PPIT Final Exam

Combined Cheat Sheet

Exam Information

Exam Date: December 26th, 2024

Total Marks: 100

Time: 3 Hours

Comprehensive Study Guide for PPIT Final Examination

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Exam Structure Overview

Question	Marks	Type	Focus Areas
Q1	25	Multiple Choice (25 questions)	Broad coverage of all topics
Q2	25	Ethical Decision Making (4-step process)	Ethics, ethical theories, stakeholder analysis
Q3	15	Business Structures	Veil of incorporation, company structures
Q4	15	Short Answer Questions	Licensing, computer crimes, contracts
Q5	10	Communication	Grapevine communication, rumor management
Q6	10	Organizational Structure	Designing organizational structure

Total: 100 Marks | Duration: 3 Hours

Part I

HIGH PRIORITY TOPICS (50+ Marks)

1 ETHICAL THEORIES & 4-STEP DECISION MAKING (Q2 - 25 marks)

1.1 Core Ethical Theories

Theory	Key Principle	Focus	Key Figure

Utilitarianism	Greatest good for greatest number	Outcomes, consequences	Consequentialist
Deontology	Duty-based, categorical imperative	Rules and duties, not consequences	Kant
Egoism	Self-interest based	Personal benefit	NOT duty-based
Hedonism	Pursuit of happiness/pleasure	Pleasure as highest aim	–
Consequentialism	Focus on outcomes	Results matter most	Utilitarianism is a type
Rights & Duties	Individual rights + moral duties	Fairness, fundamental rights	–
Virtue Ethics	Character and virtues	"What would a virtuous person do?"	–
Justice/Fairness	Fair treatment and equity	Distribution of benefits/harms	–

1.2 4-Step Ethical Decision Making Framework

1.2.1 Step I: Understanding the Situation

1. **List relevant facts** (10–15 facts, numbered)

   - Neutral, logical exercise
   - Do NOT judge at this stage
   - Just state what is known

2. **Identify ethical issues** (4–6 issues)

   - Why it's an ethical issue
   - Potential or resulting harm
   - Look for: discrimination, privacy violations, safety risks, conflicts of interest

3. **List stakeholders** (8–10 stakeholders)

   - Directly and indirectly affected parties
   - Think broadly: applicants, employees, management, customers, society, industry, regulators

1.2.2 Step II: Isolating the Major Ethical Dilemma

- Format: "Should [person/entity] [action] or [alternative action]?"

- Identify core ethical conflict

- What values/rights/duties compete?

- Frame as clear either/or question

1.2.3 Step III: Analyzing Ethicality (BOTH ALTERNATIVES)

A. CONSEQUENTIALISM (Utilitarian Analysis)

- A. If action done, who harmed?

- B. If action NOT done, who harmed?

- C. Which preferable, A or B?

- D. If action done, who benefits?

- E. If action NOT done, who benefits?

- F. Which preferable, D or E?

- G. Which produces greatest good for greatest number?

- Consider both short-term and long-term consequences

B. RIGHTS AND DUTIES

1. What rights do stakeholders have?

2. What duties do we have toward stakeholders?

3. Which rights/duties take precedence when they conflict?

4. Does action respect fundamental rights?

5. Does action fulfill our duties?

- Fundamental rights (fairness, non-discrimination) usually take precedence over efficiency

C. DEONTOLOGY (Kant's Categorical Imperative)

- H. If action done, who treated with disrespect?

- I. If action NOT done, who treated with disrespect?

- J. Which preferable, H or I?

- K. If action done, who treated unlike others?

- L. If action NOT done, who treated unlike others?

- M. Which preferable, K or L?

- N. Benefits if everyone did this action?

- O. Benefits if nobody did this action?

- P. Which preferable, N or O?

- Universalization test: Would it be okay if everyone acted this way?

1.2.4 Step IV: Making Decision and Implementation

1. **Make defensible ethical decision**

   - Reference supporting frameworks (A–G, 1–5, H–P)
   - Justify choice
   - Explain which rights/duties take precedence
   - Be clear and direct: "Should/Should not…"

2. **List implementation steps** (5–8 concrete steps)

   - Document findings
   - Escalate to management
   - Suspend problematic activity
   - Conduct audit/review
   - Retrain staff
   - Implement oversight
   - Communicate with stakeholders
   - Be specific, not vague

3. **Show stakeholder impacts**

   - For each stakeholder: positive impacts, benefits, challenges
   - Go through each stakeholder from Step I.C
   - Be balanced – acknowledge both benefits and challenges

4. **Longer-term preventive changes** (4–6 measures)

   - **Technical**: Bias testing, audits, standards
   - **Organizational**: Ethics codes, review boards, training, culture
   - **Legal/Compliance**: Legislation, industry standards, regulations
   - **Cultural**: Ethical engineering culture, open discussion
   - **Societal**: Public awareness, education, diversity
   - **Industry**: Collaboration, best practices, professional organizations

5. **Pivot point prevention**

   - What should have been done at design/planning stage?
   - Ethical impact assessment, diverse data, bias testing
   - Cross-functional teams, early intervention

1.3 Key Ethics Definitions

- **Whistleblowers**: Make unauthorized disclosures about harmful situations or fraud

- **Moral principles ≠ Law**: They can differ (False that they always align)

- **Code of conduct objectives**: Discipline, Inspiration, Education (NOT Enforcement)

- **Ethical theories are NOT formulas**: They are frameworks for analysis (NOT formulas to solve problems, NOT for judging involuntary actions)

- **Egoism is NOT duty-based**: Egoism is self-interest based, NOT based on altruism or care for others

- **ACM Code Requirement**: Give comprehensive and thorough evaluations of computer systems and their impacts, including analysis of possible risks (True)

- **Utilitarianism is consequentialist**: Focuses on outcomes and collective welfare

- **Deontology is attributed to Kant**: Duty-based ethical theory

- **Profession traits**: Expert knowledge, substantial education/training, autonomy, internal governance, service to society, codes of conduct, professional bodies

- **Mature profession**: Education + accreditation + certification + licensing + CPD + codes + societies

- **Pillars of Professionalism**: Commitment, Integrity, Responsibility, Accountability

1.4 Informal Guidelines (Quick Tests)

1. **Secrecy Test** – Is anyone asking me to keep this quiet?

2. **Mom Test** – Would I be proud to tell my mother?

3. **TV Test** – Would I be comfortable if this appeared on news?

4. **Market Test** – Could this be advertised as a selling point?

5. **Smell Test** – Does something feel "off" instinctively?

1.5 Golden Rule

Would I accept this if roles were reversed?

2 PROFESSIONAL CODE OF CONDUCT

2.1 ACM Code of Ethics - General Principles

1. Contribute to society and human well-being

2. Avoid harm

3. Be honest and trustworthy

4. Be fair and non-discriminatory

5. Respect intellectual property

6. Respect privacy

7. Honor confidentiality

2.2 Professional Responsibilities

- Achieve high quality in processes and products

- Maintain professional competence

- Know and respect existing rules

- Accept professional review

- **Give comprehensive and thorough evaluations** of computer systems and their impacts, including analysis of possible risks

- Honor contracts and agreements

- Improve public understanding

- Access resources only when authorized

2.3 Leadership Principles

- Ensure public good is central concern

- Articulate and evaluate social responsibilities

- Manage resources to enhance quality of working life

- Create growth opportunities

- Care when modifying/retiring systems

2.4 IEEE Code of Ethics - Key Principles

- Accept responsibility for safety, health, welfare of public

- Avoid conflicts of interest

- Be honest in claims/estimates

- Reject bribery

- Improve understanding of technology

- Maintain technical competence

- Seek and offer honest criticism

- Treat all persons fairly

- Avoid injuring others

- Assist colleagues' professional development

2.5   Ethical Issues in Computing

- **Privacy and Data Protection**: Collect only necessary, secure, informed consent

- **Security**: Robust measures, responsible disclosure, protect from unauthorized access

- **Intellectual Property**: Respect copyrights, patents, trademarks, proper attribution

- **Accessibility**: Design for disabilities, follow WCAG, Section 508

- **Quality and Reliability**: Thorough testing, honest reporting, proper maintenance

2.6   Whistleblowing

- **Definition**: Reporting unethical, illegal, or harmful activities

- **When Justified**: Clear evidence, internal channels exhausted, significant harm, proper motives, proportional disclosure

- **Risks**: Retaliation, career damage, legal consequences, personal/financial stress, social isolation

- **Protections**: Legal protections (varies by jurisdiction), professional code support, internal policies, anonymous reporting

2.7   Conflict of Interest

- **Types**: Financial, personal relationships, competing loyalties, gifts/favors, outside employment

- **Managing**: Disclose, recuse, avoid, follow policies, seek guidance

- **Examples in Computing**: Working for competitor, using company resources for personal projects, accepting vendor gifts, hiring friends/family improperly

2.8   Professional Liability

- **Types**: Legal responsibility for actions, malpractice in services, negligence in design/implementation, product liability for defects

- **Limiting Liability**: Professional liability insurance, clear contracts, proper documentation, following industry standards, regular professional development

- **Responsibility Chain**: Designers, Developers, Testers, Managers, Organizations all share responsibility

3   ISLAMIC ETHICS

3.1   Foundational Principles

- **Tawheed** (Oneness): Belief in absolute oneness of Allah

- **Accountability** (Hisab): Belief in accountability before Allah

- **Justice** (Adl): Fairness and equity in all dealings

- **Trust** (Amanah): Fulfilling responsibilities and obligations

- **Truthfulness** (Sidq): Honesty in words and actions

- **Compassion** (Rahmah): Showing mercy and kindness

- **Moderation** (Wasatiyyah): Avoiding extremes, balanced approach

3.2 Core Ethical Values

- Honesty and Integrity, Justice and Fairness, Compassion and Mercy

- Respect and Dignity, Responsibility, Humility, Patience (Sabr)

- Gratitude (Shukr), Forgiveness, Generosity

3.3 Sources of Islamic Ethics

1. **Quran (Holy Book)**: Primary source of Islamic guidance

2. **Sunnah (Prophetic Tradition)**: Teachings, actions, and approvals of Prophet Muhammad (peace be upon him)

3. **Ijma (Consensus)**: Agreement of Islamic scholars

4. **Qiyas (Analogical Reasoning)**: Applying established principles to new situations

5. **Ijtihad (Independent Reasoning)**: Scholarly effort to derive rulings for new situations

3.4 Islamic Business Ethics

- **Lawful Earnings (Halal)**: Earning through permissible means only

- **Honesty in Trade**: Truthful representation, fair pricing, full disclosure

- **Fair Contracts**: Clear agreements, mutual consent, fulfilling obligations

- **Prohibition of Riba**: Avoiding interest-based transactions

- **Prohibition of Gharar**: Avoiding excessive uncertainty

- **Fair Treatment of Employees**: Fair wages, safe conditions, respect

- **Environmental Responsibility**: Protecting environment, sustainable practices

3.5 Islamic Professional Ethics

- Professional Competence, Work Ethics (punctuality, reliability, diligence)

- Honesty and Integrity, Fair Treatment, Responsibility

- Respect for Authority, Teamwork and Cooperation, Avoiding Harm

3.6 Islamic Ethics in Technology and IT

- Ethical Use: Using technology for beneficial purposes, avoiding harm

- Privacy and Data Protection: Respecting privacy, protecting data, maintaining confidentiality

- Intellectual Property: Respecting IP rights, not engaging in piracy, giving credit

- Honest Representation: Accurate representation, not misleading users

- Avoiding Harmful Content: Not creating/distributing harmful content

- Fair Access: Ensuring fair access, not discriminating, promoting digital inclusion

- Environmental Considerations: Considering environmental impact, sustainable practices

- Social Responsibility: Using technology for social good, ethical innovation

4 HUMAN RIGHTS

4.1 Core Principles

- **Universality**: Rights for all

- **Inalienability**: Cannot be taken away

- **Equality/Non-discrimination**: Equal treatment

- **Accountability**: Duty-bearers responsible

- **Rule of Law**: Legal framework

4.2 Key Instruments

- **UDHR (1948)**: Art.1 (dignity/equality), Art.2 (non-discrimination), Art.3 (life/liberty), Art.12 (privacy), Art.19 (expression), Art.23/25 (work, adequate living)

- **ICCPR / ICESCR**: Civil-political vs. economic-social-cultural rights

- **Pakistan Constitution**: Arts. 8–28 (fundamental rights), Art.19 (speech w/ restrictions), Art.19A (right to information), Art.25 (equality)

4.3 Categories ("Generations") of Rights

- **1st**: Civil & political (life, liberty, fair trial, expression, privacy)

- **2nd**: Economic, social, cultural (work, education, health, housing)

- **3rd**: Collective/solidarity (development, environment, self-determination)

4.4 Duties & Duty-Bearers

- **State**: Respect, Protect, Fulfill

- **Corporate (UNGPs)**: Respect rights, human-rights due diligence, enable remedy

- **Professionals**: Avoid complicity; uphold privacy/fairness/security

4.5 Tech/Digital Rights Focus

- **Privacy & Data**: Minimization, consent, purpose limitation, security, retention limits; risks—surveillance, breaches, secondary use, re-ID

- **Expression & Information**: Art.19/19A; ensure due process for takedown/appeal; proportional restrictions

- **Non-discrimination**: Algorithmic bias $\rightarrow$ need fairness, explainability, bias audits

- **Due process**: Notice and ability to contest automated decisions

- **Access & Inclusion**: Digital divide, affordability, accessibility (WCAG), localization

- **Safety/Security**: Cybersecurity as an enabler of rights; protection from harassment/stalking

4.6 Limitations on Rights

- Must be **lawful, necessary, proportionate, for legitimate aim** (e.g., security, public order, rights of others)

- No arbitrary/broad restrictions

4.7 Business & Human Rights (Tech)

- **UNGPs**: Protect–Respect–Remedy; due diligence; grievance mechanisms

- Areas: content moderation, surveillance tech, ad targeting, AI/ML bias, supply chain labor, transparency reports

5 BUSINESS ORGANIZATIONS & STRUCTURES (Q3 - 15 marks)

5.1 Veil of Incorporation

- **Definition**: Legal principle separating company from owners (limited liability)

- **Purpose**: Protects owners' personal assets from company debts

5.2 Business Structure Comparison

Feature	Sole Proprietorship	Partnership/AOP	Public Ltd.	SMC Pvt. Ltd.	Private Ltd.
Owners	1	2+ (no upper limit)	7+ (unlimited)	1	2–100
Directors	N/A	N/A	3+	1 (must nominate 2 alternates)	2+
Legal Entity	No (not separate)	No (not separate)	Yes	Yes	Yes
Liability	Unlimited	Unlimited (joint and several)	Limited	Limited	Limited
Suffix	None	None	Limited (Ltd.)	(SMC-Private) Limited	Private Limited (Pvt Ltd)
Prospectus	No	No	Required	Not allowed	Not required
Public Subscription	No	No	Allowed	Not allowed	Not allowed
Company Secretary	No	No	Required	Required (sole director cannot be)	Optional
Taxation	Personal income tax	AOP pays tax once	Corporate tax	Corporate tax	Corporate tax
Registration	FBR (if income threshold)	FBR + Registrar of Firms	SECP	SECP	SECP

5.3 Employment Contract Clauses

- **Non-compete Clause**: Prevents employees (current AND former) from working for direct competitors of a business for a period of time

- **Non-solicitation Clause**: Prevents employees from encouraging other employees AND/OR organization's customers to move to another company

5.4 Key Requirements

- **SMC**: Must nominate 2 individuals (one nominee director, one alternate); must appoint company secretary (sole director cannot be secretary)

- **Public Ltd.**: 7+ members, 3+ directors, prospectus required, public subscription allowed

- **Private Ltd.**: 2–100 shareholders, 2+ directors, not publicly traded

- **Partnership/AOP**: Partnership Deed defines ownership, profit/loss division, decision-making; registered with FBR and Registrar of Firms

5.5 Partnership Deed (10 Key Provisions)

1. Firm name and business type

2. Partners' names and addresses

3. Capital contribution by each partner

4. Profit and loss sharing ratio

5. Decision-making powers

6. Rules for adding/removing partners

7. Handling partner's death/withdrawal

8. Duration (fixed term or indefinite)

9. Banking arrangements

10. Dissolution procedure

5.6 Types of Organizations

- **Public Sector**: Owned and operated by government (NADRA, PIA, State Bank of Pakistan)

- **Private Sector**: Owned by individuals or private groups (DPL, Systems Ltd, TPL Corp)

- **Non-Profit (NPO)**: Operates for social welfare (Edhi Foundation, Shaukat Khanum)

- **International**: Operate across borders (UNDP Pakistan, WHO)

5.7 Key Considerations in Choosing Business Structure

1. Liability Protection: Need for limited liability vs. personal responsibility

2. Tax Implications: Tax treatment, planning opportunities, compliance

3. Capital Requirements: Ability to raise capital, investment needs

4. Management and Control: Desired control level, decision-making structure

5. Regulatory Compliance: Reporting requirements, compliance costs

6. Business Goals: Growth plans, exit strategy, long-term objectives

7. Number of Owners: Single vs. multiple owners, partnership considerations

6   ORGANIZATIONAL STRUCTURE & DESIGN (Q6 - 10 marks)

6.1   Types of Organizational Structures

Type	Description	Best For	Example
Simple	Few layers, central decision-maker	Small startups	Small teams
Functional	Organized by departments (HR, Tech, Sales)	Mid-sized companies	Department-based
Divisional/Product	Based on products/clients	Product-focused orgs	Product teams
Matrix	Dual reporting (functional + project)	Complex projects	Consulting firms
Flat	Minimal hierarchy, wide control span	Innovation-focused	DPL, Netflix
Hierarchical/Tall	Many levels, clear authority chain	Traditional corporates	Banks, NADRA
Network	Relies on external partners	Outsourcing models	Virtual companies
Team-based	Built around teams	Agile organizations	Cross-functional teams

6.2   Key Elements of Structure

Element	Meaning	Example
Work Specialization	Division of tasks into specific jobs	Separate DevOps, Design, Sales
Departmentalization	Grouping jobs (function, product, geography)	IT Dept., Product Teams
Chain of Command	Who reports to whom	CEO $\to$ Managers $\to$ Teams
Span of Control	Number of people manager supervises	Wide = autonomy; Narrow = control
Centralization	Where decisions made	Centralized vs. Decentralized
Formalization	Degree of rules and procedures	High = banks; Low = startups

6.3   Factors Affecting Structure

Factor	Impact	Example
Strategy	Structure must support goals	Innovation $\to$ flat; Control $\to$ hierarchical
Size	Larger = more specialization	10 people = simple; 10,000 = complex
Technology	Complexity affects coordination	Software = agile teams; Manufacturing = process-based

Environment	Stable vs. dynamic	Government = stable; Tech = dynamic
Culture & Leadership	Values shape structure	People-first → flat; Control → tall
Geography	Multiple regions → divisional	Multinationals = geographic divisions
Legal/Regulatory	Some sectors require formal hierarchies	Regulated industries = layered

6.4   Tall vs. Flat Organizations

Feature	Tall	Flat
Levels	Many	Few
Decision Speed	Slow	Fast
Control	Tight supervision	Empowered teams
Communication	Top-down	Open and horizontal
Example	NADRA, Banks	DPL, Netflix
Characteristics	Bureaucratic, hierarchical, formal	Flexible, informal, empowered

6.5   For Q6 (Designing Structure):

- Analyze: Products, geography, centralized functions

- Suggest: Likely Matrix or Hybrid structure

- Justify: Based on strategy, size, technology, geography

- Draw: Organization chart showing reporting relationships

6.6   Example Scenario: Kangaroo Corp (Multi-product, Multi-geography)

- **Products**: Multiple software packages (Farming Basics, Premium, Analytics)

- **Geography**: Multiple countries (Australia, USA, Pakistan)

- **Centralized Functions**: Software development, customer services, Technology (CTO), PMO

- **Country Operations**: Business development, sales, marketing at country level

- **Structure Recommendation**: Matrix or Hybrid (product divisions + geographic divisions + centralized functions)

- **Justification**: Need to balance product focus, geographic responsiveness, and centralized efficiency

- **Key Elements**:
  - Product divisions (FB, FP, FA) with flat hierarchy
  - Geographic sub-offices (USA, Pakistan) for country operations

  – Centralized head office (Sydney) for development and customer services
  – Centralized Technology (CTO) and PMO for technical/project management

7 ORGANIZATIONAL CULTURE

7.1 What Is Organizational Culture?

- **Definition**: The shared system of values, beliefs, norms, and behaviors that shapes how people within an organization think, feel, and act

- **Metaphor**: The "personality" of an organization

7.2 Components

- **Values**: What the organization considers important

- **Beliefs**: Assumptions about how things work

- **Norms**: Unwritten rules of behavior

- **Behaviors**: Observable actions and practices

- **Symbols**: Visible representations of culture

7.3 What Do Cultures Do?

1. **Defines the Boundary**: Creates distinction between one organization and others

2. **Conveys a Sense of Identity**: Helps members understand who they are

3. **Facilitates Commitment**: Generates commitment to something larger than self-interest

4. **Enhances Stability**: Provides stability to the social system

5. **Sense-Making and Control**: Serves as sense-making mechanism and controls employee behavior

7.4 Characteristics of Organizational Culture

Characteristic	Description	Example
Innovation & Risk-taking	Encourages new ideas and experimentation	DPL teams trying new AI tools
Attention to Detail	Emphasizes precision and quality	QA and code review processes
Outcome Orientation	Focus on results rather than procedures	Performance based on delivery
People Orientation	Values employee well-being and respect	Flat hierarchy, flexible work
Team Orientation	Promotes collaboration	Cross-functional product pods

Aggressiveness	Competitive and ambitious attitude	Sales pursuing bold targets
Stability	Desire for order and consistency	Corporate HR processes

7.5 Schein's Model of Organizational Culture (Three Levels)

Level	Description	Examples	Characteristics
Artifacts and Symbols (Visible)	The "visible" symbols of the culture	Logos, architecture, structure, business processes	Observable, tangible, easy to see
Espoused Values (Stated)	The company's declared set of values and norms	Mission statements, value statements	Stated beliefs, official values
Basic Underlying Assumptions (Deepest)	The bedrock of organizational culture	Deeply embedded beliefs, unconscious assumptions	Deeply embedded, often unconscious, hardest to change

7.6 Do Organizations Have Uniform Culture?

- **Dominant Culture**: Expresses the core values shared by a majority of the organization's members

- **Subcultures**: Minicultures within an organization, typically defined by department designations and geographical separation

- **Core Values**: The primary or dominant values accepted throughout the organization

- **Strong Culture**: A culture in which core values are intensely held and widely shared

7.7 Relationship Between Structure and Culture

- **How Structure Influences Culture**: Hierarchical structures → Formal culture; Flat structures → Informal culture

- **How Culture Influences Structure**: Innovation culture → Flexible structures; Stability culture → Hierarchical structures

- **Alignment**: Structure and culture should align; mismatch creates problems

8 ORGANIZATIONAL COMMUNICATION (Q5 - 10 marks)

8.1 Grapevine Communication

- **Definition**: Informal communication network

- **Why Grapevine Thrives** (5 marks):

  1. Response to important situations

    2. Ambiguity in formal communication

    3. Conditions that arouse anxiety

    4. Fills information gaps

    5. Creates sense of closeness and friendship

    6. Fast information spread

    7. Lack of formal communication

8.2 Managing Grapevine/Rumors (5 marks)

1. **Provide information regularly** (best defense)

2. Explain actions and decisions

3. Don't shoot the messenger

4. Maintain open communication channels

5. Regular updates and transparency

6. Address concerns promptly

7. Create formal communication channels

8. Encourage employees to come forward

8.3 Communication Process Model

1. Sender → 2. Encoding → 3. Message → 4. Channel → 5. Decoding → 6. Receiver → 7. Feedback

- **Noise**: Interference (physical, psychological, semantic)

8.4 Channel Richness

- **Rich**: Face-to-face (highest), video conferencing, telephone

- **Moderate**: Email, instant messaging, written documents

- **Lean**: Bulletins, memos, formal reports

8.5 Communication Networks

Network	Structure	Characteristics	Best For
Chain	Linear: A→B→C→D→E	Sequential, slow, high accuracy	Assembly lines
Wheel	Central hub	Fast, centralized, leader satisfaction	Strong leader, crisis
All-Channel	Everyone with everyone	Fast, high satisfaction, complex tasks	Problem-solving

Circle	Adjacent members only	Moderate speed, moderate satisfaction	Committees

8.6 Barriers to Communication

- **Physical**: Distance, noise, poor technology, time zones

- **Psychological**: Perceptions, emotions, attitudes, stress

- **Language/Semantic**: Jargon, technical terms, ambiguity

- **Cultural**: Different values, norms, styles

- **Organizational**: Hierarchy, status, information overload

- **Personal**: Poor listening, defensiveness, biases

8.7 Active Listening Techniques

- **Paraphrasing**: Restate in your own words

- **Reflecting feelings**: Acknowledge emotions

- **Asking open-ended questions**: Encourage elaboration

- **Summarizing**: Review key points

- **Nonverbal encouragement**: Nodding, eye contact, appropriate expressions

9 GROUP DYNAMICS & COMMUNICATION

9.1 Tuckman's Five-Stage Model

1. **Forming**: High dependence, low trust, unclear roles

2. **Storming**: Conflict, tension, power struggles

3. **Norming**: Cooperation, trust building, role clarity

4. **Performing**: High performance, synergy, goal achievement

5. **Adjourning**: Reflection, transition, disbanding

9.2 Group Decision-Making Techniques

Technique	Process	Best For	Benefits
Brainstorming	Generate ideas without criticism	Creative solutions	Participation, innovation
Nominal Group	Silent generation → sharing → discussion → voting	Structured input needed	Prevents dominance, all voices heard

Delphi	Anonymous expert input $\rightarrow$ summary $\rightarrow$ feedback	Expert knowledge, dispersed	Avoids pressure, expert input
Consensus	All agree to support decision	High commitment needed	High buy-in, shared ownership
Majority Vote	Decision by majority rule	Fast decision needed	Quick, clear outcome
Authority	Leader makes decision	Urgent, clear accountability	Fastest, clear responsibility

9.3 Groupthink Symptoms

- Illusion of invulnerability, collective rationalization, belief in inherent morality

- Stereotyped views of out-groups, direct pressure on dissenters, self-censorship

- Illusion of unanimity, mindguards

9.4 Group Structure Elements

1. **Roles**: Task roles, Maintenance roles, Individual roles

2. **Norms**: Shared expectations about behavior (explicit and implicit)

3. **Status**: Relative position or rank in group (formal and informal)

4. **Cohesiveness**: Forces keeping members in group

5. **Size**: Affects interaction, communication, decision-making

9.5 Advantages of Group Decision-Making

- More information and knowledge

- Diverse perspectives and alternatives

- Better understanding and acceptance

- Legitimacy and validity

- Synergy through collaboration

9.6 Disadvantages of Group Decision-Making

- Time-consuming (slower than individual)

- Groupthink: Pressure for conformity

- Dominance by strong personalities

- Ambiguous responsibility

- Social loafing: Some contribute less

10 MANAGEMENT FUNCTIONS - POLC (Q1: Q12, Q25)

10.1 POLC Framework

Function	Definition	Key Activities
Planning	Goals defined and strategy established	Setting goals, developing strategies, creating action plans
Organizing	Resources gathered and tasks arranged	Arranging resources, allocating tasks, creating structure
Leading	Motivating and directing people	Influencing, inspiring, guiding, communicating
Controlling	Monitoring performance and making corrections	Measuring performance, comparing to standards, taking corrective action

10.2 Management Levels

Level	Focus	Examples	Time Horizon
Top Management	Strategic decisions, long-term vision	CTO, VP Engineering	Long-term
Middle Management	Tactical decisions, department coordination	Engineering Manager, Product Manager	Medium-term
First-Line Management	Operational decisions, daily supervision	Team Lead, Project Manager	Short-term

10.3 Management Skills

- **Technical Skills**: Knowledge of specific tools, technologies, processes

- **Human Skills**: Ability to work with and through people (interpersonal)

- **Conceptual Skills**: Ability to see big picture and think strategically

10.4 POLC - Key Points for MCQs

- **Planning**: Goals defined and strategy established (NOT monitoring employees, gathering resources, or exchanging information)

- **Organizing**: Resources gathered and tasks arranged

- **Leading**: Motivating and directing people

- **Controlling**: Monitoring performance and making corrections

- Management functions fall into: Planning, Organizing, Controlling, Leading

11 LEADERSHIP & MENTORSHIP

11.1 Leadership vs. Management

Aspect	Management	Leadership
Focus	Processes, efficiency, stability	People, vision, change
Goal	Doing things right	Doing the right things
Time	Short-term, operational	Long-term, strategic
Risk	Minimize risk	Take calculated risks
Change	Maintain stability	Drive change

11.2 Leadership Styles

1. **Autocratic**: Leader makes decisions alone

2. **Democratic**: Leader involves team in decision-making

3. **Laissez-Faire**: Leader provides minimal guidance

4. **Transformational**: Leader inspires through vision and charisma

5. **Transactional**: Leader uses rewards/punishments

6. **Servant Leadership**: Leader focuses on serving and developing team

7. **Situational**: Leader adapts style based on situation and team maturity

11.3 Leadership Theories

- **Trait Theory**: Leaders are born with certain traits (intelligence, charisma)

- **Behavioral Theory**: Leadership is learned through behaviors

- **Contingency Theory**: Effective leadership depends on matching style to situation

- **Transformational Theory**: Leaders transform followers through inspiration

11.4 Emotional Intelligence in Leadership

- **Self-Awareness**: Understanding emotions, strengths, weaknesses

- **Self-Regulation**: Managing emotional responses

- **Motivation**: Intrinsic drive to achieve goals

- **Empathy**: Understanding others' emotions and perspectives

- **Social Skills**: Building relationships and managing social situations

11.5 Mentorship Types

- **Formal**: Structured program with assigned pairs

- **Informal**: Natural relationship that develops organically

- **Peer**: Colleagues at similar levels mentoring each other

- **Reverse**: Junior mentors senior (often on new technologies)

- **Group**: One mentor works with multiple mentees

- **Virtual**: Relationship conducted online/remotely

11.6 Mentorship Benefits

- **For Mentees**: Career guidance, skill development, networking, confidence, faster progression

- **For Mentors**: Personal satisfaction, coaching skills development, fresh perspectives, legacy

- **For Organizations**: Knowledge retention, employee development, succession planning, culture building

11.7 Mentorship vs. Coaching vs. Training

Aspect	Training	Coaching	Mentorship
Duration	Short-term	Short-term	Long-term
Focus	Specific skills	Performance improvement	Holistic development
Relationship	Instructor-student	Coach-coachee	Mentor-mentee
Scope	Skill-focused	Goal-focused	Career-focused

12 CONFLICT MANAGEMENT & NEGOTIATION

12.1 Conflict Management Styles (Thomas-Kilmann)

Style	Assertiveness	Cooperativeness	When Appropriate
Competing	High	Low	Quick decision, protecting vital interests
Accommodating	Low	High	Issue more important to others, preserving harmony
Avoiding	Low	Low	Issue trivial, cooling-off needed
Collaborating	High	High	Both concerns important, commitment needed
Compromising	Moderate	Moderate	Goals moderately important, equal power

12.2 Types of Conflict

- **Task Conflict**: Disagreement about work content/goals/methods (can be constructive)

- **Relationship Conflict**: Personal incompatibilities, personality clashes (usually destructive)

- **Process Conflict**: Disagreement about how work should be done (can be constructive or destructive)

- **Value Conflict**: Fundamental differences in beliefs/principles

12.3 Conflict Resolution Process

1. Acknowledge the Conflict

2. Define the Problem

3. Gather Information

4. Generate Options

5. Evaluate and Select Solution

6. Implement and Follow Up

12.4 Negotiation Process

1. **Preparation**: Define goals, research other party, determine BATNA, set target/reservation/opening

2. **Opening**: Establish rapport, state position, listen, identify agreement/disagreement

3. **Bargaining**: Make concessions strategically, focus on interests not positions, explore options

4. **Closing**: Summarize agreements, confirm understanding, put in writing

5. **Implementation**: Follow through, monitor progress, maintain relationship

12.5 BATNA (Best Alternative To a Negotiated Agreement)

- Your best option if negotiations fail

- Determines your **reservation point** (minimum acceptable outcome)

- **Stronger BATNA = More leverage**

12.6 Types of Negotiation

- **Distributive (Zero-Sum)**: Fixed pie, one party's gain is another's loss (e.g., salary)

- **Integrative (Win-Win)**: Expanding the pie, creating value for all (e.g., partnerships)

13 INTERVIEW SKILLS

13.1 STAR Method

- **S**ituation: Set the context and background

- **T**ask: Describe what needed to be accomplished

- **A**ction: Explain what you specifically did

- **R**esult: Share the outcome and what you learned

13.2 Common Interview Questions

1. **"Tell me about yourself"**: 2–3 minutes, professional, relevant, connect to position

2. **"What are your strengths?"**: Relevant to job, specific examples, show benefit

3. **"What are your weaknesses?"**: Real but manageable, show growth, steps to improve

4. **"Why do you want this job?"**: Show research, connect skills/goals, alignment with values

5. **"Why should we hire you?"**: Highlight unique qualifications, match to requirements, differentiate

6. **"Tell me about a challenge"**: Use STAR, show problem-solving, learning, growth

7. **"Where do you see yourself in 5 years?"**: Show ambition but realistic, align with company growth

8. **"Do you have any questions?"**: Always have questions, show interest, ask about role/team/company

13.3 Body Language

- **Positive**: Eye contact (60–70%), sit up straight, natural gestures, smile appropriately, clear voice, firm handshake

- **Negative to Avoid**: Crossing arms, avoiding eye contact, fidgeting, slouching, checking phone

13.4 Technical Interview Preparation (IT)

- Review fundamentals (programming, data structures, algorithms, system design)

- Practice coding (LeetCode, HackerRank, CodeSignal)

- Review your projects (be ready to discuss technical decisions, architecture, challenges)

- Problem-solving approach: Think out loud, ask clarifying questions, start with brute force then optimize

Part II

MEDIUM PRIORITY TOPICS (25 Marks)

14 BUSINESS MODELS & REVENUE MODELS (Q1: Q1, Q20, Q24)

14.1 Key Definitions

- **Revenue Model**: Framework for generating income (NOT same as business model)

- **Business Model**: Overall approach to creating, delivering, and capturing value

- **Value Proposition**: Promise of value to be delivered to customer (NOT same as business model or revenue model)

14.2 Common Business Models

Model	Description	Example
Freemium	Free basic tier, paid premium features	Dropbox, Spotify
Donationware	Software supported by donations	Open source projects
Crippleware	Limited version to encourage purchase	Trial software
Subscription/SaaS	Recurring monthly/annual fees	Microsoft 365, Salesforce
Advertising-Supported	Free to users, revenue from ads	Google, Facebook
Marketplace/Platform	Connects buyers/sellers, commission	Amazon, Uber
Usage-Based	Pay per use (API calls, compute)	AWS, Twilio
Product License	One-time software sale	Traditional enterprise software
Licensing & White-Label	License technology or provide rebrandable solutions	B2B software licensing
Open Source & Dual Licensing	Free core code + paid support/hosting/commercial license	MySQL, MongoDB
Data-Driven/Analytics	Sell insights or data products	Analytics platforms

14.3 Key Distinctions (Important for MCQs)

- **Revenue Model ≠ Business Model**: Revenue model is framework for generating income; business model is overall approach to creating/delivering/capturing value

- **Value Proposition ≠ Business Model ≠ Revenue Model**: Value proposition is promise of value to customer

- **Freemium**: Some features free, advanced features require premium/payment (NOT commission model, donationware, or crippleware)

14.4 Business Model Canvas (Key Blocks)

- **Customer Segments**: Who you serve (B2C, B2B, B2G, multi-sided)

- **Value Proposition**: Which problem you solve and why you're better

- **Channels**: How you reach customers (web, app stores, partners, sales)

- **Customer Relationships**: Self-service, communities, account managers

- **Revenue Streams**: Subscriptions, ads, fees, licenses, services

- **Key Resources**: Team, tech, IP, brand, data

- **Key Activities**: Building, operating, marketing, supporting the product

- **Key Partners**: Cloud providers, payment processors, resellers, integrators

- **Cost Structure**: Salaries, infra, marketing, support, compliance costs

14.5 Horizontal vs. Vertical IT

- **Horizontal**: Generic tools for many industries (email, office suites, generic CRM, infrastructure)

- **Vertical**: Domain-specific solutions (core banking, HIS, airline booking, LMS)

15 IT INDUSTRY VERTICALS

15.1 Major Verticals & IT Needs

Vertical	Key Systems	Priorities
BFSI	Core banking, payment gateways, trading platforms, fraud/AML/KYC	High security, uptime (99.99%+), regulatory compliance, auditability
Healthcare	HIS, EHR/EMR, LIS, telemedicine	Patient privacy (PHI), accuracy, device integration, HL7/FHIR standards
Telecom	Billing/charging, CRM, network management, provisioning	Massive event volumes, real-time rating, scalability, lawful intercept
Retail/E-Commerce	POS, inventory, e-commerce platforms, recommendations	UX, checkout speed, seasonal scaling, payment/logistics integration

Manufacturing	ERP, MRP, MES, SCADA, supply chain	Real-time monitoring, optimization, machine integration (IoT)
Government	Citizen ID (NADRA), tax/e-filing, land records, e-governance	Scalability, transparency, security, privacy vs. FOI balance
Education	SIS, LMS, exam platforms, virtual classrooms	Secure exams, scalable content, student records, accessibility
Energy/Utilities	Smart metering, grid monitoring (SCADA), outage management	Reliability, real-time telemetry, cyber-security of critical infrastructure
Media/Entertainment	Streaming platforms, DRM, recommendation engines, game servers	Low-latency delivery, peak-traffic scaling, IP/copyright management

15.2 Cross-Cutting Concerns Across Verticals

- **Security & Compliance**: Finance (KYC/AML), healthcare (PHI), telecom (intercept), government (FOI + privacy)

- **Data & Analytics**: Fraud detection, personalization, operational optimization

- **Cloud & APIs**: Many vertical products delivered as SaaS/microservices with integration APIs

- **Domain Knowledge**: As important as technical skill for roles like BA, architect, PO in a given vertical

16 AGILE SOFTWARE DEVELOPMENT

16.1 Agile Manifesto - Four Values

1. **Individuals and interactions** over processes and tools

2. **Working software** over comprehensive documentation

3. **Customer collaboration** over contract negotiation

4. **Responding to change** over following a plan

16.2 Core Principles

- Deliver working software frequently (weeks rather than months)

- Welcome changing requirements (even late in development)

- Business people and developers work together daily

- Build projects around motivated individuals

- Face-to-face conversation is most effective

- Working software is primary measure of progress

- Sustainable development pace

- Continuous attention to technical excellence

- Simplicity—maximizing work not done

- Self-organizing teams

- Regular reflection and adjustment (retrospectives)

16.3   Scrum Overview

Roles:

- **Product Owner**: Owns backlog, prioritizes by value, represents stakeholders

- **Scrum Master**: Facilitates process, removes impediments, protects team

- **Development Team**: Cross-functional, self-organizing, delivers increments

Events:

- **Sprint** (1–4 weeks): Timeboxed iteration, potentially shippable increment

- **Sprint Planning**: Team selects backlog items, plans work

- **Daily Scrum**: 15-minute daily meeting (What did I do? What will I do? Impediments?)

- **Sprint Review**: Demo of completed work, stakeholder feedback

- **Sprint Retrospective**: Team reflects on process, identifies improvements

Artifacts:

- **Product Backlog**: Ordered list of all work

- **Sprint Backlog**: Selected items for sprint

- **Increment**: Sum of completed items (must meet Definition of Done)

16.4   XP (Extreme Programming) Practices

- **TDD** (Test-Driven Development): Write tests first

- **Pair Programming**: Two developers work together

- **Continuous Integration**: Frequent code integration and testing

- **Refactoring**: Continuously improve code structure

- **Simple Design**: Design for current needs

- **Collective Code Ownership**: Anyone can modify any code

16.5 Estimation & Planning

- **Story Points**: Relative estimation (Fibonacci: 1, 2, 3, 5, 8, 13, 21)
- **Velocity**: Story points finished per sprint (used for forecasting)
- **User Stories**: Capture requirements from user's perspective
- **Product Backlog**: Prioritized by value/risk; refined continuously

16.6 Benefits and Challenges

- **Benefits**: Faster, incremental value delivery; better alignment with real user needs; higher transparency and adaptability; continuous improvement
- **Challenges**: Cultural change; risk of misinterpreting Agile as "no planning/documentation"; coordination harder in large or highly regulated environments; needs discipline and good engineering

17 COMPUTER CRIMES & PECA (Q1: Q17, Q18, Q19 | Q4: Q4b, Q4c)

17.1 Computer Crime Definition

- Unlawful activity where computer is **tool, target, or storage medium**

17.2 Major Categories

- **Unauthorized access & hacking**: Password attacks, SQLi, XSS, session hijacking, privilege escalation
- **Data crimes**: Theft, copying, leaks, alteration, destruction
- **Malware & ransomware**: Viruses, worms, trojans, spyware, encryption + ransom
- **Online fraud**: Phishing, scams, crypto fraud, investment scams
- **Identity theft**: Misuse of CNIC, SIM, email, social profiles
- **Harassment & cyberstalking**: Threats, monitoring, leaking private images
- **Content offences**: Revenge porn, CSAM, hate speech, extremist content
- **Cyber terrorism**: Attacks on critical infrastructure (telecom, NADRA, banks, energy)
- **Social engineering crimes**: Deepfakes, AI voice calls, WhatsApp/OTP scams

17.3 Technical Attack Lifecycle & Footprinting

- **Footprinting / OSINT**: Collect domain, IP, DNS, tech stack, leaked creds, employee info, public repos/docs
- **Passive** (no direct contact) vs **active** (scans/probes)
- Goals: understand security posture, narrow focus, map networks, find vulnerabilities

17.4 Business Attacks Purpose (Q4b - 3 marks)

1. Disrupt operations

2. Steal data/information

3. Cause financial harm

4. Gain competitive advantage

5. Damage reputation

17.5 Jurisdiction Challenges (Q4c - 3 marks)

1. Borderless nature (multiple countries involved)

2. Which country's laws apply?

3. Extradition challenges

4. Different legal standards

5. Anonymous attackers (VPN, TOR, crypto)

6. Cryptocurrency payments hard to trace

7. Server locations in multiple countries

17.6 PECA 2016 - Pakistan's Cybercrime Law

Offence Category	Examples	Penalties
Harassment & Personal Harm	Cyberstalking, non-consensual images, explicit content (especially minors)	3–7 years, Rs. 1–10M
Fraud, Forgery & Identity	Electronic fraud, identity theft, spoofing, spam, hacking tools	Months to 7 years, tens of thousands to millions
System, Data & Critical Infrastructure	Unauthorized access, data theft, malware, interception, cyber terrorism	Up to 14 years, Rs. 50M (cyber terrorism)

17.7 Criticism of PECA

- Claimed to be **over-broad and harsh**, with overlapping offences and disproportionate punishments

- Vague wording and wide powers may allow misuse against journalists, activists and ordinary users

- Threatens **freedom of expression** and access to information

- Surveillance criteria and content-blocking powers seen as too open-ended

- Law mixes **cybercrime**, **cyberterrorism** and **cyberwarfare** in one framework

17.8   Data Mining & Related Concepts

- **Data Mining**: Process of analyzing data to discover patterns

- **Collaborative Filtering**: Form of data mining (used in recommendations, NOT credit reports or flash cookies)

- **Micro Targeting**: Using data mining to target specific groups (e.g., political campaigns determine voters most likely to support particular candidate)

18   PROFESSIONAL LICENSING (Q1: Q23 | Q4: Q4a)

18.1   Licensing Definition

- Process by which candidates evaluated to determine readiness to enter profession

18.2   Purpose of Licensing (Q4a - 3 marks)

1. Ensure minimum competency

2. Protect public interest

3. Regulate profession

4. Maintain standards

5. Legal authorization to practice

18.3   Related Concepts

- **Certification**: Voluntary recognition of skills/knowledge

- **Accreditation**: Recognition of educational institutions/programs

19   CONTRACTS (Q4: Q4d, Q4e)

19.1   Indemnity (Q4d - 3 marks)

- **Definition**: Contractual obligation to compensate for loss or damage

- Protection against liability

- Financial compensation

- Risk transfer mechanism

19.2 Cost-Plus vs. Fixed Price Contracts (Q4e - 3 marks)

Type	Description	Risk	Example
Cost-Plus	Pay actual costs + profit margin	Client bears cost overruns	Software dev: hours + overhead + profit %
Fixed Price	Agreed price regardless of actual costs	Contractor bears cost overruns	Software project: $50,000 fixed price

19.3 Employment & Legal Issues

- **Firing Employees**: Ethical and legal if employee doesn't perform according to expectation or fails to follow contractual obligations

- **Contractual Obligations**: Employees must fulfill their contractual duties; failure to do so can result in termination

20 LEGAL SYSTEM OF PAKISTAN (Q1: Q8, Q13, Q14, Q15)

20.1 Key Definitions

- **Jurisdiction**: Area covered by single legal system and set of laws

- **Succession**: Falls under **Civil Law**

- **Court System**:
    - Civil courts fall directly under High Courts (**True**)
    - Hierarchy: Supreme Court → High Courts → Civil Courts

- **Legislative Process**: National Assembly and Senate (NOT Superior judiciary or three pillars)

20.2 Court Hierarchy

1. **Supreme Court of Pakistan** – Highest court, constitutional interpretation, final appeals

2. **High Courts** (one per province + Islamabad) – Appeals from lower courts, some original cases

3. **District & Sessions Courts** – Civil and criminal cases at district level

4. **Special Courts/Tribunals** – Banking courts, taxation, anti-terrorism, cybercrime/PECA courts

20.3 Legal System - Key Points for MCQs

- **Jurisdiction**: Area covered by single legal system and set of laws (NOT Executive, Legislature, or Torts)

- **Succession**: Falls under Civil Law (NOT Criminal Law, Public Law, or Substantive Law)

- **Civil Courts**: Fall directly under High Courts (True) – NOT under Supreme Court directly

- **Legislative Process**: National Assembly and Senate (NOT Superior judiciary or three pillars of state)

21 INTELLECTUAL PROPERTY (Q1: Q6)

21.1 IP Types

Type	Protects	Duration (Pakistan)	Example
Copyright	Expression (code, UI, docs, media)	Life + 50 years	Software code, documentation
Trademark	Brand identifiers (names, logos)	Renewable	App name, company logo
Patent	New, inventive, industrially applicable inventions	20 years	Novel technical processes
Trade Secret	Confidential business information	As long as secret kept	Proprietary algorithms, AI models

21.2 Key Points

- **Trademark and Domain Names**: Trademark can be used as domain name (Yes), but should be used carefully to avoid conflicts

- **Copyright Violation**: Making unauthorized copies of copyrighted software is NOT ethical and NOT legal

- **Planting Viruses**: Planting viruses in someone else's computer is NOT ethical and NOT legal

- **Copyright protects expression, NOT ideas**

21.3 Protecting a Startup/FYP

- Use **copyright** automatically for code and content

- Consider **patent** if truly novel technical solution

- Keep some elements as **trade secrets** (architecture, tuning)

- Register **trademark** early for product/company name and logo

21.4 Pakistan's IP Framework

- **Copyright Ordinance 1962**
- **Patents Ordinance 2000**
- **Trade Marks Ordinance 2001**
- **Registered Designs Ordinance 2000**
- Administered by **IPO-Pakistan**

21.5 International Protection

- **Copyright**: Automatic globally (Berne Convention)
- **Patents**: File in each country or via **PCT**; no global patent
- **Trademarks**: National filings or **Madrid Protocol**
- **Trade Secrets**: Protected via contracts and secrecy, not registration

22 PRIVACY, DATA PROTECTION & FOI

22.1 Core Data Protection Principles

1. **Fair & lawful processing** – Clear, honest reasons for collection
2. **Purpose limitation** – Use only for stated purposes
3. **Data minimization** – Collect only necessary data
4. **Accuracy** – Keep data correct and updateable
5. **Storage limitation** – Define retention, delete when no longer needed

22.2 Security Measures

- **Access control**: RBAC, least privilege, MFA
- **Encryption**: HTTPS/TLS in transit; encrypted databases/backups at rest
- **Integrity & verification**: Hashes, signatures, change logs, audit trails
- **Backup & recovery**: Regular backups, off-site redundancy, disaster recovery
- **Monitoring & breach response**: Intrusion detection, anomaly alerts, 72-hour notification

22.3 GDPR (EU) - Key Rights

- Informed consent, access, correction, deletion ("right to be forgotten"), portability
- **72-hour breach notification**
- Fines: Up to €20M or 4% of global turnover

22.4 Other Privacy Laws

- **HIPAA (US health)**: Protects PHI (Protected Health Information)

- **CCPA (California)**: Rights to know, delete, opt-out of data selling

- **UAE PDPL / Saudi PDPL**: Strict consent, security, cross-border transfer rules

22.5 Article 19A & FOI (Pakistan)

- **Article 19A**: Right to access information on matters of public importance

- **FOI/RTI laws**: Citizens can request public records (spending, contracts, policies)

- **Not accessible**: National security/classified info, private citizens' personal data, internal memos

22.6 Privacy by Design Principles

1. Build privacy into architecture from start

2. Default to privacy (opt-in tracking, conservative permissions)

3. Be transparent (clear notices, easy-to-use privacy settings)

4. Limit internal access (RBAC, no blanket production access)

5. Secure data end-to-end (encryption, monitoring, deletion policies)

6. Test regularly (privacy impact assessments, pen-tests)

22.7 Data Mining & Re-identification

- **Data Mining**: ML/statistical analysis for patterns (recommendations, fraud detection)

- **Secondary Use**: Using data for new purposes not originally disclosed $\rightarrow$ often illegal

- **Re-identification**: "Anonymous" datasets can be linked to other data to identify individuals (Netflix Prize case)

Part III

SUPPORTING TOPICS

23 EXAM STRATEGY TIPS

23.1 Time Allocation

- **Q1 (MCQ)**: ~1 minute per question (25 minutes total)

- **Q2 (Ethical Decision Making)**: ~45 minutes

- **Q3 (Business Structures)**: ∼20 minutes

- **Q4 (Short Answers)**: ∼20 minutes (4 minutes per question)

- **Q5 (Communication)**: ∼15 minutes

- **Q6 (Structure Design)**: ∼15 minutes

23.2 For Q2 (Ethical Decision Making - 25 marks)

1. **Read scenario carefully** (5 min) – underline key facts

2. **Step I: Understanding** (10 min) – 10–15 facts, 4–6 ethical issues, 8–10 stakeholders

   - Facts: Number each fact, be neutral and logical
   - Ethical issues: Why it's an issue, potential/resulting harm
   - Stakeholders: Directly and indirectly affected parties

3. **Step II: Dilemma** (2 min) – frame clear either/or question

   - Format: "Should [person/entity] [action] or [alternative action]?"

4. **Step III: Analysis** (15 min) – Use ALL THREE frameworks (A–G, 1–5, H–P) for BOTH alternatives

   - Consequentialism (A–G): Harm/benefit analysis for both alternatives
   - Rights and Duties (1–5): Rights, duties, precedence for both alternatives
   - Deontology (H–P): Respect, universalization for both alternatives

5. **Step IV: Decision** (13 min) – Clear decision, 5–8 implementation steps, stakeholder impacts, 4–6 preventive measures, pivot point

   - Reference frameworks (A–G, 1–5, H–P) to justify decision
   - Show which rights/duties take precedence

23.3 Common Mistakes to Avoid

- Missing facts or stakeholders

- Not using all three frameworks

- Vague implementation steps

- Forgetting to analyze BOTH alternatives

- Not justifying which rights/duties take precedence

- Skipping the universalization test in Deontology

23.4 What Gets Full Marks

- Complete fact list (10+ facts)

- All stakeholders identified

- All three frameworks used thoroughly

- Clear, defensible decision

- Specific, actionable implementation steps

- Comprehensive stakeholder impact analysis

- Multiple preventive measures across categories

- Clear pivot point prevention

23.5 Example Scenario: Qaswa Corporation (E-Mail-Based Effort to Boost Morale)

- **Key Elements**: Employee morale, anonymous memo, system security bypass, management response

- **Typical Stakeholders**: Khalid (employee), Maryam (colleague), Shahzeb (director), Qaswa Corporation, other employees, management, board of directors

- **Typical Ethical Issues**: Anonymity, system security bypass, disrespect to management, impact on morale, potential harm to company reputation

- **Typical Dilemma**: Should Shahzeb fire Khalid or take alternative disciplinary action?

23.6 For Q3 (Business Structures - 15 marks)

- Define each structure clearly

- Compare characteristics side-by-side

- Include advantages and disadvantages

- Time: ~20 minutes

23.7 For Q4 (Short Answers - 15 marks)

- Be concise but complete

- 3 marks = 3–4 key points

- Provide examples where relevant

- Time: ~20 minutes (4 minutes per question)

23.8 For Q5 (Communication - 10 marks)

- List multiple reasons/strategies

- Be specific and practical

- Time: ~15 minutes

23.9 For Q6 (Structure Design - 10 marks)

- Analyze the scenario carefully (products, geography, centralized functions)

- Identify key factors: strategy, size, technology, environment, geography

- Suggest suitable structure (often Matrix or Hybrid for complex scenarios)

- Justify your choice with factors

- Draw clear organization chart showing reporting relationships

- Consider: Product divisions, geographic divisions, centralized departments (Technology, PMO, etc.)

- **For Kangaroo Corp type scenarios**:
    - Product-based divisions (FB, FP, FA)
    - Geographic sub-offices (country-level operations)
    - Centralized functions (development, customer services, Technology, PMO)
    - Matrix structure allows dual reporting (product + geography + function)

- Time: ~15 minutes

24 FINAL PREPARATION CHECKLIST

24.1 One Week Before Exam:

Review all ethical theories and frameworks

Practice 4-step ethical decision making with scenarios

Memorize business structure definitions and comparisons

Review POLC framework

Study grapevine communication and management strategies

Review legal system of Pakistan

Memorize key definitions (revenue model, value proposition, etc.)

24.2   Two Days Before Exam:

Practice drawing organization charts

Review all MCQ topics

Practice short answer questions

Review case studies

24.3   Day Before Exam:

Quick review of all key definitions

Review 4-step ethical decision making process

Review business structures comparison

Get good sleep!

24.4   Exam Day:

Read all questions first

Allocate time per question

Answer MCQs first (quick points)

Then tackle longer questions

Review answers if time permits

25   QUICK REFERENCE CHECKLIST

25.1   Ethics (Must Know)

Utilitarianism: "Greatest good for greatest number" – consequentialist

Deontology: Duty-based, Kant – focuses on rules/duties

Egoism: Self-interest based (NOT duty-based, NOT altruism)

Hedonism: Pursuit of happiness as highest aim

4-Step Ethical Decision Making Process (all steps)

Consequentialism, Rights and Duties, Deontology frameworks

Whistleblowers: Make unauthorized disclosures about harmful situations or fraud

Moral principles $\neq$ Law (False that they always align)

Code of conduct objectives (Discipline, Inspiration, Education – NOT Enforcement)

Ethical theories are NOT formulas but frameworks for analysis

ACM Code: Comprehensive evaluations of systems and impacts required

25.2   Business Structures (Must Know)

Veil of Incorporation definition and purpose

Sole Proprietorship characteristics

Partnership/AOP characteristics

Public Limited Company characteristics and requirements

SMC Pvt. Ltd. characteristics and requirements

Private Limited Company characteristics

Non-compete clause definition

Non-solicitation clause definition

25.3   Management (Must Know)

POLC: Planning, Organizing, Leading, Controlling

Planning: Goals defined and strategy established

Organizing: Resources gathered and tasks arranged

Leading: Motivating and directing people

Controlling: Monitoring performance and making corrections

25.4   Communication (Must Know)

Grapevine communication definition

Why grapevine thrives (4–5 reasons)

How to manage rumors (4–5 strategies)

Communication process model (7 steps)

Channel richness (rich, moderate, lean)

Communication networks (chain, wheel, all-channel, circle)

25.5   Legal (Must Know)

Jurisdiction definition

Succession falls under Civil Law

Civil courts fall under High Courts (True)

Legislative process: National Assembly and Senate

Copyright protects expression, NOT ideas

Trademark can be used as domain name (Yes)

Making unauthorized copies is NOT ethical and NOT legal

25.6 Business Models (Must Know)

Revenue model: Framework for generating income

Value proposition: Promise of value to customer

Business model: Overall approach to creating/delivering/capturing value

Freemium: Free features + premium paid features

SaaS: Subscription-based software

Marketplace: Connects buyers/sellers, earns commission

25.7 Computer Crimes (Must Know)

Computer crime: Tool, target, or storage medium

Collaborative filtering: Form of data mining

Micro targeting: Using data mining for targeting

Business attacks purpose (5 points)

Jurisdiction challenges (5–6 points)

PECA 2016 offence categories and penalties

25.8 Professional Practices (Must Know)

Licensing: Evaluation for profession readiness

Licensing purpose (5 points)

Indemnity: Compensation for loss/damage

Cost-plus vs. Fixed price contracts

Firing employees: Ethical and legal if they don't perform or fail contractual obligations

Unauthorized copying/planting viruses: NOT ethical and NOT legal

25.9 Organizational Structure (Must Know)

Types: Simple, Functional, Divisional, Matrix, Flat, Hierarchical

Elements: Work Specialization, Departmentalization, Chain of Command, Span of Control, Centralization, Formalization

Factors: Strategy, Size, Technology, Environment, Culture, Geography, Legal

How to design and justify structure

Tall vs. Flat organizations

25.10 Agile (Must Know)

Agile Manifesto four values

Scrum roles: Product Owner, Scrum Master, Development Team

Scrum events: Sprint, Sprint Planning, Daily Scrum, Sprint Review, Sprint Retrospective

Scrum artifacts: Product Backlog, Sprint Backlog, Increment

XP practices: TDD, Pair Programming, Continuous Integration

Story points and velocity

26 KEY FORMULAS/DEFINITIONS TO MEMORIZE

26.1 Ethics:

- **Utilitarianism** = Greatest good for greatest number (consequentialist)
- **Deontology** = Duty-based, Kant, focus on rules not outcomes
- **Egoism** = Self-interest based
- **Hedonism** = Pursuit of happiness as highest aim
- **Rights & Duties** = Individual rights + moral duties

26.2 Business:

- **Revenue Model** = Framework for generating income
- **Value Proposition** = Promise of value to customer
- **Business Model** = Overall approach to creating/delivering/capturing value
- **Freemium** = Free features + premium paid features

26.3 Legal:

- **Jurisdiction** = Area covered by single legal system
- **Veil of Incorporation** = Separation of company from owners (limited liability)
- **Copyright** = Protects expression, NOT ideas
- **Patent** = Protects new, inventive, industrially applicable inventions

26.4 Management:

- **POLC** = Planning, Organizing, Leading, Controlling

- **Planning** = Goals defined and strategy established

- **Organizing** = Resources gathered and tasks arranged

- **Leading** = Motivating and directing people

- **Controlling** = Monitoring performance and making corrections

26.5 Communication:

- **Grapevine** = Informal communication network

- Thrives due to: Importance, ambiguity, anxiety, information gaps

- **Channel Richness** = Information-carrying capacity (rich, moderate, lean)

27 EXAM-SPECIFIC ANSWER PATTERNS & CLARIFICATIONS

27.1 MCQ Answer Patterns (Based on Exam Questions)

27.1.1 Ethics Questions

- **Q2**: Hedonism (pursuit of happiness as highest ethical aim)

- **Q3**: Whistleblowers make unauthorized disclosures about harmful situations or fraud

- **Q4**: Moral principles are NOT always aligned with law (False)

- **Q5**: Statements 1 and 3 are correct (Utilitarianism is consequentialist, Deontology is Kant's theory); Statement 2 is FALSE (Egoism is NOT duty-based)

- **Q7**: Utilitarianism ("greatest good for greatest number")

- **Q9**: Ethical theories are NOT formulas to solve problems

27.1.2 Business & Legal Questions

- **Q1**: Revenue model is a framework for generating income (NOT same as business model)

- **Q6**: Trademark can be used as domain name (Yes), but should be used carefully

- **Q8**: Jurisdiction means area covered by single legal system

- **Q13**: Succession falls under Civil Law

- **Q14**: Civil courts fall directly under High Courts (True)

- **Q15**: Legislative process consists of National Assembly and Senate

- **Q16**: Firing employees who don't perform is Ethical and Legal

- **Q19**: Making unauthorized copies/planting viruses is NOT ethical and NOT legal

- **Q20**: Freemium (free features + premium payment)

- **Q21**: Non-compete clause prevents current AND former employees from working for competitors

- **Q22**: Non-solicitation clause prevents encouraging employees AND customers to move

- **Q23**: Licensing is process to evaluate readiness to enter profession

- **Q24**: Value proposition is promise of value to customer (NOT business model or revenue model)

- **Q25**: Management functions: Planning, Organizing, Controlling, Leading

27.1.3   Data & Technology Questions

- **Q17**: Collaborative filtering is a form of data mining

- **Q18**: Micro targeting uses data mining to determine voters most likely to support candidate

27.1.4   Code of Conduct Questions

- **Q10**: Code of conduct objectives: Discipline, Inspiration, Education (NOT Enforcement)

- **Q11**: ACM code requires comprehensive evaluations of systems and impacts (True)

Good luck with your exam preparation! Focus on understanding concepts rather than just memorizing, especially for the ethical decision-making question.