NEC Registration Examination

Computer Engineering (ACtE)

Electronics and Communication
Telecommunication
Software Engineering
Information Technology

Chapter 10: Project Planning, Design and Implementation

(AALL10)

Complete Detailed Notes — Key Points • Formulas • Tables • Diagrams • Solved MCQs

COMPLETE NOTES WITH SOLVED MCQ AND PYQS

EASY EXPLANATION



EASY EXPLANATION

10.1 Engineering Drawings and its Concepts

Drawing Sheets, Dimensions and Scale

- **Standard drawing sheets:** ISO A-series (A0 largest → A4 smallest); each successive size is exactly half the area of the one before it.

Sheet Size	Dimensions (mm, approx.)
A0	841 × 1189
A1	594 × 841
A2	420 × 594
A3	297 × 420
A4	210 × 297

- **Dimensioning:** shows size and location of features — must be clear, non-redundant, and follow standard conventions (extension lines, dimension lines, leader lines, arrowheads).
- **Scale:** the ratio of drawing size : actual size.

Scale Type	Example	Meaning
Full Scale	1:1	Drawing is the same size as the actual object.
Reducing Scale	1:10, 1:100	Drawing is smaller than actual (used for large objects like buildings).
Enlarging Scale	10:1, 2:1	Drawing is larger than actual (used for very small objects like PCB components).

Types of Views and Projections

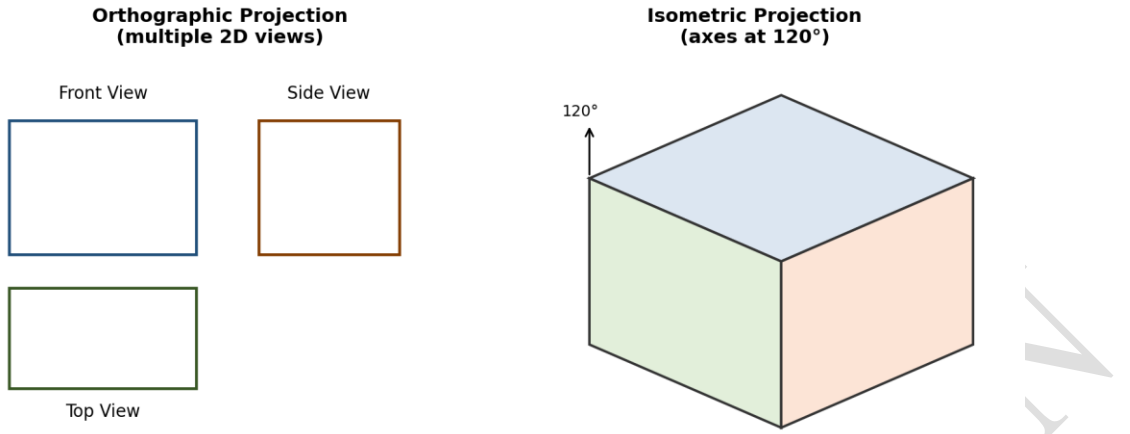


Figure 10.1 — Orthographic Projection (multiple 2D views) vs Isometric Projection (axes at 120°)

Type	Description
Orthographic Projection	Multiple 2D views (front, top, side) — gives precise dimensions, used for manufacturing/engineering drawings.
Isometric Projection	A single pictorial 3D-like view; all three axes are at 120° to each other, and true lengths are preserved along the axes.
Pictorial Views	General term for 3D-like views (isometric, oblique, perspective) showing the object approximately as it appears to the eye.
Sectional Drawing	Shows a 'cut-away' internal view of an object — reveals internal features/hidden details that a normal external view would hide.

- **Line diagram:** a simplified representation using standard line types (visible/continuous, hidden/dashed, center, dimension lines) to represent a system, circuit, or object schematically.

Line Type	Convention / Use
Visible (continuous, thick)	Shows edges and outlines that are visible in the current view.
Hidden (dashed, thin)	Shows edges/features hidden behind other surfaces.
Center line (long-short dash)	Marks axes of symmetry, centers of circles/holes.
Dimension/Extension line (thin, continuous)	Indicates the size/location being measured.

Easy Explanation

Orthographic = multiple flat views used by engineers to MANUFACTURE a part precisely (like a blueprint); Isometric = one pictorial view used to help people VISUALIZE what the part looks like in 3D.

Solved MCQs — Engineering Drawings

1. In the ISO A-series of drawing sheets, which is the LARGEST standard size?

a) A4
b) A3
c) A0
d) A2
✓ Answer: c) A0
Explanation: A0 is the largest standard ISO sheet size; each subsequent size (A1, A2...) is half the area of the previous.

2. A scale of 1:10 on a drawing means:

a) The drawing is 10 times larger than actual size
b) The drawing is 10 times smaller than actual size
c) The drawing is the same size as actual
d) Scale doesn't affect size
✓ Answer: b) The drawing is 10 times smaller than actual size
Explanation: A 1:10 reducing scale means 1 unit on paper represents 10 units in reality — the drawing is smaller than actual.

3. Isometric projection draws the three principal axes at an angle of:

a) 90° to each other
b) 45° to each other
c) 120° to each other
d) 180° to each other
✓ Answer: c) 120° to each other
Explanation: In isometric projection, the three axes are equally inclined at 120° to each other.

4. A sectional drawing is primarily used to show:

a) The exterior color of an object
b) Internal/hidden features via a cut-away view
c) Only the top view
d) The manufacturing cost
✓ Answer: b) Internal/hidden features via a cut-away view
Explanation: Sectional views reveal internal details that would otherwise be hidden in a normal external view.

5. Orthographic projection is preferred over isometric projection when:

a) A quick 3D impression is needed
b) Precise manufacturing dimensions are required
c) Only a rough sketch is needed
d) Color representation is required
✓ Answer: b) Precise manufacturing dimensions are required
Explanation: Orthographic views (front/top/side) give exact dimensions needed for precise manufacturing.

6. A dashed thin line in an engineering drawing conventionally represents:

a) A visible edge
b) A hidden edge/feature
c) A center line
d) A dimension line
✓ Answer: b) A hidden edge/feature
Explanation: Hidden (dashed) lines indicate edges or features that are concealed behind other surfaces in the current view.

7. An A2 sheet, compared to an A1 sheet, has:

a) Double the area
b) Half the area
c) The same area
d) No standard relationship
✓ Answer: b) Half the area

EASY EXPLANATION

Explanation: Each ISO A-series size is exactly half the area of the size before it — A2 is half of A1.

8. A scale of 2:1 on a drawing would most likely be used for:

a) Drawing a building's floor plan

b) Drawing a very small component (e.g. a PCB part) in enlarged detail

c) Drawing at actual size

d) Drawing a country map

✓ Answer: b) Drawing a very small component (e.g. a PCB part) in enlarged detail

Explanation: Enlarging scales (like 2:1 or 10:1) are used when the actual object is too small to show clearly at full scale.

10.2 Engineering Economics

Time Value of Money

- Core principle: money available today is worth more than the same amount in the future, because of its earning/interest potential.

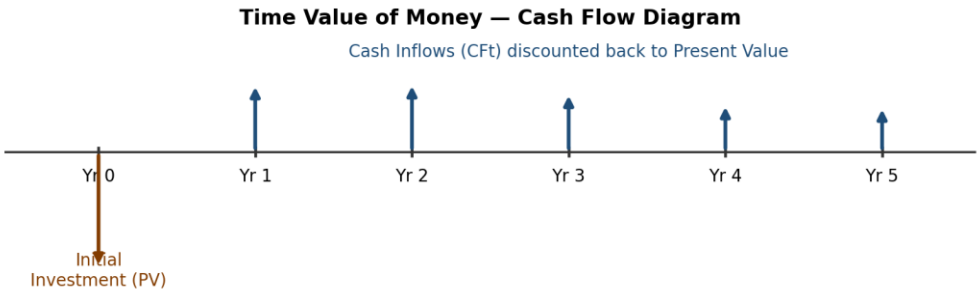


Figure 10.2 — Cash flow diagram: an initial investment followed by a stream of future inflows, all referenced to Present Value

Future Value: $FV = PV \times (1 + i)^n$

Present Value: $PV = FV / (1 + i)^n$

i = discount/interest rate, n = number of periods

Economic Analysis Methods

Method	Key Idea
Payback Period	Time needed to recover the initial investment (simple; ignores the time value of money).
Discounted Payback Period	Same as payback period, but cash flows are DISCOUNTED to present value first.
NPV (Net Present Value)	Sum of all discounted cash inflows minus the initial investment — ACCEPT the project if NPV > 0.
IRR (Internal Rate of Return)	The discount rate at which NPV = 0 — ACCEPT the project if IRR > MARR.
Benefit-Cost Ratio (BCR)	Ratio of the present value of benefits to the present value of costs — ACCEPT if BCR > 1.

Method	Key Idea
MARR	Minimum Acceptable Rate of Return — the hurdle rate a project must beat to be worthwhile.

NPV = Σ [CFt / (1+i)^t] − Initial Investment (t = 0, 1, 2, ..., n)

Easy Explanation

Decision rule cheat sheet: NPV > 0 → accept project; NPV < 0 → reject. IRR > MARR (required/hurdle rate) → accept; IRR < MARR → reject. Both methods should normally agree for a standalone, conventional-cash-flow project.

Depreciation and Taxation

- **Depreciation:** the systematic allocation of an asset's cost over its useful life.

Depreciation Method	Key Idea
Straight-Line	Equal depreciation amount charged every year over the useful life.
Declining Balance	Larger deductions early on, decreasing each year (accelerated depreciation).
Sum-of-Years'-Digits	Accelerated method that weights early years more heavily using a fraction based on remaining life.

Straight-Line Depreciation = (Cost − Salvage Value) / Useful Life

- **Taxation system in Nepal:** engineering projects/firms are subject to Income Tax, VAT, and sector-specific levies as per Nepal's **Income Tax Act** and related fiscal regulations — depreciation is used to reduce taxable income (a non-cash deductible expense).

Solved MCQs — Engineering Economics

1. A project should be ACCEPTED based on NPV analysis when:

a) NPV < 0
b) NPV = 0 only
c) NPV > 0
d) NPV is undefined
✓ Answer: c) NPV > 0
Explanation: A positive NPV means the project's discounted returns exceed its cost — it adds value.

2. IRR is defined as the discount rate at which:

a) NPV is maximized
b) NPV equals zero
c) Payback period is shortest
d) Depreciation is highest

✓ **Answer: b) NPV equals zero**

Explanation: IRR is the break-even discount rate where the NPV of a project's cash flows equals zero.

3. MARR stands for:

a) Maximum Allowed Return Rate

b) Minimum Acceptable Rate of Return

c) Marginal Annual Revenue Rate

d) Monthly Adjusted Return Rate

✓ **Answer: b) Minimum Acceptable Rate of Return**

Explanation: MARR is the minimum return threshold a project must meet/exceed to be considered worthwhile.

4. Straight-line depreciation allocates an asset's depreciable cost:

a) Entirely in the first year

b) In equal amounts each year over its useful life

c) Randomly across years

d) Only in the last year

✓ **Answer: b) In equal amounts each year over its useful life**

Explanation: Straight-line method spreads (Cost − Salvage Value) evenly across the useful life.

5. The Discounted Payback Period differs from the simple Payback Period because it:

a) Ignores the time value of money

b) Uses discounted (present value) cash flows

c) Never considers investment cost

d) Is always shorter than simple payback

✓ **Answer: b) Uses discounted (present value) cash flows**

Explanation: Discounted payback period first converts future cash flows to present value before computing recovery time.

6. A Benefit-Cost Ratio (BCR) greater than 1 indicates the project should be:

a) Rejected

b) Accepted

c) Deferred indefinitely

d) Re-costed only

✓ **Answer: b) Accepted**

Explanation: BCR > 1 means the present value of benefits exceeds the present value of costs, favoring acceptance.

7. Which depreciation method charges LARGER deductions in the early years of an asset's life?

a) Straight-Line

b) Declining Balance

c) Both charge equal amounts always

d) Neither — depreciation is always constant

✓ **Answer: b) Declining Balance**

Explanation: Declining Balance is an accelerated method, front-loading larger deductions in earlier years.

8. Present Value (PV) of a future sum increases when:

a) The discount rate i increases

b) The discount rate i decreases (all else equal)

c) The number of periods n increases (all else equal)

d) It never changes with i or n

✓ **Answer: b) The discount rate i decreases (all else equal)**

Explanation: Since $PV = FV / (1+i)^n$, a lower discount rate i produces a larger present value for a fixed future sum.

10.3 Project Planning and Scheduling

EASY EXPLANATION

Project Classification and Life Cycle

- **Project classifications:** by size (small/large), sector (public/private), nature (construction, IT, R&D), and duration (short/long-term).
- **Typical project life cycle phases:** Initiation → Planning → Execution → Monitoring & Controlling → Closure. Cost and staffing levels are usually low at initiation, rise through execution, and taper off at closure.

Project Scheduling Techniques

Technique	Key Idea
Bar Chart (Gantt Chart)	Visual timeline — horizontal bars show the start/end of each task; simple and widely used.
CPM (Critical Path Method)	Uses DETERMINISTIC (fixed) activity durations — identifies the CRITICAL PATH (the longest path = minimum project duration).
PERT (Program Evaluation Review Technique)	Uses PROBABILISTIC durations (optimistic, pessimistic, most-likely) — better suited for uncertain/R&D projects.

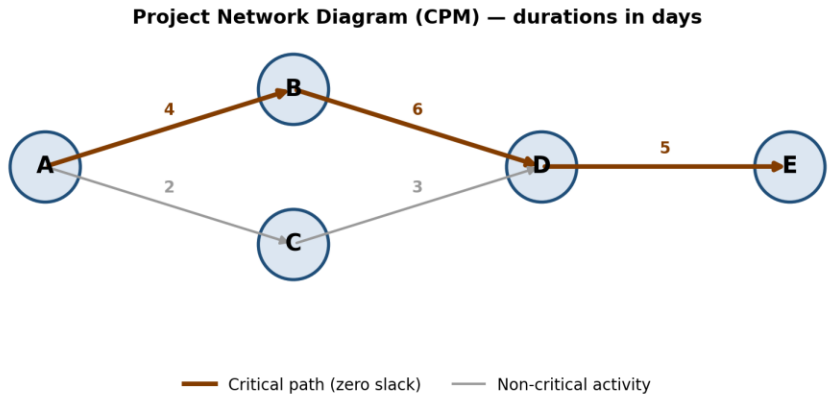


Figure 10.3 — A project network diagram: the critical path (orange, highest total duration) has zero slack

PERT Expected Time: Te = (Optimistic + 4×Most Likely + Pessimistic) / 6
PERT Variance: σ^2 = [(Pessimistic − Optimistic) / 6]²

- **Critical Path:** the longest path through the network — determines the minimum possible project duration; activities on it have **ZERO slack/float** (any delay here delays the whole project).
- **Free Float / Total Float:** total float is the amount an activity can be delayed without delaying the overall project finish; free float is the amount it can be delayed without delaying the START of the next activity.
- **Resource Leveling:** adjusts the schedule to smooth resource usage (avoiding over-allocation) — this MAY extend the project duration.
- **Resource Smoothing:** adjusts activities within their available slack to balance resource use WITHOUT changing the project end date.

Monitoring, Evaluation and Controlling

- An ongoing process of tracking actual progress against the plan, identifying variances, and taking corrective action — often uses **Earned Value Management (EVM)**, which compares Planned Value (PV), Earned Value (EV), and Actual Cost (AC) to compute schedule and cost performance indices (SPI, CPI).

Easy Explanation

Quick CPM vs PERT distinction: CPM = fixed/certain durations (used for repetitive, well-understood work like construction); PERT = uncertain durations with 3 time estimates (used for R&D/novel projects). Resource Leveling CAN delay the project; Resource Smoothing CANNOT (it only uses existing slack).

Solved MCQs — Project Planning & Scheduling

1. The Critical Path in a project network is defined as the:

a) Shortest path through the network
b) Longest path through the network, determining minimum duration
c) Path with the most resources
d) Path with zero cost
✓ Answer: b) Longest path through the network, determining minimum duration
Explanation: The critical path is the longest sequence of dependent activities, setting the minimum possible project duration.

2. PERT differs from CPM mainly because PERT:

a) Uses only one fixed time estimate per activity
b) Uses three time estimates (optimistic, most likely, pessimistic) to model uncertainty
c) Cannot identify a critical path
d) Is used only for very short projects
✓ Answer: b) Uses three time estimates (optimistic, most likely, pessimistic) to model uncertainty
Explanation: PERT incorporates uncertainty using three time estimates, unlike CPM's single deterministic estimate.

3. Activities on the critical path have a slack/float of:

a) Maximum possible value
b) Zero
c) Negative infinity
d) Exactly one day
✓ Answer: b) Zero
Explanation: Critical path activities have zero slack — any delay directly delays the entire project.

4. Resource Smoothing differs from Resource Leveling because it:

a) Always extends the project's end date
b) Balances resources WITHOUT changing the project end date, using existing slack
c) Ignores all resource constraints
d) Requires unlimited resources
✓ Answer: b) Balances resources WITHOUT changing the project end date, using existing slack
Explanation: Resource smoothing only shifts activities within their available float, keeping the end date fixed.

5. A Gantt (bar) chart is primarily used to show:

a) Cash flow projections only
b) A visual timeline of task start/end dates
c) Risk probability distributions
d) Organizational hierarchy
✓ Answer: b) A visual timeline of task start/end dates
Explanation: Gantt charts display tasks as horizontal bars along a timeline, showing schedule and duration.

EASY EXPLANATION

6. In the PERT formula Te = (O + 4M + P) / 6, the letter 'M' represents:

a) Minimum possible time
b) Most likely time
c) Maximum allowed time
d) Mean of all estimates
✓ Answer: b) Most likely time
Explanation: M is the 'Most Likely' time estimate, weighted four times more heavily than the optimistic (O) and pessimistic (P) estimates.

7. Total Float for an activity is best described as:

a) The time it can be delayed without affecting the very next activity only
b) The time it can be delayed without delaying the overall project finish
c) Always zero for every activity
d) Only relevant to non-critical resources
✓ Answer: b) The time it can be delayed without delaying the overall project finish
Explanation: Total float measures how much an activity can slip without pushing back the project's overall completion date.

8. Earned Value Management (EVM) compares which three key measures?

a) Planned Value, Earned Value, Actual Cost
b) Optimistic, Most Likely, Pessimistic time
c) NPV, IRR, MARR
d) Cohesion, Coupling, Abstraction
✓ Answer: a) Planned Value, Earned Value, Actual Cost
Explanation: EVM tracks Planned Value (PV), Earned Value (EV), and Actual Cost (AC) to assess schedule and cost performance.

10.4 Project Management

Project Information System and Risk Management

- **Project Information System:** tools/systems (often software-based) for collecting, storing, and reporting project data — supports decision-making and tracking of cost, schedule, and resources.

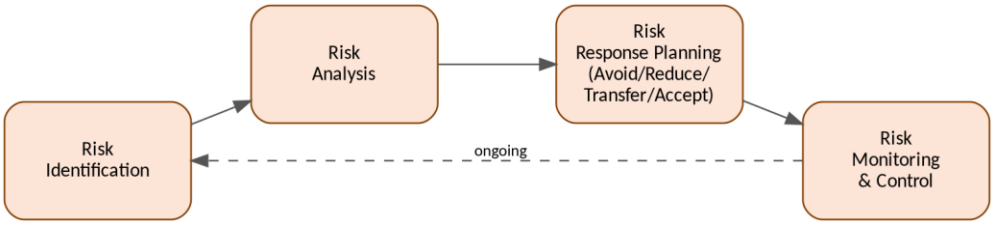


Figure 10.4 — The Risk Management Cycle (a continuous, iterative process)

Risk Management Step	Description
Risk Identification	Recognizing potential threats to project success (technical, financial, schedule, external).
Risk Analysis	Assessing the probability and impact of each identified risk (qualitative and/or quantitative).
Risk Response Planning	Deciding a strategy for each significant risk: Avoid, Reduce, Transfer, or Accept.

EXAM EXPLANATION

Risk Management Step	Description
Risk Monitoring & Control	Tracking identified risks, watching for new ones, and evaluating the effectiveness of response strategies.

Risk Response Strategy	Meaning
Avoid	Eliminate the risk entirely by changing the plan/approach.
Reduce (Mitigate)	Lower the probability and/or impact of the risk.
Transfer	Shift the risk to a third party (e.g. insurance, subcontracting).
Accept	Acknowledge the risk and do nothing extra — used for very low-impact/low-probability risks.

Project Financing, Tender and Contract Management

- **Project financing:** securing funds via equity, debt/loans, government grants, or a Public-Private Partnership (PPP).
- **Tender process:** Invitation to bid → Bid submission → Bid evaluation → Contract award — ensures fair, competitive, and transparent contractor selection.
- **Contract management:** overseeing contractual obligations, deliverables, payments, and disputes throughout project execution — ensures both parties meet agreed terms.

Contract Type	Key Idea
Lump Sum	A single fixed total price for the defined scope of work.
Unit Price	Payment based on a rate per unit of work/quantity completed.
Cost-Plus	Contractor is paid actual costs plus an agreed fee/margin.

Easy Explanation

Risk response strategies, memorized as AVOID-REDUCE-TRANSFER-ACCEPT: AVOID = eliminate the risk entirely (change plan); REDUCE = lower probability/impact; TRANSFER = shift risk to a third party (e.g. insurance, subcontract); ACCEPT = acknowledge and do nothing extra (used for very low-impact risks).

Solved MCQs — Project Management

1. Which risk response strategy involves shifting the risk to a third party, such as through insurance?

a) Avoid
b) Reduce
c) Transfer
d) Accept

✓ Answer: c) Transfer

Explanation: Transferring risk means passing it to another party (e.g., an insurer or subcontractor) rather than bearing it directly.

2. The correct general sequence of a tender process is:

a) Contract award → Bid evaluation → Invitation to bid
b) Invitation to bid → Bid submission → Bid evaluation → Contract award
c) Bid submission → Contract award → Invitation to bid
d) Contract award → Invitation to bid → Bid submission
✓ Answer: b) Invitation to bid → Bid submission → Bid evaluation → Contract award
Explanation: Tendering follows: invite bids, receive submissions, evaluate them, then award the contract.

3. A contract type where payment is a single fixed total price is called:

a) Unit Price contract
b) Cost-Plus contract
c) Lump Sum contract
d) Time and Materials contract
✓ Answer: c) Lump Sum contract
Explanation: A Lump Sum contract sets one fixed total price for the defined scope of work.

4. Public-Private Partnership (PPP) is an example of which project management area?

a) Risk analysis technique
b) Project financing approach
c) Scheduling technique
d) Quality control method
✓ Answer: b) Project financing approach
Explanation: PPP is a financing/delivery model where public and private sectors jointly fund and/or operate a project.

5. In risk management, assessing the probability and impact of an identified risk is called:

a) Risk identification
b) Risk analysis
c) Risk transfer
d) Contract management
✓ Answer: b) Risk analysis
Explanation: Risk analysis quantifies/qualifies how likely a risk is and how severe its impact would be.

6. A Cost-Plus contract pays the contractor:

a) A single fixed price regardless of actual cost
b) Actual costs incurred plus an agreed fee/margin
c) Only a rate per unit of work completed
d) Nothing until project completion
✓ Answer: b) Actual costs incurred plus an agreed fee/margin
Explanation: Cost-Plus contracts reimburse actual costs and add an agreed profit margin/fee on top.

7. Choosing to eliminate a risk entirely by changing the project plan/approach is the strategy of:

a) Accept
b) Transfer
c) Avoid
d) Reduce
✓ Answer: c) Avoid
Explanation: Risk Avoidance means altering the plan so the risk no longer applies at all.

8. A low-probability, low-impact risk that the project team decides to simply monitor without special action illustrates which response?

a) Avoid
b) Reduce
c) Transfer

EASY EXPLANATION

d) Accept
✓ Answer: d) Accept
Explanation: Accepting a risk means acknowledging it but taking no extra mitigating action, appropriate for minor risks.

10.5 Engineering Professional Practice

Environment, Society and Ethics

- **Environment and society:** engineers must consider environmental impact and social responsibility in design decisions — sustainability, and minimizing harm to communities/ecosystems.
- **Professional ethics — core principles:** honesty, integrity, competence, public safety/welfare as the top priority, avoiding conflicts of interest, and maintaining confidentiality.

Ethical Principle	What it Requires
Public safety & welfare (paramount)	Engineers must hold the safety, health, and welfare of the public above all other considerations.
Competence	Only undertake work within one's area of competence.
Honesty & Integrity	Provide truthful, objective professional statements and reports.
Confidentiality	Protect client/employer information unless disclosure is legally/ethically required.
Avoiding conflict of interest	Disclose and avoid situations where personal interest could compromise professional judgment.

- **Regulatory environment:** engineers must comply with building codes, safety standards, environmental regulations, and relevant national laws.
- **Contemporary issues:** sustainability, climate change, data privacy, AI ethics, rapid technological change, cybersecurity.

Occupational Health and Safety (OHS)

- Employers/engineers must ensure a safe working environment — this includes hazard identification, risk assessment, provision of protective equipment (PPE), safety training, and incident reporting.

Nepal Engineers' Association (NEA)

- NEA is the professional body representing engineers in Nepal — its roles include advocating for engineers' interests, promoting professional development, organizing technical events/training, and upholding professional standards and ethics.

Easy Explanation
Distinguish NEA from NEC: NEA (Nepal Engineers' Association) = a professional MEMBERSHIP body advocating for engineers; NEC (Nepal Engineering Council) = the statutory REGULATORY body that registers/licenses engineers (this exam itself is conducted by NEC). Don't mix them up in MCQs!

Solved MCQs — Professional Practice

1. Which principle is generally considered the HIGHEST priority in engineering professional ethics?

a) Maximizing company profit
b) Public safety and welfare
c) Personal career advancement
d) Minimizing project duration
✓ Answer: b) Public safety and welfare
Explanation: Nearly all engineering codes of ethics place public safety and welfare as the paramount consideration.

2. The Nepal Engineers' Association (NEA) primarily functions as a:

a) Government regulatory/licensing authority
b) Professional membership body advocating for engineers
c) University accreditation board
d) Bank for engineering projects
✓ Answer: b) Professional membership body advocating for engineers
Explanation: NEA is a professional association representing and supporting engineers, distinct from the regulatory NEC.

3. Occupational Health and Safety (OHS) practices primarily aim to:

a) Increase project cost
b) Ensure a safe working environment for workers
c) Speed up construction regardless of risk
d) Replace the need for engineering ethics
✓ Answer: b) Ensure a safe working environment for workers
Explanation: OHS focuses on identifying hazards and protecting worker health and safety on the job.

4. An engineer discovering a conflict of interest on a project should:

a) Ignore it if the project is nearly complete
b) Disclose it and avoid letting it compromise professional judgment
c) Only mention it if asked directly
d) Resign without informing anyone
✓ Answer: b) Disclose it and avoid letting it compromise professional judgment
Explanation: Professional ethics require proactive disclosure and management of conflicts of interest to preserve objective judgment.

5. Considering environmental impact and social responsibility in design decisions reflects an engineer's duty toward:

a) Maximizing personal profit
b) Environment and society
c) Avoiding all documentation
d) Ignoring regulatory compliance
✓ Answer: b) Environment and society
Explanation: Engineers are expected to weigh sustainability and community/ecosystem impact as part of responsible design.

6. Hazard identification and provision of PPE (personal protective equipment) fall under:

a) Engineering Economics
b) Occupational Health and Safety (OHS)
c) Contract Management
d) Depreciation accounting
✓ Answer: b) Occupational Health and Safety (OHS)
Explanation: OHS practices specifically address identifying hazards and protecting workers via measures like PPE and training.

10.6 Engineering Regulatory Body

EASY EXPLANATION

Nepal Engineering Council (NEC) — Formation

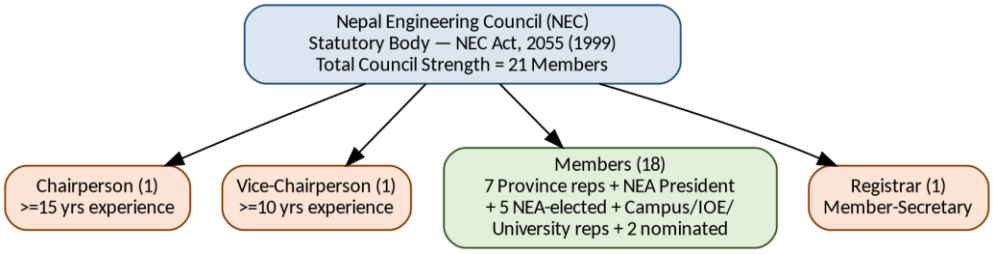


Figure 10.5 — Nepal Engineering Council (NEC) and its core regulatory functions

- **NEC:** the statutory regulatory body established under the **Nepal Engineering Council Act, 2055 (1999)** — the Royal Seal and publication date was **2055/11/27 B.S. (11 March 1999 A.D.)**. It is responsible for the planning, coordinated development, and monitoring of the engineering profession and engineering education in Nepal.
- **NEC Rules/Regulation, 2057** was subsequently framed under Clause 37 of the Act to operationalize registration, categories of engineers, and the professional code of conduct. The Act was amended in **2079 B.S. (2022 A.D.)**, making it mandatory to pass the NEC licensing examination to obtain a license; as of that amendment, NEC issues licenses for **37 engineering fields**.

Composition of the Council — Number of Members

The Nepal Engineering Council consists of **21 total Councilors (Members)**, made up as follows:

#	Composition	Count	Designation
1	Engineer with ≥ 15 years' experience after a Bachelor's degree in engineering, appointed by the Government of Nepal	1	Chairperson
2	Engineer with ≥ 10 years' experience after a Bachelor's degree in engineering, appointed by the Government of Nepal	1	Vice-Chairperson
3	Engineers with ≥ 7 years' experience, one representing each of the 7 provinces, nominated by GoN on inclusion principles (at least 3 women)	7	Members
4	President of the Nepal Engineers' Association (ex-officio)	1	Member
5	Engineers elected by the Nepal Engineers' Association	5	Members
6	Representative of the Chief Engineers of Engineering Campuses, appointed by GoN	1	Member

#	Composition	Count	Designation
7	Representative of the Institute of Engineering (IOE), Tribhuvan University	1	Member
8	An individual from universities running engineering education/research, appointed by GoN	1	Member
9	Engineers with ≥ 7 years' experience (incl. at least 1 woman), nominated by the recommendation committee	2	Members
10	Registrar of the Council	1	Member-Secretary

Total strength of Nepal Engineering Council = 21 Members
(1 Chairperson + 1 Vice-Chairperson + 18 Members + 1 Member-Secretary)

Tenure, Qualification and Disqualification

Post	Qualification Required	Tenure
Chairperson	Bachelor's degree in engineering + at least 15 years' experience in the profession	4 years (as a nominated/elected Member)
Vice-Chairperson	Bachelor's degree in engineering + at least 10 years' experience	4 years
Nominated/Elected Members	As per the specific category (e.g. 7 years' experience for province & committee-nominated members)	4 years — eligible for re-nomination/re-election
Registrar (Member-Secretary)	Bachelor's degree in engineering + at least 10 years' experience; appointed by GoN through open competition	4 years

- **Vacancy rule:** if a Member's seat falls vacant before the tenure expires, a replacement is nominated/elected only for the **remainder of that tenure**, not a fresh 4 years.
- **Disqualification from Council membership:** (a) not a Nepalese citizen; (b) a person whose name has been removed from the NEC Registration Book; (c) a person declared bankrupt (property distributed among creditors for failing to repay debt).

Meetings, Quorum and Decisions

Aspect	Rule
Quorum	At least 50% of the total Members must be present for a Council meeting to proceed.
Chairing	The Chairperson presides; in their absence, the Vice-Chairperson presides; if both are absent, Members present select one of themselves to preside.
Decision rule	Decided by majority opinion of Members present; in the event of a tie, the presiding person exercises a casting (deciding) vote.
Authentication	Decisions of the Council are authenticated by the Member-Secretary (the Registrar).

Categories of Registered Engineers (NEC Rules, 2057)

Category	Who it Covers
General Registered Engineer	Engineers holding a recognized Bachelor's degree, registered for general practice.
Professional Engineer	Senior engineers meeting higher experience/qualification criteria, authorized for higher-responsibility work (e.g. design sign-off).
Non-Nepali Registered Engineer	Foreign engineers registered to practice in Nepal, subject to additional requirements (e.g. reciprocity, minimum experience).

Core Functions of NEC

NEC Function	Description
Registration & Licensing	Registers and licenses qualified engineers to legally practice in Nepal.
Conducting Registration Examinations	Runs examinations (like this one) to verify competence before registration — at least 2 examinations are conducted every year.
Accreditation	Accredits engineering education programs/institutions to ensure they meet required standards.
Maintaining the Register	Keeps an official Registration Book/record of all licensed engineers.
Disciplinary Action	Investigates and takes action (including removal from the Registration Book) against professional misconduct.
Policy & Standard-Setting	Prepares policies, plans, and programs for the engineering profession, and sets norms/standards for engineering education.

Functions of the Chairman, Vice-Chairman and Registrar

- **Chairman:** sets the priority/agenda of Council meetings; monitors and evaluates plans and programs of the Council and issues directions; ensures Council business is conducted systematically and effectively; performs other prescribed functions.
- **Vice-Chairman:** performs the Chairman's functions, duties, and powers in the Chairman's absence.
- **Registrar:** appointed by the Government of Nepal through open competition from among persons with at least 10 years' experience after a Bachelor's degree in engineering; serves as Member-Secretary of the Council; can be removed for weak performance or violation of rules; holds office for a 4-year tenure.
- Only **NEC-registered engineers** are legally authorized to practice, sign off, and take professional responsibility for engineering work in Nepal (for regulated categories of work); engineers working in government, private, NGO/INGO, or consultancy roles without NEC registration can face penalties under the Act.

Body	Type	Primary Role
Nepal Engineering Council (NEC)	Statutory regulatory body (Act, 2055)	Registration, licensing, examinations, discipline, accreditation — 21 Councilors.
Nepal Engineers' Association (NEA)	Professional membership body	Advocacy, professional development, technical events; its President and 5 elected engineers also sit on the NEC Council.

Easy Explanation

*Memorize the headline numbers: NEC has **21 total Councilors**; Chairperson needs **15 years'** experience, Vice-Chairperson **10 years'**; every nominated/elected Member's **tenure is 4 years** (Registrar's too); a Council meeting needs **50%** of Members present (quorum); and NEC Rules 2057 splits registered engineers into **3 categories** (General, Professional, Non-Nepali).*

Solved MCQs — Engineering Regulatory Body (NEC)

1. The body responsible for REGISTERING and LICENSING engineers in Nepal is the:

a) Nepal Engineers' Association (NEA)
b) Nepal Engineering Council (NEC)
c) Ministry of Finance
d) Tribhuvan University
✓ Answer: b) Nepal Engineering Council (NEC)
Explanation: NEC is the statutory regulatory body responsible for registration/licensing of engineers in Nepal.

2. The Nepal Engineering Council was established under which Act?

a) Nepal Engineering Council Act, 2055 (1999)
b) Nepal Engineers' Association Act, 2050
c) Nepal Bar Council Act, 2050
d) Civil Service Act, 2049
✓ Answer: a) Nepal Engineering Council Act, 2055 (1999)
Explanation: NEC was formed under the Nepal Engineering Council Act, 2055 (1999 A.D.), sealed on 2055/11/27 B.S.

3. The TOTAL number of Councilors (Members) in the Nepal Engineering Council is:

a) 15
b) 18

c) 21
d) 25
✓ Answer: c) 21
Explanation: As per the NEC Act, 2055, the Council is composed of 21 total Councilors, including the Chairperson, Vice-Chairperson, 18 Members, and the Registrar as Member-Secretary.

4. How many engineers sit on the NEC Council as representatives, one from each of Nepal's 7 provinces?

a) 5
b) 7
c) 9
d) 3
✓ Answer: b) 7
Explanation: One engineer (with at least 7 years' experience) is nominated to represent each of the 7 provinces, including at least 3 women overall.

5. How many Members of the NEC Council are elected by the Nepal Engineers' Association (NEA)?

a) 1
b) 3
c) 5
d) 7
✓ Answer: c) 5
Explanation: The NEA elects 5 engineers as Council Members, in addition to its President sitting as an ex-officio Member.

6. The minimum years of professional experience required for a person to be appointed NEC Chairperson is:

a) 7 years
b) 10 years
c) 15 years
d) 20 years
✓ Answer: c) 15 years
Explanation: The Chairperson must hold a Bachelor's degree in engineering plus at least 15 years of professional experience.

7. The minimum years of professional experience required for the NEC Vice-Chairperson is:

a) 5 years
b) 10 years
c) 15 years
d) None required
✓ Answer: b) 10 years
Explanation: The Vice-Chairperson requires a Bachelor's degree in engineering plus at least 10 years of professional experience.

8. The tenure of office for a nominated or elected Member of the NEC Council is:

a) 2 years
b) 3 years
c) 4 years
d) 5 years
✓ Answer: c) 4 years
Explanation: The NEC Act, 2055 fixes the tenure of nominated/elected Members (and the Registrar) at 4 years, with eligibility for re-nomination/re-election.

9. The minimum quorum required to hold a valid meeting of the NEC Council is:

a) 25% of Members
b) 50% of Members
c) 75% of Members
d) 100% of Members

EASY EXPLANATION

✓ **Answer: b) 50% of Members**

Explanation: At least 50% of the total Members must be present for a Council meeting to proceed.

10. If votes are tied during a Council meeting, the decision is made by:

a) Automatically rejecting the motion

b) The casting vote of the person presiding over the meeting

c) Re-voting indefinitely until a majority forms

d) The Registrar's sole decision

✓ **Answer: b) The casting vote of the person presiding over the meeting**

Explanation: In the event of a tie, the person presiding (usually the Chairman) exercises a casting vote to break it.

11. The Registrar of NEC is appointed by:

a) The NEC Chairman alone

b) The Government of Nepal, through open competition

c) The Nepal Engineers' Association

d) Tribhuvan University

✓ **Answer: b) The Government of Nepal, through open competition**

Explanation: The Government of Nepal appoints the Registrar through open competition, from candidates with at least 10 years' experience after a Bachelor's degree in engineering.

12. NEC Rules, 2057 classifies registered engineers into how many categories?

a) Single category

b) 2 categories

c) 3 categories

d) 4 categories

✓ **Answer: c) 3 categories**

Explanation: NEC Rules, 2057 defines three categories: General Registered Engineer, Professional Engineer, and Non-Nepali Registered Engineer.

13. Which of the following would make a person DISQUALIFIED from being a Member of the NEC Council?

a) Holding a Master's degree

b) Being a non-Nepalese citizen

c) Having more than 15 years of experience

d) Being a woman

✓ **Answer: b) Being a non-Nepalese citizen**

Explanation: The Act disqualifies non-Nepalese citizens, persons removed from the Registration Book, and bankrupt persons from Council membership.

14. If a Council Member's seat becomes vacant before their term ends, the replacement Member serves:

a) A fresh full 4-year term

b) Only the remainder of the original tenure

c) A lifetime term

d) No fixed term at all

✓ **Answer: b) Only the remainder of the original tenure**

Explanation: A mid-term replacement is nominated/elected only to complete the remaining portion of the original 4-year tenure.

15. This NEC Registration Examination itself is conducted under the authority of the:

a) Nepal Engineers' Association

b) Nepal Engineering Council

c) Ministry of Education

d) Local municipality

✓ **Answer: b) Nepal Engineering Council**

Explanation: The Nepal Engineering Council (NEC) is the regulatory body that conducts this registration examination.

EASY EXPLANATION