Purpose |
|---|---|---|---|
| Processor (CPU) | Intel Core i3 / AMD Ryzen 3 (2 GHz+) | Intel Core i7/i9 or AMD Ryzen 7/9 (3.5 GHz+, 8+ cores) | Processes video encoding, 3D rendering, audio mixing — CPU-intensive tasks |
| RAM (Memory) | 8 GB DDR4 | 16-32 GB DDR4 or DDR5 | Holds multimedia files in memory while working — more = smoother multitasking |
| Graphics Card (GPU) | Integrated Intel UHD Graphics | NVIDIA RTX 4070 / AMD RX 7900 (4-8 GB VRAM) | Renders video, 3D animations, graphic effects — dedicated GPU essential for pro work |
| Storage — HDD | 500 GB HDD (for basic work) | 2 TB HDD for archive storage | Stores multimedia project files, raw footage, assets |
| Storage — SSD | 256 GB SSD | 1-2 TB NVMe SSD | Fast SSD for OS and working files — drastically speeds up video editing |
| Monitor / Display | 1920×1080 Full HD, 60Hz | 4K UHD (3840×2160), IPS panel, colour-calibrated | Higher resolution shows more detail; colour accuracy vital for design work |
| Sound Card / Audio | Built-in audio (Realtek) | Dedicated audio interface (Focusrite Scarlett) + studio monitors | High-quality audio input/output for recording, mixing, podcast production |
| Optical Drive (CD/DVD) | DVD-RW drive (optional today) | Blu-ray writer | Reading/writing multimedia CDs, DVDs, Blu-rays |
| Speakers / Headphones | Basic stereo speakers | Studio monitor speakers (Yamaha HS5) or headphones (Sennheiser HD 650) | Audio playback for music production, video editing |
| Microphone | Built-in mic | Condenser microphone (Audio-Technica AT2020) + pop filter | Recording narrations, podcasts, voice-overs for multimedia |

| Hardware Component | Minimum Requirement | Recommended for Professional Multimedia | Purpose |
|---|---|---|---|
| Webcam | 720p built-in webcam | 4K webcam or DSLR via capture card | Recording video content, live streaming, video conferencing |
| Drawing Tablet | Not required | Wacom Intuus Pro or Huion KAMVAS | Precise drawing and illustration for graphic design and animation |

## 2.2 Additional Multimedia Peripherals

| Device | Use in Multimedia |
|---|---|
| Scanner (Flatbed) | Digitise physical artwork, photographs, documents — convert to digital image files |
| Digital Camera / DSLR | High-quality photo and video capture — raw images for photo editing and production |
| Video Capture Card | Digitise analog video (VHS), capture HDMI/SDI from external cameras for editing |
| MIDI Keyboard/Controller | Input musical notes for digital audio workstation (DAW) — music production |
| External HDD / NAS | Store large multimedia projects — raw video files can be 100 GB+ |
| Projector | Display multimedia presentations and videos to an audience |
| VR Headset | Create and test VR experiences — Oculus Quest, HTC Vive |
| 3D Printer | Print physical models from 3D multimedia designs |

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## SECTION 3: TEXTUAL INFORMATION IN MULTIMEDIA

# 3.1 Role of Text in Multimedia

> *Text is the most fundamental component of multimedia. Even in highly visual multimedia projects, text provides context, headings, captions, scripts, menus, and instructions. Text makes multimedia accessible and searchable.*

| Text Use | Description | Example in Multimedia |
|---|---|---|
| Titles & Headings | Large prominent text identifying sections or slides | PowerPoint slide title, YouTube video title card |
| Body Text | Main readable content — paragraphs of information | Article text, e-learning lesson content |
| Captions & Labels | Short text accompanying images or explaining visuals | Photo caption, diagram label, chart axis label |
| Navigation Menus | Text-based interface elements for navigation | DVD menu options, website navigation bar, app menus |
| Subtitles & Closed Captions | Synchronized text overlay on video content | YouTube auto-captions, movie subtitles, live caption |
| Scripts & Transcripts | Written version of spoken content in audio/video | Podcast transcript, video script for production |
| Metadata | Text describing properties of media file | Image EXIF data, MP3 ID3 tags (artist, album, title) |
| Hypertext | Clickable text linking to other content — foundation of WWW | Wikipedia links, website navigation, e-book cross-references |

## 3.2 Text Properties in Multimedia

| Property | Description | Impact on Multimedia |
|---|---|---|
| Font Face (Typeface) | The design of the letters — Serif, Sans-serif, Decorative, Monospace | Arial/Helvetica (modern), Times New Roman (formal), Impact (headlines) |
| Font Size | Physical size of text — measured in points (pt) or pixels (px) | Hierarchy: Title 36pt, Heading 24pt, Body 12pt |
| Font Weight | Thickness of strokes — Light, Regular, Bold, Black | Bold for emphasis; light for elegant design |
| Font Style | Upright (Normal), Italic (slanted), Oblique | Italic for citations, foreign words, emphasis |
| Colour | Text colour vs background colour — contrast is critical for readability | Black on white = highest readability; red on green = poor (accessibility issue) |
| Leading (Line Spacing) | Vertical space between lines of text | Tight (0.8×) for headlines; 1.5× for body text readability |
| Kerning | Space between specific letter pairs | Adjust 'AV', 'WA' pairs — optical alignment |
| Tracking | Overall space between all letters in a word | Increase for elegant headline text; normal for body |

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## SECTION 4 & 5: IMAGES AND THEIR TYPES

# 4.1 What is a Digital Image?

> *A digital image is a representation of a visual using numerical values. Each tiny element of a digital image is called a pixel (picture element). The more pixels, the higher the resolution and detail of the image.*

- Pixel: Smallest unit of a digital image — a tiny square of a single colour
- Resolution: Number of pixels — expressed as Width × Height (e.g., 1920 × 1080)
- DPI (Dots Per Inch): Density of pixels when printed — 72 DPI (screen), 300 DPI (print quality)
- Colour Depth / Bit Depth: Number of colours each pixel can represent — 8-bit (256 colours), 24-bit (16.7 million colours = True Colour)

## 4.2 Types of Digital Images

| Image Type | Description | Properties | Best Used For |
|---|---|---|---|
| Raster / Bitmap Image | Made of a fixed grid of pixels — each pixel stores colour information | Pixel-based; loses quality when enlarged (pixelation); large file size | Photographs, scanned images, realistic artwork, web images |
| Vector Image | Made of mathematical paths and curves (points, lines, shapes) | Resolution-independent; scales to any size without quality loss; smaller file size | Logos, icons, illustrations, charts, typographic designs |

## 4.3 Raster Image File Formats

| Format | Full Form | Compression | Transparency | Best For |
|---|---|---|---|---|
| JPEG / JPG | Joint Photographic Experts Group | Lossy (reduces quality each save) | No | Photographs, web images where small file size needed |
| PNG | Portable Network Graphics | Lossless | Yes (alpha channel) | Web graphics needing transparency — logos, buttons, UI elements |
| GIF | Graphics Interchange Format | Lossless (256 colours only) | Yes (1-bit) | Simple animations, icons; limited to 256 colours |
| BMP | Bitmap | None (uncompressed) | No | Windows system images; very large file size |
| TIFF | Tagged Image File Format | Lossless (optional) | Yes | Professional print, publishing, medical imaging — highest quality |
| WebP | Web Picture (Google) | Lossy or lossless | Yes | Modern web images — smaller than JPEG/PNG at same quality |
| HEIF/HEIC | High Efficiency Image Format | Lossless | Yes | iPhone default format; 2× better compression than JPEG |

| Format | Full Form | Compression | Transparency | Best For |
|---|---|---|---|---|
| RAW | Camera Raw Format | None (unprocessed) | N/A | Professional photography — maximum editing flexibility |
| PSD | Photoshop Document | Lossless (layers preserved) | Yes | Photoshop working files with editable layers |

## 4.4 Vector Image File Formats

| Format | Full Form | Software | Best For |
|---|---|---|---|
| SVG | Scalable Vector Graphics | Any browser, Inkscape, Illustrator | Web logos, icons — scales perfectly at any size; editable via code |
| AI | Adobe Illustrator | Adobe Illustrator | Professional vector design — logos, brand identity, print |
| EPS | Encapsulated PostScript | Illustrator, CorelDRAW | Print industry standard — high-quality logos and illustrations |
| CDR | CorelDRAW format | CorelDRAW | Vector design — popular in India for print design |
| PDF | Portable Document Format (can contain vectors) | Adobe Acrobat, Reader | Documents with vector graphics — maintains quality at any zoom |

> **Exam Tip:** JPEG = lossy, photos, no transparency. PNG = lossless, supports transparency, web use. GIF = animation, 256 colours. BMP = uncompressed, large. Vector = scalable, mathematical (SVG, AI, EPS). Raster = pixel-based, JPEG/PNG/BMP.

## 4.5 Colour Models in Images

| Colour Model | Full Form | Used In | Description |
|---|---|---|---|
| RGB | Red, Green, Blue | Screens, monitors, web, digital cameras | Additive colour — mixing light. Red + Green + Blue = White. Values 0-255 each. |
| CMYK | Cyan, Magenta, Yellow, Key (Black) | Printing (inkjet, offset, laser) | Subtractive colour — mixing ink. Used for all print production. 0-100% each. |
| HSL / HSV | Hue, Saturation, Lightness/Value | Photo editing, design tools | Intuitive: Hue = colour type, Saturation = intensity, Lightness = brightness |
| Grayscale | — | Black & white photos, documents | 16, 256, or 65,536 shades of grey. Single channel. |
| Indexed / Palette | — | GIF, PNG-8, older web images | Limited set of colours (e.g., 256) stored in a colour table |

## SECTION 6: ANIMATION

# 5.1 What is Animation?

> *Animation is the process of creating the illusion of movement by displaying a sequence of slightly different images (frames) in rapid succession. Our eyes perceive this sequence as continuous, smooth movement — called persistence of vision.*

- Frame: A single still image in an animation sequence
- FPS (Frames Per Second): How many frames are shown per second — 12 FPS (basic cartoon), 24 FPS (cinema), 30/60 FPS (games)
- Persistence of Vision: The eye retains an image for 1/16th of a second — basis of animation
- Keyframe: A specific frame that defines a key position or state; software interpolates frames between keyframes

## 5.2 Types of Animation

| Type | Description | Examples |
|---|---|---|
| Traditional / Cell Animation | Hand-drawn frames on transparent celluloid sheets; photographed in sequence | Old Disney films (Snow White, Bambi), Tom and Jerry, Doraemon |
| 2D Digital Animation | Traditional animation done digitally — characters and backgrounds drawn with software | Modern cartoons: Gravity Falls, Rick and Morty; explainer videos |
| 3D Computer Animation | Three-dimensional models created in software; animated by moving control points | Pixar films (Toy Story, Frozen), Hollywood VFX, video games, product demos |
| Stop Motion Animation | Physical objects (clay, puppets, paper) photographed frame by frame | Wallace and Gromit, Kubo and the Two Strings, claymation ads |
| Flipbook Animation | Simple animation — slightly different drawings on sequential pages; flip to animate | Children's flipbooks — demonstrates persistence of vision concept |
| Morphing | Smooth transformation from one image/shape to another | Music videos, sci-fi transformation effects, face-aging effects |
| Motion Graphics | Text and graphic elements animated — used in TV and social media | Title sequences, infographic animations, Instagram reels, news lower-thirds |
| Sprite Animation | 2D images (sprites) moved and changed to simulate movement — used in games | Old video games (Mario, Pac-Man), mobile game characters |
| Skeletal / Rigged Animation | 3D model with internal skeleton (armature) — animator moves bones | Realistic character animation in movies and games — most common 3D technique |

## 5.3 Principles of Animation (Disney's 12 Principles)

| Principle | Description |
|---|---|
| Squash and Stretch | Objects deform when moving — gives sense of weight and flexibility (ball flattens on impact) |
| Anticipation | Small preparatory action before main action — baseball pitcher winds up before throwing |
| Staging | Clear presentation of idea — viewer's eye guided to important action; uncluttered composition |
| Straight Ahead vs Pose-to-Pose | Straight: draw frame by frame (natural, spontaneous). Pose-to-Pose: set key poses first, fill in between. |
| Follow Through & Overlapping Action | Parts of character continue after main motion stops — hair, clothing, ears settle after body stops |
| Slow In and Slow Out | More frames (slower) at start and end of action; fewer in middle = smooth acceleration/deceleration |
| Arcs | Natural movements follow arc paths — not straight lines. Arms swing in arcs; balls travel in parabolas. |
| Secondary Action | Supporting action reinforces main action — character thinks while walking (head tilts while striding) |
| Timing | Number of frames determines action speed — few frames = fast; many frames = slow |
| Exaggeration | Push actions beyond reality for effect — eyes pop out of head when surprised |
| Solid Drawing | 3D sense, weight, and balance even in 2D drawing — understanding form and anatomy |
| Appeal | Characters should be interesting, charismatic, and watchable — doesn't mean cute, but engaging |

## 5.4 Animation Software

| Software | Type | Platform | Best For |
|---|---|---|---|
| Adobe Animate (Flash) | 2D Digital Animation | Windows, Mac | Web animations, interactive content, cartoons, UI animations |
| Blender | 3D Animation + Modelling (Free) | Windows, Mac, Linux | Professional 3D animation, VFX, game assets, films |
| Autodesk Maya | Professional 3D Animation (Paid) | Windows, Mac, Linux | Hollywood films, VFX, game character animation (industry standard) |
| Cinema 4D | 3D Animation + Motion Graphics (Paid) | Windows, Mac | Motion graphics, broadcast design, product visualisation |
| Adobe After Effects | Motion Graphics + VFX (Paid) | Windows, Mac | Video compositing, title animations, VFX, YouTube intros |
| Toon Boom Harmony | Professional 2D Animation (Paid) | Windows, Mac | TV cartoons and series (Simpsons, Family Guy, Peppa Pig use it) |
| Moho (Anime Studio) | 2D Rigged Animation (Paid) | Windows, Mac | 2D character animation with rigging and bone system |
| Pencil2D | 2D Traditional Animation (Free) | Windows, Mac, Linux | Learning traditional frame-by-frame animation; beginners |

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## SECTION 7: DIGITAL AUDIO

# 6.1 What is Digital Audio?

> *Digital audio is the representation of sound as a series of numerical values in binary format. Sound waves (analog) are converted to digital data by an Analog-to-Digital Converter (ADC) — stored, processed, and played back.*

| Audio Concept | Description | Example / Values |
|---|---|---|
| Sound Wave | Continuous analog pressure variation — measured in frequency (Hz) and amplitude (decibels) | Speech: 300-3000 Hz; music: 20-20,000 Hz |
| Sampling | Process of measuring sound wave amplitude at regular intervals to convert analog to digital | 44,100 samples/second (CD quality = 44.1 kHz) |
| Sample Rate (kHz) | How many times per second the sound is measured — higher = more accurate | 8 kHz (telephone), 44.1 kHz (CD), 48 kHz (professional video), 96 kHz (high-res audio) |
| Bit Depth | Precision of each sample — number of bits per sample — higher = wider dynamic range | 8-bit (256 levels, low quality), 16-bit (65,536 levels, CD quality), 24-bit (professional) |
| Bit Rate | Data used per second of audio = Sample Rate × Bit Depth × Channels | MP3 128 kbps (basic), 320 kbps (high quality), WAV 1,411 kbps (uncompressed CD) |
| Channels | Mono = 1 channel (same sound both speakers). Stereo = 2 channels (left + right). Surround = 5.1, 7.1 channels | Stereo (2ch) = most music; 5.1 = movies and games |
| ADC | Analog-to-Digital Converter — microphone converts sound wave to digital numbers | Sound card in PC converts microphone input to digital audio |
| DAC | Digital-to-Analog Converter — converts digital audio back to sound waves for speakers | Sound card converts digital file to electrical signal for speakers/headphones |

## 6.2 Digital Audio File Formats

| Format | Full Form | Type | File Size | Best For |
|---|---|---|---|---|
| MP3 | MPEG Audio Layer 3 | Lossy | Small (3-5 MB/song) | Music streaming, portable audio — universal compatibility |
| WAV | Waveform Audio File Format | Uncompressed | Large (~50 MB/song) | Professional audio editing, recording studio, Windows system sounds |
| FLAC | Free Lossless Audio Codec | Lossless | Medium-Large | Audiophile music — CD quality in smaller file than WAV |

| Format | Full Form | Type | File Size | Best For |
|---|---|---|---|---|
| AAC | Advanced Audio Coding | Lossy | Small | Apple's format — iTunes, iPhone, streaming — better quality than MP3 at same bitrate |
| OGG Vorbis | — | Lossy | Small | Open-source alternative to MP3 — used in games and Linux |
| AIFF | Audio Interchange File Format | Uncompressed | Large | Apple's professional uncompressed format — like WAV for Mac |
| WMA | Windows Media Audio | Lossy/Lossless | Varies | Microsoft's format — Windows Media Player |
| M4A | MPEG-4 Audio | Lossy/Lossless | Small-Medium | Apple/iTunes audio — AAC in an MPEG-4 container |

- Lossy compression: Removes audio data that human ears are less sensitive to — smaller file but permanent quality loss
- Lossless compression: Compresses without removing any data — exact original quality when decompressed

> **Exam Tip:** MP3 = lossy, universal. WAV = uncompressed, large, professional. FLAC = lossless, high quality. AAC = Apple's MP3 alternative. CD quality = 44.1 kHz sample rate + 16-bit depth.

## 6.3 Digital Audio Software

| Software | Type | Platform | Best For |
|---|---|---|---|
| Audacity | Audio Editor (Free, Open-source) | Windows, Mac, Linux | Recording, editing, mixing, podcast production — ideal for beginners |
| Adobe Audition | Professional Audio Editor (Paid) | Windows, Mac | Broadcast audio, podcast production, audio restoration |
| GarageBand | DAW (Free — Apple only) | Mac, iOS | Music production, recording, mixing — excellent for beginners on Apple |
| Logic Pro | Professional DAW (Paid) | Mac only | Professional music production on Mac |
| FL Studio | DAW (Paid) | Windows, Mac | Music production, beat making, electronic music |
| Ableton Live | DAW (Paid) | Windows, Mac | Live performance, electronic music production |
| Pro Tools | Professional DAW (Paid) | Windows, Mac | Industry standard for professional recording studios |
| LMMS | DAW (Free, Open-source) | Windows, Mac, Linux | Music production alternative to FL Studio — free |

## SECTION 8: DIGITAL VIDEO

# 7.1 What is Digital Video?

> *Digital video is a series of digital images (frames) displayed in rapid sequence with accompanying digital audio, creating the perception of moving pictures with sound. Each frame is essentially a digital photograph.*

| Video Concept | Description | Values / Examples |
|---|---|---|
| Frame | A single still image in a video sequence — like a single photograph | A 1-minute video at 30 FPS contains 1,800 individual frames |
| Frame Rate (FPS) | Frames Per Second — how many frames displayed per second | 24 FPS (cinema film), 30 FPS (TV/broadcast), 60 FPS (gaming, sports), 120 FPS (slow motion) |
| Resolution | Number of pixels in each frame — Width × Height | 480p (SD), 720p (HD), 1080p (Full HD), 4K/2160p (Ultra HD), 8K/4320p |
| Bitrate | Amount of data used per second of video — higher = better quality | 1-4 Mbps (streaming SD), 8-16 Mbps (1080p), 40-100 Mbps (4K) |
| Aspect Ratio | Width to height proportion of video frame | 4:3 (old TV), 16:9 (modern widescreen), 21:9 (cinematic), 9:16 (vertical/mobile) |
| Codec | Software algorithm that encodes/decodes video — compresses to smaller size | H.264 (AVC), H.265 (HEVC), VP9 (YouTube), AV1 (Netflix/YouTube) |
| Container / Format | File that holds encoded video + audio + subtitles together | MP4, AVI, MKV, MOV, WMV |
| Colour Space | Range of colours the video can represent | Rec.709 (standard HD), Rec.2020 (HDR), DCI-P3 (cinema) |

## 7.2 Video File Formats and Codecs

| Format/Codec | Type | Compression | Compatibility | Best For |
|---|---|---|---|---|
| MP4 (H.264) | Container + Codec | Lossy — high efficiency | Universal — all devices | Standard for internet video, YouTube uploads, smartphones |
| MP4 (H.265/HEVC) | Container + Codec | Lossy — better than H.264 (50% smaller) | Modern devices | 4K video — half the file size of H.264 at same quality |
| AVI | Container only | Varies (codec dependent) | Windows primarily | Older format; common in Windows; large files |
| MKV (Matroska) | Container only | Flexible (any codec inside) | Wide (VLC) | High-quality video with multiple audio tracks and subtitles |
| MOV (QuickTime) | Container + Codec | Apple ProRes or H.264 | Apple devices, Final Cut Pro | Apple editing and playback; professional quality |
| WMV | Container + Codec (Windows) | Lossy | Windows primarily | Older Windows Media Player format; declining use |

| Format/Codec | Type | Compression | Compatibility | Best For |
|---|---|---|---|---|
| WebM (VP9) | Container + Codec | Lossy — good compression | Web browsers | Web video — used by YouTube, open-source alternative to H.264 |
| FLV / SWF | Flash Video | Lossy | Legacy — requires Flash | Old web video (pre-HTML5) — largely obsolete now |
| MPEG-2 | Container + Codec | Lossy | DVD players | DVD discs, broadcast television standard |

## 7.3 Video Editing Software

| Software | Type | Platform | Best For |
|---|---|---|---|
| Adobe Premiere Pro | Professional NLE (Paid) | Windows, Mac | Film/TV production, YouTube, broadcast — industry standard |
| DaVinci Resolve | Professional NLE + Colour (Free/Paid) | Windows, Mac, Linux | Colour grading, professional editing — free version very powerful |
| Final Cut Pro | Professional NLE (Paid) | Mac only | Professional Apple ecosystem video editing |
| iMovie | Basic NLE (Free) | Mac, iOS | Beginner video editing on Apple devices |
| Windows Movie Maker | Basic NLE (Discontinued) | Windows (old) | Basic Windows video editing — replaced by Photos and Clipchamp |
| Filmora | Consumer NLE (Paid) | Windows, Mac | Easy-to-use editing for YouTube creators, beginners |
| Kdenlive | Free Open-source NLE | Windows, Mac, Linux | Free professional-grade editing — alternative to Premiere |
| Shotcut | Free Open-source NLE | Windows, Mac, Linux | Another free alternative — supports many formats |
| Blender (VSE) | 3D + Video Editor (Free) | Windows, Mac, Linux | 3D animation pipeline with built-in video sequence editor |

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## SECTION 9: SOFTWARE FOR MULTIMEDIA CREATION

# 8.1 Categories of Multimedia Software

| Category | Description | Examples |
|---|---|---|
| Image Editing | Create and edit raster images — photos, digital art | Adobe Photoshop, GIMP (free), Affinity Photo, Canva |
| Vector Graphics | Create and edit vector illustrations, logos | Adobe Illustrator, Inkscape (free), CorelDRAW, Affinity Designer |
| Video Editing | Cut, arrange, and enhance video footage | Adobe Premiere Pro, DaVinci Resolve, Final Cut Pro |
| Audio Editing | Record, edit, and mix audio content | Audacity, Adobe Audition, GarageBand, FL Studio |
| 3D Modelling & Animation | Create 3D objects and animate them | Blender, Autodesk Maya, Cinema 4D, 3ds Max |
| Presentation Software | Create and deliver slide presentations | MS PowerPoint, Google Slides, Keynote, Prezi |
| Desktop Publishing (DTP) | Professional page layout for print and web | MS Publisher, Adobe InDesign, QuarkXPress, Scribus |
| Web Design | Design and build websites with multimedia | Adobe Dreamweaver, Figma, WordPress, Adobe XD |
| Screen Recording | Record computer screen with audio | OBS Studio (free), Camtasia, Loom, Screencast-O-Matic |
| E-learning Authoring | Create interactive multimedia courses | Adobe Captivate, Articulate Storyline, iSpring |

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## SECTION 10: INTRODUCTION TO MS PUBLISHER

# 9.1 What is Microsoft Publisher?

> *Microsoft Publisher is a Desktop Publishing (DTP) application included in the Microsoft Office suite. It is designed for creating professional-quality publications such as brochures, flyers, newsletters, business cards, greeting cards, calendars, and posters — with precise control over layout, text, and images.*

| Feature | Details |
|---|---|
| Category | Desktop Publishing (DTP) — between MS Word (word processor) and Adobe InDesign (professional DTP) |
| Part Of | Microsoft Office suite — not included in all editions |
| File Extension | .pub (Publisher format); can export to PDF, JPG, PNG, HTML |
| Target Users | Small businesses, students, organisations — not requiring professional print industry output |
| Templates | 500+ built-in templates for brochures, flyers, newsletters, business cards, calendars |
| Key Feature | WYSIWYG (What You See Is What You Get) — printed output matches screen view exactly |
| Commercial Printing | Can export to press-ready PDF with bleed marks, crop marks, colour separation |

## 9.2 MS Publisher Interface

| Interface Element | Description |
|---|---|
| Ribbon | Tabbed toolbar at top — Home, Insert, Page Design, Mailings, Review, View tabs |
| Publication Pane | Large working area where you design the publication |
| Page Navigation Panel | Left panel showing thumbnail previews of all pages |
| Rulers | Horizontal and vertical rulers for precise measurement and object placement |
| Scratch Area | Grey area outside publication page — temporary storage for objects you're not using yet |
| Status Bar | Bottom of screen — shows page number, zoom level, publication information |
| Master Pages | Background design applied consistently to multiple pages — like slide master in PowerPoint |

## 9.3 Key Features of MS Publisher

| Feature | Description | Use |
|---|---|---|
| Text Boxes | Frames containing text — position anywhere on page | Place text at precise locations — not restricted to margins |
| Picture Frames | Frames for inserting and positioning images | Place photos, clip art, logos at exact positions on page |

| Feature | Description | Use |
|---|---|---|
| Building Blocks | Pre-designed elements — borders, backgrounds, titles, calendars | Insert professional design elements with one click |
| Master Pages | Common background design applied to multiple/all pages | Consistent header, footer, background across multi-page publications |
| Mail Merge | Connect to database/Excel to create personalised publications | Print 500 personalised letters with different names/addresses |
| Business Information | Store company name, address, logo — auto-fills in templates | Quick setup of branded publications |
| Colour Schemes | Set of coordinated colours applied to entire publication | Consistent brand colours throughout brochure/newsletter |
| Font Schemes | Complementary font pairs for heading and body text | Professional typography with matching headline + body fonts |
| Print Settings | Control bleeds, crop marks, colour proofs for commercial printing | Professional print-ready output |
| Pack and Go Wizard | Packages publication with embedded fonts and linked images for sharing | Send to commercial printer with all assets included |

## 9.4 Types of Publications in MS Publisher

| Publication Type | Description | Common Uses |
|---|---|---|
| Flyer | Single-sided or folded sheet — quick information | Event announcements, promotions, lost and found, notices |
| Brochure | Tri-fold or bi-fold printed information document | Product/service information, company profiles, educational material |
| Newsletter | Multi-page periodic publication with articles and news | School/college newsletter, company internal communication |
| Business Card | Small card with contact information — 3.5" × 2" | Professional contact exchange |
| Letterhead | Official letter paper with company header | Official correspondence, formal letters |
| Greeting Card | Folded card for birthdays, festivals, occasions | Birthday wishes, Diwali greetings, thank you cards |
| Calendar | Monthly or yearly calendar with custom design | Corporate gift calendars, school calendars |
| Poster | Large-format promotional or informational print | Events, exhibitions, awareness campaigns |
| Certificate | Award or achievement document | Course completion, participation, merit awards |
| Label | Adhesive labels for products, mailing, CD/DVD | Shipping labels, product labels, name badges |

# SECTION 11: INTRODUCTION TO MICROSOFT PHOTODRAW

## 10.1 What is Microsoft PhotoDraw?

> *Microsoft PhotoDraw was a photo editing and illustration software developed by Microsoft, released as part of the Microsoft Office 2000 suite (specifically the Professional and Premium editions). It combined photo editing with vector drawing capabilities — a hybrid tool bridging photo editors and illustration programs.*

| Feature | Details |
|---|---|
| Full Name | Microsoft PhotoDraw 2000 (versions V1 and V2) |
| Released | Version 1: 1999 (with Office 2000), Version 2: 2000 |
| Discontinued | Discontinued in 2001 — Microsoft stopped development |
| Purpose | Photo editing (raster) + vector illustration + web graphics creation in one application |
| File Format | .mix (native format); could work with BMP, GIF, JPG, PNG, TIFF, WMF |
| Target Users | Small businesses, home users, Office users needing basic image editing without learning Photoshop |
| Current Status | Discontinued — replaced by other tools. Modern equivalent: Canva, MS Paint, GIMP, or Photoshop Elements |

## 10.2 Key Features of Microsoft PhotoDraw

| Feature | Description |
|---|---|
| Photo Editing | Crop, resize, rotate, flip, adjust brightness/contrast/colour, remove red-eye |
| Filters & Effects | Apply artistic effects: watercolour, oil paint, sketch, mosaic, blur, sharpen |
| Vector Drawing Tools | Draw shapes, lines, curves — scalable vector objects on top of photos |
| Text Effects | Add decorative text with shadows, outlines, 3D effects, perspective distortion |
| Cutout Tool | Remove backgrounds from photos — isolate subjects (like Photoshop's Magic Wand) |
| Web Graphics | Create web-optimised images, animated GIFs, image maps for websites |
| Templates | Pre-designed templates for greeting cards, certificates, banners, web graphics |
| Touchup | Clone, smudge, healing brush tools for photo retouching |
| Visual Designer | Built-in designer that suggested designs based on your project type |

## 10.3 Modern Equivalents (Since PhotoDraw is Discontinued)

| For This Purpose | Use This Modern Tool |
|---|---|
| Basic photo editing (free, easy) | Canva (web), Microsoft Photos, Google Photos |

| For This Purpose | Use This Modern Tool |
|---|---|
| Intermediate photo editing (free) | GIMP (free, open-source Photoshop alternative) |
| Professional photo editing | Adobe Photoshop, Affinity Photo |
| Creating web graphics/logos | Canva (web-based), Figma (free) |
| Vector illustration | Adobe Illustrator, Inkscape (free), CorelDRAW |
| GIF creation | GIMP, Adobe Photoshop, EZGif.com (web) |

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## SECTION 12: DEVELOPING SIMPLE APPLICATIONS & PRESENTATIONS USING MS PUBLISHER

# 11.1 Creating a Simple Flyer in MS Publisher

| Step | Action | Details |
|---|---|---|
| 1 | Open MS Publisher | Start → Microsoft Publisher → opens with template gallery |
| 2 | Choose Template or Blank | Click 'Flyers' → select a template OR click 'Blank A4' for custom design |
| 3 | Set Page Size | Page Design tab → Size → A4 (210mm × 297mm) or as required |
| 4 | Add Title Text Box | Insert tab → Draw Text Box → draw at top → type title → format font (size 36+, bold) |
| 5 | Add Body Text | Insert another text box → type event details, dates, venue, contact information |
| 6 | Insert Image / Logo | Insert tab → Pictures → browse and insert image → resize and position |
| 7 | Add Shapes & Design | Insert tab → Shapes → draw lines, rectangles for visual design elements |
| 8 | Apply Colour Scheme | Page Design tab → Colour Schemes → select matching scheme |
| 9 | Format Text | Select text → Home tab → change font, size, colour, alignment, bold/italic |
| 10 | Preview | View tab → Whole Page → check final appearance |
| 11 | Save | File → Save As → choose location → save as .pub |
| 12 | Export to PDF | File → Export → Create PDF/XPS → Save — for printing or sharing digitally |

## 11.2 Creating a Tri-fold Brochure in MS Publisher

| Step | Action | |
|---|---|---|
| 1 | New Publication | File → New → Brochures → choose '3-panel brochure (Tri-fold)' template → Customize |
| 2 | Business Information | Click Business Information → fill in company/institute name, address, phone, website, logo |
| 3 | Choose Colour Scheme | Page Design → Colour Schemes → select brand colours |
| 4 | Edit Front Panel | Click on placeholder text on front cover → replace with your title and tagline |
| 5 | Add Photos | Delete placeholder images → Insert → Pictures → insert relevant photographs |
| 6 | Edit Inside Panels | Navigate to pages 1-2 → edit three inside panels with content, images, details |
| 7 | Edit Back Panel | Back panel: add contact details, address, map, QR code |
| 8 | Adjust Text Boxes | Resize text boxes to fit content → adjust font sizes for consistency |

| Step | Action | |
|---|---|---|
| 9 | Check for Overflow | Red box with '...' = text overflow → reduce font size or remove content |
| 10 | Print Setup | File → Print → check printer settings → set duplex (two-sided) printing → Print |

## 11.3 Creating a Newsletter in MS Publisher

- File → New → Newsletters → choose a 4-page newsletter template
- Page 1 (Cover): Title, date/volume, lead story headline, large image, table of contents
- Page 2-3 (Inside): Articles with columns, images, pull quotes, sidebars
- Page 4 (Back): Additional articles, contact info, subscription form, back page ad
- Columns: Select text box → Format Text Box → Columns → set to 2 or 3 columns
- Master Pages: Page Design → Master Pages → edit header/footer applied to all pages
- Insert Page Numbers: Insert → Header & Footer → Page Numbers → position and format
- Table of Contents: Manual — type article titles and page numbers in text box

## 11.4 Creating a Business Card in MS Publisher

| Step | Details |
|---|---|
| Template | File → New → Business Cards → choose template → set colour scheme |
| Size | Standard business card = 3.5 inches × 2 inches (89mm × 51mm) |
| Content | Name (largest text), Designation, Company, Phone, Email, Website, Social media handles |
| Logo | Insert → Pictures → place company logo in corner |
| Multiple per page | Publisher automatically arranges multiple copies per A4 sheet for printing |
| Paper Stock | Print on 300 GSM card stock or order from print shop using exported PDF |

## 11.5 Useful MS Publisher Tips

- Snap to Guides: View → Guides → turn on for precise alignment of objects
- Baseline Guides: Arrange → Layout Guides → set baseline grid for consistent text alignment
- Group Objects: Select multiple objects → Right-click → Group — move as single unit
- Layering: Right-click object → Arrange → Bring Forward / Send Backward — control overlap order
- Wrap Text: Select image → Format → Picture → Layout → Text Wrapping — text flows around image
- Undo: Ctrl+Z (multiple levels). Redo: Ctrl+Y.
- Zoom: Ctrl+Scroll wheel. Whole Page: Ctrl+Shift+W.

## SECTION 13: QUICK REVISION POINTS

# Key Points for Exam

### Multimedia Basics

- Multimedia = Text + Images + Audio + Video + Animation combined
- Linear = fixed sequence (film). Non-linear/Interactive = user controls (e-learning, games)
- Pixel = smallest unit of digital image. DPI = dots per inch (72 = screen, 300 = print quality)
- RGB = for screens (light). CMYK = for printing (ink)

### Image Formats

- JPEG = lossy, no transparency, photos. PNG = lossless, transparency, web. GIF = animation, 256 colours.
- BMP = uncompressed, large. TIFF = professional print. SVG = scalable vector.
- Raster = pixel-based (JPEG/PNG/BMP). Vector = mathematical (SVG/AI/EPS) — scale without loss.

### Audio & Video

- MP3 = lossy audio, universal. WAV = uncompressed. FLAC = lossless. AAC = Apple MP3 alternative.
- CD Quality = 44.1 kHz sample rate + 16-bit depth. Higher kHz/bit = better quality, larger file.
- FPS = Frames Per Second. 24 FPS = cinema. 30 FPS = TV. 60 FPS = gaming.
- MP4 (H.264) = most common video format. MKV = container with multiple tracks.

### MS Publisher & PhotoDraw

- MS Publisher = Desktop Publishing (DTP) tool. Makes brochures, flyers, newsletters, business cards.
- File extension = .pub. Export to PDF for printing and sharing.
- MS PhotoDraw = hybrid photo editor + vector tool from Office 2000. Discontinued in 2001.
- WYSIWYG = What You See Is What You Get — screen matches printed output.

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## SECTION 14: IMPORTANT MCQ QUESTIONS

# Multiple Choice Questions (MCQs)

> *20 important exam questions. Correct answer marked with ✓ and explanation provided.*

**Q1. Multimedia is the combination of which of the following?**

(a) Text and Audio only
**(b) Text, Graphics, Audio, Video, and Animation ✓**
(c) Only Video and Images
(d) Only Text and Images

**Explanation:** *Multimedia = Text + Graphics/Images + Audio + Video + Animation — all combined. Using just one or two of these is not multimedia. The word comes from 'Multi' (many) + 'Media' (communication means).*

**Q2. The smallest unit of a digital image is called:**

(a) Byte
(b) Dot
**(c) Pixel ✓**
(d) Voxel

**Explanation:** *A Pixel (Picture Element) is the smallest unit of a digital image — a tiny square that stores one colour value. Resolution = total number of pixels. More pixels = higher resolution = sharper image.*

**Q3. Which image format supports TRANSPARENCY (alpha channel)?**

(a) JPEG (.jpg)
(b) BMP (.bmp)
**(c) PNG (.png) ✓**
(d) TIFF (.tif) only

**Explanation:** *PNG supports transparency (alpha channel) — useful for logos and web graphics placed on different backgrounds. JPEG does NOT support transparency — the background is always solid (white). GIF supports binary transparency (on/off, no partial).*

**Q4. JPEG compression is called 'lossy' because:**

(a) It loses the file name
**(b) It permanently removes some image data to reduce file size ✓**
(c) It loses colour information completely
(d) It loses image resolution but gains quality

**Explanation:** *JPEG uses lossy compression — it permanently discards some image data (mostly fine detail) to achieve smaller file sizes. Each time a JPEG is saved, more data is lost. This makes it unsuitable for images that need to be edited repeatedly.*

**Q5. Which colour model is used for PRINTING?**

(a) RGB
(b) HSL
**(c) CMYK ✓**
(d) Grayscale only

**Explanation:** *CMYK (Cyan, Magenta, Yellow, Key/Black) is the colour model used for printing — it is subtractive (mixes ink). RGB (Red, Green, Blue) is used for screens/monitors — it is additive (mixes light). Always convert RGB to CMYK for professional print jobs.*

**Q6. Animation is based on which human eye phenomenon?**

(a) Colour blindness
(b) Depth perception

**(c) Persistence of Vision ✓**
(d) Pupil dilation

**Explanation:** *Persistence of Vision is the phenomenon where the human eye retains an image for approximately 1/16 second after it disappears. This makes a rapid sequence of slightly different images (at 12+ FPS) appear as continuous smooth motion.*

**Q7. Which audio format provides CD quality lossless compression?**

(a) MP3
(b) AAC
**(c) FLAC ✓**
(d) WMA

**Explanation:** *FLAC (Free Lossless Audio Codec) provides lossless compression — no audio data is lost, preserving exact CD quality while reducing file size compared to uncompressed WAV. MP3 and AAC are lossy formats.*

**Q8. Standard CD audio quality uses a sample rate of:**

(a) 8 kHz
(b) 22.05 kHz
**(c) 44.1 kHz ✓**
(d) 96 kHz

**Explanation:** *CD audio quality standard is 44.1 kHz (44,100 samples per second) + 16-bit depth. 8 kHz = telephone quality. 48 kHz = professional video. 96 kHz = high-resolution audio. Higher kHz = better quality, larger file.*

**Q9. Which video format/codec is most universally compatible for internet video?**

(a) AVI
**(b) MP4 (H.264) ✓**
(c) WMV
(d) FLV

**Explanation:** *MP4 with H.264 codec is the most universally compatible video format — supported by all devices, browsers, platforms, and social media. YouTube, smartphones, browsers, and TVs all natively support it.*

**Q10. What is the difference between Raster and Vector images?**

(a) Raster = scalable; Vector = pixel-based
**(b) Raster = pixel-based (loses quality when enlarged); Vector = mathematical (scales without quality loss) ✓**
(c) Raster = for print only; Vector = for screen only
(d) Both are identical — just different names

**Explanation:** *Raster images (JPEG, PNG, BMP) are made of pixels — enlarging them causes pixelation/blurring. Vector images (SVG, AI, EPS) are mathematically defined shapes and paths — they can be scaled to any size (billboard or thumbnail) without quality loss.*

**Q11. Microsoft Publisher is classified as which type of software?**

(a) Word Processor (like MS Word)
(b) Spreadsheet Application
**(c) Desktop Publishing (DTP) Software ✓**
(d) Database Management System

**Explanation:** *MS Publisher is Desktop Publishing (DTP) software — designed for creating professional page layouts for print and digital publications like brochures, flyers, newsletters, business cards, and posters. It provides precise control over layout, text, and images.*

**Q12. What is the file extension used by MS Publisher files?**

(a) .doc
(b) .ppt

**(c) .pub ✓**
(d) .psd

**Explanation:** *.pub is the native file extension for Microsoft Publisher documents. .doc/.docx = Word, .ppt/.pptx = PowerPoint, .xls/.xlsx = Excel, .psd = Photoshop. Publisher files can be exported to PDF for sharing and printing.*

**Q13. FPS in video/animation stands for:**

(a) File Processing Speed
**(b) Frames Per Second ✓**
(c) Format Per Screen
(d) Flash Processing Standard

**Explanation:** *FPS = Frames Per Second — how many individual still images are displayed per second to create the illusion of motion. 24 FPS = cinema standard, 30 FPS = television/broadcast, 60+ FPS = smooth gaming and sports.*

**Q14. GIF format is commonly used for:**

(a) High-resolution photography
(b) Lossless audio compression
**(c) Short looping animations and simple graphics (max 256 colours) ✓**
(d) Professional vector illustration

**Explanation:** *GIF (Graphics Interchange Format) is famous for short, looping animations. It supports only 256 colours (8-bit), making it unsuitable for photographs. Used widely for memes, reaction animations, and simple icon animations on the web.*

**Q15. Which of these is a Digital Audio Workstation (DAW) used for music production?**

(a) Adobe Premiere Pro
(b) Audacity (basic editor)
**(c) FL Studio ✓**
(d) Adobe After Effects

**Explanation:** *FL Studio (Fruity Loops) is a DAW (Digital Audio Workstation) used for music production, beat making, and electronic music. Adobe Premiere Pro and After Effects are for video. Audacity is a basic audio editor, not a full DAW.*

**Q16. Microsoft PhotoDraw was part of which Microsoft Office version?**

(a) Microsoft Office 97
**(b) Microsoft Office 2000 ✓**
(c) Microsoft Office 2003
(d) Microsoft Office 2007

**Explanation:** *Microsoft PhotoDraw was included in Microsoft Office 2000 (Professional and Premium editions). It was discontinued in 2001 and was never included in later Office versions. It combined photo editing with vector drawing capabilities.*

**Q17. What does WYSIWYG mean in context of MS Publisher?**

**(a) What You See Is What You Get — screen output matches printed output ✓**
(b) What You Send Is What You Get — email formatting preserved
(c) Why You Should Install Windows on Graphics
(d) Write Your Script In Web Graphics

**Explanation:** *WYSIWYG (What You See Is What You Get) means the layout on screen exactly matches the printed output. This is fundamental to desktop publishing — Publisher, InDesign, and Word all use WYSIWYG to eliminate layout surprises at print time.*

**Q18. Which compression type preserves ALL original data when decompressing?**

(a) Lossy compression (JPEG, MP3)
**(b) Lossless compression (PNG, FLAC, ZIP) ✓**
(c) Delta compression

(d) Fractal compression

**Explanation:** *Lossless compression (used in PNG, FLAC, ZIP, GIF) preserves all original data — the decompressed file is 100% identical to the original. Lossy compression (JPEG, MP3) permanently removes some data for smaller file sizes.*

**Q19. Which 3D animation software is free and open-source?**

(a) Autodesk Maya
(b) Cinema 4D
(c) Adobe After Effects
**(d) Blender ✓**

**Explanation:** *Blender is a completely free, open-source 3D creation suite supporting modelling, rigging, animation, simulation, rendering, compositing, and video editing. Maya, Cinema 4D, and After Effects are paid commercial tools.*

**Q20. DPI in images stands for and affects:**

(a) Digital Processing Index — file size only
**(b) Dots Per Inch — image print quality and resolution ✓**
(c) Display Pixel Interface — screen brightness
(d) Digital Photo Index — image colour depth

**Explanation:** *DPI = Dots Per Inch — measures the density of pixels/dots when an image is printed. 72 DPI = screen resolution (web images). 300 DPI = print quality (brochures, photos). Higher DPI = sharper print but larger file size.*

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## Best of Luck for Your Exam!

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