

EAP

Ch. 1

- E.E. → Get respect from society.
- Can make heaven from hell

Ch. 2

- ↳ To prevent yourself from unnecessary legal hassle (Professional ethics)
- ↳ पेशाको मर्यादालाई सम्मान गर्ने
- ↳ Legal / Illegal ; Ethics / unethic
- ↳ CIAP

Ch. 3

- ↳ To know how engineering is practiced in Nepal.
- ↳ Private Sector: construction companies, consulting firms, NGO/INGOs, etc
- ↳ Public: Government org

Ch. 4

- ↳ To have idea on how to manage contract.
- ↳ दुवै वा दुवैभन्दा बढी व्यक्ति वा समुहले कुनै सम्झौता गर्दै र त्यो सम्झौताले कानुनी मान्यता पाउँछ → contract
- ↳ Contract? ⇒ same as agreement?
- ↳ Methods of work execution? ⇒ Negotiation or Competition?
- ↳ types of contract?
- ↳ Modes of Payment?
- ↳ Steps followed in Tendering procedure
- ↳ How does contract form or Terminate?
- ↳ contract (करार)
- ↳ कुन, हामीले ने गर्दा कुनै agreement मा sign गर्छौं → will it be contract?

If the person signing says
in Adalat 52 एउटा ठोस जवाफ हो भने
it will not get legal based / no कानुनी मान्यता

धुस दिने पकाउ पढे? → सामाजिक but if जरुरतमी गुन कि लोसाके से सम्मानित

Ch. 5 Regulatory Environment

↳ copyright ↳ Trademark

↳ patents

↳ Intellectual property right

अधिकार प्राप्त मानदेसँग permission लेब लिनु पर्छ

↳ एर पढिसकेपछि → NEC or NEA को Member

↳ Must be NEC को Member (licensing)
NEA को जनाउ नि हुन्छ

Labour Act: Weekly → 48hrs only

if excess: overtime
(up to 20hrs)

daily → 8hrs

(with overtime: 12hrs)

Ch. 6

↳ Contemporary Issues in Engineering

Globalization & Cross Cultural Issues

Public Private Partnership

Safety, Risk and Benefit Analysis

Development and Environment

Conflict & Dispute Management

Bid Rigging → Contractor कस गिनेर एकले अर्कोलाई ठेक्का पार्नेलाई
collusion भनिन्छ किन भनेको जोसो ठेक्का पार्ने

↳ Illegal

Ch. 7

↳ Case Studies

Eg. If you are appointed as a Highway Er. and Transferred to Jumla to work as Site Er. of Jumla, Mugu road.

Your Friend — is already there as an Er. in the same project from contractor side, contractor has established a very good camp.

You are looking for the accommodation

Your friend asked you to share his accommodation till you find new one.

What will you do? Why?

→ Not good to stay together:

↳ Many issues:

Locals: सरकारी र contractor को एर सँगै बस्ने भनिन्छ
भैसा साथै contract बिगाले —

↳ Not Her in professional Norms

(मर्यादाबिपर पढेन)

Uptz 100 → प्रकृति शक्ति बनाए रखने
अन्य वेला → contract & tendering

Ch-1

Human, Technology and Society

Q. 2.5 story RCC frame residential building बनाने की कति?

↳ Gen. 5-6 months.

Fastest: 3 D-printed building completes in Dubai in 2 days

(प्रसिद्धि विकास)

Sapiens → ability to think
(A brief History of Mankind) ↳ agricultural advances
↳ inventions of money and writing
↳ trade and communicate better

[Note: चिन्तन शक्ति]

Man → most intelligent creature

↳ uses mind to solve the problem, make the env friendly and achieves benefit that's why diff. from other animals

↳ usually live in group i.e. family

↳ A child in a society, absorbs its values and behaviour way of thought, language after certain value and orientation in the family

↳ Earlier: Man is a Social Animal

Now: Man is a social Networking animal

• Society → Latin word: Socius

companionship or friendship

↳ social relations: work, family, political, Military, Religious, Economic, etc.

• Types of relationships

✓ • voluntary: you choose them eg: friends.

✓ • Involuntary: not chosen eg: people on job, family.

✓ • Family relationships

✓ • Friendship

✓ • Casual relationships: people you do not associate with often but you have formed a small bond

Society: → समुदाय को जालो

Characteristics of society

- ↳ consists of people
- ↳ social relationships
- ↳ Mutual interaction & Mutual awareness
- ↳ depends on likeness
- ↳ rests on differentiation

- ✓ co-operation
- ✓ conflict
- ✓ Society implies interdependence
- ✓ dynamic
- ✓ social control & norms
- ✓ society is abstract
(पवित्रनक्षित)

Theories of origin of society

1. Divine origin theory

- Society is creation of god - Modhu karitra
 - Structure and activity of society is will of god
 - God is guiding & human being is doing acting only.
- * विष्णुले Modhu karitra माझ्यासारं मागे संसारको ~~आ~~ उत्पत्ती जाली.
- खोनामाना → रजत, लोह → पद्मा, मांस → मांस

2. Social contact theory (सहयोग विना २ किनचा नाही)

- Society is planned by human being
- ends with mutual agreement of individuals
- Every man is enemy of other and to protect against evil consequences, man organized himself in society

3. Evolution theory. (Darwin)

- ↳ society is not a make but a growth
- ↳ It is a result of gradual evolution. It is continuous development from unorganized to organized; from less perfect to more perfect and various factors helped in its development from time to time.
- ↳ kinship and family were the earliest bonds uniting men with men

[1.2] Technology and society

- ① Systematic knowledge which facilitates the use of machine and tools
- ↳ transfer knowledge and skills
- ↳ practical application of knowledge that brings change in society.
- ↳ Facilitates society to reach comfortable live.
- ↳ changes lifestyle with its application.
(Internet, mobile phone, computer)

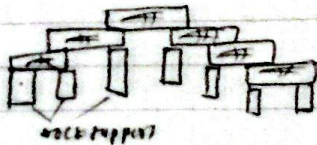
APJ Abdul Kalam : Science leads to technology and the leaders in the society decide how to use that technology. } ②

eg: concrete cutting machine (used in demolition).
↳ only concrete तोड़

Red stone machine

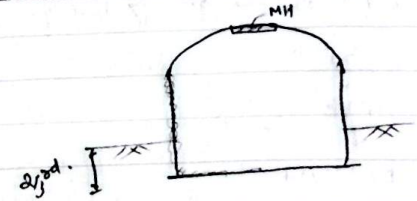
लीडर्स को बुद्धि के special technology } ③
↳ सिर्फी बनाने वाले को बुद्धि

ब्रिडज → काँच के पुल बनाई
first wide river



Ferrocement tank

- ↳ chicken mesh, HDPE all side as formwork, plaster, plaster in both inside & outside
- ↳ strong as RCC
- ↳ cheap
- ↳ UNICEF ने बनाई in Nepal. (upto 20,000 ltr)



AAC block in place of Red Bricks.

AAC → Autoclaved Aerated Concrete

- ↳ Fire resistant, long lasting, lightweight, water resistant... etc

• AAC Block सरकारी Office मा किन use गर्ने मान्दैन?

- ① Estimation according to सरकारी Norms (but जहाँ प्रविधिको अझै Norms हैन)
- ② So, Est. cannot Estimate & contractor cannot use such technology

③ (Norms → मन्त्रालयले पढा गर्नुपर्छ)
(अबन विभाग)

upto 30m → load bearing cheaper than RCC.

Pipes History

HDPE

- ↳ strength upto 100m water pressure
- ↳ 5x cheaper than GI pipe.

Cast Iron → rusty, heavy

↓
GI

↓
PVC

↓
Ductile iron

Payment / Road Maintenance Truck - used in Nepal?

↓
(x) Airport railway rehabilitation by Chinese company

Engineers are those persons who use technology practically. Engineers are:

- For the benefit of mankind
- The civilization
- Organized
- Comfort and convenience.
- Work in society.

Key roles of engineers for development are:

• Creating vision

↳ Thinking of beneficial & useful product for people.

• Preparing mission

↳ make plan, prepare economically for use of large no. of people for their safety and protection.

• Execution

Eng. skills and knowledge for implementation of vision & mission.

• Monitoring & evaluation : Quality, Economy & time.

• Train : new eng. to make professional, practically, technically & professionally.

• Upgrade profession : Innovate, systematic; keep up dignity & ethical values.

✓ planning of building ; ✓ soil investigation ✓ foundation design
✓ structural analysis & design ✓ prepare estimates ✓ invite tenders & select contractor

✓ valuation ✓ work for general welfare

Challenges : climate change Unemployment

Impacts of Technology on society

✓ Industrialization ✓ Urbanization ✓ Modernization ✓ Social institutions
✓ Change in value system ✓ Automation ✓ Technology and war
✓ Means of transport & communication ✓ Mass production ✓ Unemployment
✓ Social class

Social change.

↳ By 'significant' alteration, sociologists mean changes yielding profound social consequences.

↳ Eg: Industrial revolution, the abolition of slavery, and the feminist movement.

↳ Social change is transformation of culture and social institutions over time.

Two types:

1. Exogenous change.

↳ Caused by external agencies.

↳ e.g. colonization, war or settlement.

2. Endogenous

↳ Caused by internal agencies.

↳ e.g. Invention, mutual concern

Eg: Shift from single housing to Apartment

* Factors causing social change.

- ↳ Social Movement - 2007, 2046, 62163, Gen-Z movement
- ↳ Cultural factor
- ↳ Technological
- ↳ Demographic (population ↑)
- ↳ Environmental
- ↳ Education
- ↳ Political change - Govt. change, etc.
- ↳ Economic
- ↳ Biological
- ↳ Ideological

* Theories of social change

1. Conflict Theory

- Conflict b/w social groups.
- Change is a result of such conflicts being played out
- Conflict b/w class determines social change
- Power goes to winning group.
- Social consensus is an illusion. Conflict is inevitable.
- A big picture (Macro world) Theory

Stages of History and class conflict at each stage

Stage	Oppressing class	Oppressed class
① Primitive Communism	No classes	No conflict
② Slavery	Slave owners	Slaves
③ Feudalism	Landowners	Peasants
④ Capitalism	Bourgeoisie	Proletariat
⑤ Socialism	State Managers	Workers
⑥ Communism	No classes	No conflict

(eg. Belly-button pants)

2. Cyclical Theory

- It focuses on the rise and fall of civilizations attempting to discover and account for these patterns of growth and decay
- Toynbee and Spengler can be regarded as champions of this theory.
- Every society undergoes a phenomenon of cyclical change
- Each civilization is like a biological organism and has a similar life-cycle, birth, maturity, old-age and death. After making a study of eight major civilizations including the west he said that the modern western society is in the last stage i.e. old age

3. Functionalist social theory

- Functionalism views society as a social system of interconnected parts - a bit like a human body with each part of the body depending on the other to 'function'.
- In same way, the body needs the heart, lungs, and brain to work together for the body to survive.
- Instead of heart and lungs, society has social institutions like schools, families and the police that work together so the social body can survive.

✓ Imbalance in any part of the system, changes the society

✓ Each aspect of society depends on each other and each contributes to the overall stability and functioning of that society.

Government ↔ economy ↔ education ↔ family ↔ media ↔ religion?

→ Compensate after time extension.

Building innovations in Civil Engineering:

- ✓ (i) Self-healing concrete:
- ✓ (ii) Thermal bridging
 - ↳ efficient insulation material is becoming increasingly important throughout the construction industry
- ✓ (iii) Photo voltaic glaze
 - ↳ turning building envelope into solar panel
- ✓ (iv) Kinetic Foot fall
 - ↳ enable flooring to harness the energy of footsteps
- ✓ (v) Kinetic roads
 - ↳ convert KE produced by moving vehicle into electrical energy.
- ✓ (vi) Predictive software (Blender software)
- ✓ (vii) 3D Modelling
- ✓ (viii) Modular Construction
- ✓ (ix) Cloud collaboration (remote sharing of data on construction site in real time)
- ✓ (x) Asset mapping
 - ↳ collecting data from serial number, firmware, engineering notes of when it was installed and by whom, and combine all data in one place

Society

- ✓ Group of people (collection of individual)
- ✓ - sharing common territory / boundary of a country
- ✓ - " " law / regulation (government)
- ✓ - " " culture / belief / value.
- ✓ - considered as a stable institution
- A formal association of people with similar interests
- The state of being with someone.

Elements of society

• Plurality

(Male / Female / Young / Old)

• Differences

(opinion / gender / interest)

• Dynamic

(changeability / interest quality)

• Interdependence

(like mother & baby)

• Cooperation

(like in family & friendship)

• Ukenew (Blood / nationality)

• Mutual understanding / interaction / awareness

• Social control / stability

• Culture (traditions, activities, values)

Social structural social needs

For the survival, every society must address some fundamental needs.

On this regard, Talcott Parsons (American sociologist) identified six basic fundamental social needs.

- (1) Organizing the activities to obtain basic goods & services - food/clothing/shelter/fuel/water
- (2) Protection of members from external & internal threat
- (3) Replacement of members lost by death & immigration
- (4) Transmission of knowledge to new members - regarding: rights/obligation/responsibility/expectation
- (5) Motivation to both new & continuing members to fulfill their responsibility & conform to expected behaviour
- (6) Development of mechanism for solving conflicts

Social institutions

- Five basic institutions
- Each institution is intended to address one or more of the basic needs determining society's survival
- Institutions may even provoke or exacerbate systemic inequalities b/w groups within society

(1) The family

- Manifest function: contribute new members
- teaches new members ; motivate

(2) The Religion

- motivate members to comply with their responsibilities and obligations

(3) The Economy

The purpose of economic institutions (corporations, organized markets, banking community, international trade associations, labor unions, and consumer organizations) is primarily to produce and distribute goods and services throughout society.

(4) Education

transmit the skills that all young members of society need to become productive members of the economy as adults

(5) The State (Politics, Welfare, Art & Leisure)

- ↳ protect society's members
- ↳ establish penal and codes to formally define standards of acceptable and unacceptable behaviours, responsibilities and obligations
- ↳ aid the economy

Types of societies
(Depending on the technology they adopted exploit the natural environment)

(1) Tribal societies

- ↳ From 2 million to thousands years before
- ↳ lived as hunter & gatherers / no permanent settlements / needed several hundred sq. miles of territory / constantly on the move for new food supply / used to take food directly from environment rather than maintaining gardens.
- ↳ Family only defined institution.

(2) Pastoral societies

- ↳ Ten to twelve thousand years before
- categorized by domestication of herds of animals
- found in mountainous region and in areas with insufficient rainfall ↳ Slavery is more common
- ↳ Family & religion

(3) Neolithic societies

- ↳ b/w 13000 to 7000 B.C.
- ↳ Produce food by gardening (domestication of plants) / cultivate manually / occurred due to large decline in of animals ↳ Slavery is fairly common
- ↳ Family, Economy & Religion

(4) Agricultural (Agrarian) societies

- ↳ 6000 years ago
- ↳ Plow was invented / maintained fertility of soil by turning top soil using plow / first society to develop city / permanent settlements / trade elaborated
- ↳ All social institutions

(5) Industrial societies

- ↳ 280 years before
- ↳ Use of machines rather than animals including human / planet's first industrial society was England / majority of people live in urban areas rather than rural settings
- ↳ All social institutions

Community

- Community is a cluster of people living with a narrow territorial radius, who share a common way of life.
- Man cannot live in isolation.
- Man is linked in many ways to his fellow in many ways who form a group.

Elements

1. Group of people sharing the common feeling & basic condition of a common life.
2. Residing in a definite locality / territorial area.
3. Feeling of community sentiment.
4. Permanent nature (unlike crowd).
5. Emergence is quite natural.
6. Likelihood in language and customs.
7. Ends and objectives of community are wider and natural.
8. No legal status.
9. Specific & particular name.

8. Concrete: group of people living in a particular area. We can see this group's local existence.

#

Community

1. Popⁿ is very essential for the form of community.

2. Same locality or area.

3. scope: narrow & localized homogenous group.

4. Came after society.

5. common objectives are locally coordinated.

6. Members are supposed to obey the commands and thus they have less chances of personal development.

7. Interrelation more imp.

Based on (Socioeconomic development) of society, societies of world have been grouped into three categories.

1. First world: industrialized, stable and developed.

North America, Western Europe, Australia, Japan, Singapore, etc.

2. Second world: ~~less~~ less industrialized and developed.

Eastern Europe, Malasia, etc.

3. Third world: less industrialized and underdeveloped.

Nepal, Bangladesh, etc.

8. Abstract: network of social relationships which cannot be seen or touched.

Society

1. Popⁿ is essential but more imp. to members should have feeling of oneness as well.

2. No area people living far off area can form a society.

3. wide scope heterogeneous character.

4. Came prior to community.

5. Closely coordinated.

6. Mix

7. Involves both likeness & difference.

#

Eastern

1. Respect for the hierarchy is inherent
2. Open debate and confrontation are avoided
3. Collectivistic. Duty towards others is highly regarded. Success is measured collectively.
4. Success is conquering yourself. Success is spiritual.
5. Silent leadership. Walk behind people.

Western

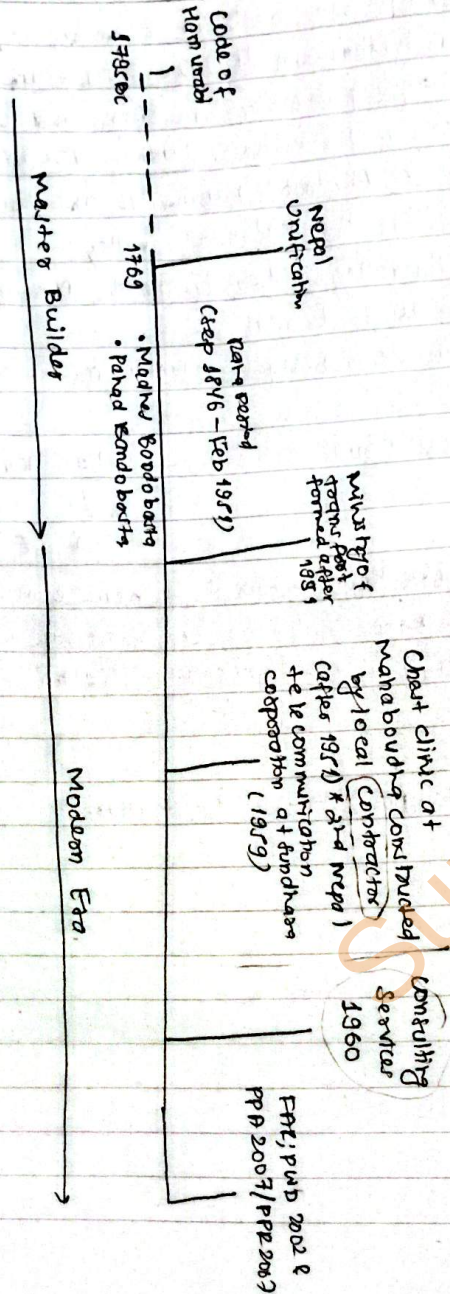
Respect is earned.
encouraged

- Individualistic. Following personal desires and dreams is valued. Success is measured individually. Success is conquering your goals. Success is material. Vocal leadership. Walk in front of people.

Engineering Practices in Nepal

- The first attempt was made in name of 'Banarune Adda' or construction bureau, in 1769 just after unification of Nepal. It maintained royal palace, gov. buildings and undertook new construction.
- In this period, there was 'Madhu Pahal Bandobasta' whose office was at Bhadatali, Kathmandu. This looked after construction works outside the Kathmandu valley.
- Inside Ktm valley: 'Sardar Public Nigam Adda' or Central Public Works Bureau.
- 1934, 'Jana Sewa Bibhag' or Public Service Depart. → for 'civil work, & municipality work.'
- Rana regime: road office named 'Bato Kaj Goshwara' / 'Chhem Bhadel Adda' for construction & maintenance of CE work.
- "Naya Bato Kaj Goshwara" → new const'n
"Purano Bato Goshwara" → maintenance work
] ^{later} merged → Public Works Department (PWD)
- ~~Para~~ Army unit: "Samarjung Gulma" → carry out maintenance under "Purano Bato Goshwara".
- Chovar Steel Bridge → first CE structure.

Historical Development



Code of Hammurabi

↳ earliest known example of construction law & engineering regulation setting strict "lex talionis" (retributive)

Diagnosing for structural failures

Law 299: If a builder constructs a house that falls in and kills the owner, the builder is put to death.

Law 230: If the collapse kills the owner's son, the builder's son is put to death.

Law 232: If house damages property the builder must replace it & rebuild the structure at their own expense.

Law 233: If a builder constructs a house that topples, they must make it solid at their own expense.

Kul Ratna Tuladhare

↳ first chief engineer of Nepal's public works department.

#Shanti Malla: First woman engineer of Nepal

Silt consultants Pvt. Ltd.

↳ First nepalase privately registered firm specialised in geo-technical investigation.

- A first structure → iron bridge over Bagmati river (1850)

First public water supply system was laid in Ktm valley during 1888-90.

Man and Society

Man → most intelligent creature; uses mind; lives in group; absorbs social values and behaviour, way of thought, language.

'Socius' → companionship or friendship

Ch 2

• Priority in Taking Decision

1. Society - do not make any decision which harms the society's people.
2. If it does not harm society, do not make decision which harms your profession.
3. Do not make decision which harms your organization.
4. Least priority should be given to your personal interest.

Profession → requires degree or completed studies at a university or other institution of higher education.

Occupation → job you are paid to do / way you earn a living / activity that occupies your time and from which you receive money for doing it.

A profession is defined as having a

- ✓ systematic knowledge (acq. thr. specialized research, training or education)
- ✓ Recognized by public as such (licensing)
- ✓ Maintaining ethical standards (follow code of conduct/ethics)

Professional institutions

↳ Societies and associations which develop and promote a career and people who practice it.

Pole:

- ✓ Regulation of the practice of the profession
- ✓ Licensing
- ✓ Guiding for new entrants in to the profession.
- ✓ Advise and assist to Engineering colleges.
- ✓ Upgrading and maintaining the competency
- ✓ Providing technical assistance
- ✓ Safety and welfare of public

NEC

↳ Established in 1999 (2056 BS) by the promulgation of Nepal Engineering Council act, 1999 (first amendment, 2022) for promoting the engineering profession.

★ Scope

✓ Licensing or registration of Engineer

- Accreditation of certificate of academic qualification
- Recognition of academic institutions
- Produce and monitor the professional code of conduct.

Objective

make engineering profession effective by mobilizing it in a more systematic & scientific and also register the engineers as per their qualification

Duties and responsibilities (NEC)

- ✓ Policies, plans, and programs (for eng. profession)
- ✓ Norms and standards for engineering education
- ✓ Grant permission and approval to carry out eng. education to
eng. colleges
- ✓ Monitor & inspect quality of eng. education
- ✓ Fix the qualification necessary to register their name in
the council to practice eng. profession
- ✓ To remove their name from registration of eng. council if
found to violate the code of ethics

Professional code of conduct by NEC

(a) Discipline and honesty

↳ do not contrary with professional dignity & integrity

(b) Courtesy and Confidentiality

(Courtesy) (in professional information)

(c) Non-discrimination

(religion, race, gender, and caste or any other matter)

(d) Should only do ^{related} professional work

(e) Do not do things that are harmful to engineering business

(f) Personal responsibility (for every work you do)

(g) Name, position, and registration no. need to be disclosed

(while signing documents & details related to Eng. business)

(h) Do not promote and advertise in a way that causes unnecessary

influence (the customer/client)

(i) Not be made to work on the basis of bad debt

(j) Not be performed any work with negligence and recklessness

(k) False or fake report or reports that are different from fact should not be prepared or recommended during any examination

The name of engineer shall not be removed from register book except in following cases:

- ✓ 1. Mentally ill
- ✓ 2. Bankrupt
- ✓ 3. Violated specified professional conduct and reported to
NEC to remove name from register book and if decided
by 2/3rd majority
- ✓ 4. If the court provided the ex. guilty in public code on moral
ground
- ✓ 5. By mistake or mischievous if anybody who basic
qualification have been registered

Registration in council

Acc to Council Act, section-2

A - General Registered Engineers.

B - Professional

C - Non-Nepalese (Foreign) Registered Engineers

Registration Regs (Submitted online and printed copies at NEC office)

↳ Application with approved format

↳ Copies of certificate of academic qualification

Notarized copy of { SEE - mark sheet; character certificate

10+2 - transcript; character certificate

Bachelor - transcript; character certificate (showing duration of study); Provisional certificate

↳ Registration fees. (Rs. 2500)

{ Equivalence certificate from an authorized

agency of Nepal gov. for students who

studied abroad for SEE 10+2, or bachelor

↳ Other relevant documents.

Nepalese citizenship certificate (Notarized copy), PP. Photo

Professional Engineer (PEng) title for Senior Experience Route Applicants

- ✓ started after 2018
- ✓ for En. registered in General category, with a Master's degree in Engineering, and seven (7) years or more professional experience after Master's degree

Disciplinary Action (Pride Ch. 2)

NEA

Relationship of en. prof. to en., clients & contractor

- ✓ Strict professional relationship. (even if closely familiar)
- ✓ NO discrimination
- ✓ Not expect extra favor
- ✓ Keep information confidential
- ✓ Warn potential risks of decision/action
- ✓ Going beyond T&C, when professionally required

Client

- ✓ Work in the best interest of client with loyalty with legal limits
- ✓ Deliver in time & quality
- ✓ An. en. shall not accept financial or other compensation from more than one party for service rendered on one project unless the details are fully disclosed and agreed by all parties
- ✓ Supervise work & prevent misuse
- ✓ Assist in decision making
- ✓ Not take a client for granted

Contractor

- ✓ provide due respect
- ✓ provide all detailed drawings, quantity and quality (including specifications) of work to contractor in time
- ✓ check and approve running bill
- ✓ prevent use of sub-standard materials
- ✓ Participate in co-decision making
- ✓ Assist the contractor

Why people behave unethically

1. Inadequate salary
2. Defective social norms or values
3. Low moral of the individual
4. Non-regulation of law and regulation
5. Lack of political commitment

Morals

- our own principles
- personal rule of right & wrong, (derived from a person's upbringing, religious beliefs)

Ethics

- created a social system
- provide us with a code or system of rules defining moral behavior of particular society

Imp. of code of Ethics

- ✓ Protection of public safety and welfare
- ✓ Guidance in ethical decision-making
- ✓ Maintains professional integrity
- ✓ Builds public trust
- ✓ Ensures accountability & responsibility
- ✓ Prevents corruption & unethical practices
- ✓ Standardizes professional behavior
- ✓ Legal & professional protection
- ✓ Strengthens the profession
- ✓ Promotes sustainable development

Case studies.

- (i) tripartite meeting
- (ii) Identify suitable works
- (iii) Sub-contracts are formalized in writing (clear scope, specifications, quality standards, timelines and payment terms).
 - ~ balancing project progress with community stakeholder interests,
 - ~ structured, documented approach.

- (i) Review contract specification → (Deviation? → contractual variation)
- (ii) Consult client/employer before approving → (unilateral approval exposes to professional liability)

- (iii) Assess technical implications.

- (iv) written site instruction or VO.

- ~ consulting ex. → bound to contract
- ~ speed matters but process protects everyone.
- ~ Deviations require formal VO from client.

- (i) Gross negligence & potentially criminal conduct
- (ii) Breach of engineering ethics
- (iii) Never compromise professional judgement for monetary gain.

- (i) Before accepting or rejecting → Moral duty to understand full situation
- (ii) Firing if for legitimate professional reasons (misconduct, incompetence, redundancy) → no problem.

Firing → to have offer for lower cost; favoritism → ? ethically questionable
~ must act with integrity and fairness in all professional dealing.

clear statement
↓
practical steps
↓
legal justification
↓
state ethical principle

- ① Professional middle path: transparency, initiative & seeking mentorship.
✓ Not pretend confidence you don't have ✓ not refuse task.
✓ Fabricating or guessing quantities or running bills is fraudulent and creates legal liability
✓ Engineering ethics demand honesty and continuous learning.

- ① Writing false statement → fraud & professional misconduct.
If client or any auditor later discovers the truth → blacklisting, legal action, loss of professional registration.
✓ Integrity & honesty.

- ① Bid rigging → illegal under Nepal's Public Procurement act & CIPA regulations.

- ✓ violates fair competition in tendering.
 - ✓ maintain confidentiality
 - ✓ 'Following orders' is not a legal or ethical defense.
- My professional license, integrity and freedom are at stake.

- ① Accepting any personal benefit → conflict of interest and constitute bribery under Nepal's anti-corruption laws.
✓ Approval decision must be based on technical merit.

- ① Legal duty of care to all visitors and workers under occupational health and safety laws.
✓ Main contractor - liable for failing to enforce safety protocols.
✓ Personal negligence - contributory negligence but it does not eliminate the sub-contractor's liability.

- ① Instructing contractor to sub-contract relative → COI and a breach of professional duty.

- ✓ violates eng. ethics on fairness, independence & integrity.
- ✓ Stop defective work immediately & issue a formal non-conformance notice.
- ✓ Report issue to contractor & client.
- ✓ Quality and public safety cannot be compromised for family loyalty.
- ✓ ethical path is costly but necessary.

- ① vicarious liability - legal doctrine that an employer is responsible for the negligent act of employee committed in the course of employment.

- ✓ contract was with firm, not with employee personally (so, victim should sue the consulting firm)
- ✓ Firms should establish proper design review procedure so that one engineer's error doesn't pass unchecked.

NEA को Member बनाने के के प्रक्रिया पूराबुद्ध?

⇒ Educational certificate (BE, +2, SEE) - Transcript
Citizenship copy, photo
& online form भरने.

NEC को Member नीचे

⇒
• BE completion certificate
• Form with 2 people साक्षी होंगे
• Fee submission

NEC को Member बनाने का जरे किस संजम पाउंड?
→

NEC
→ License देने (class A Professional; निरर्थक Eo.)
(class B)
→ Recognition of academic institution (to give NEC membership)
→ Produce & Monitor code of conduct
② If code of ethics violate → membership may be cancelled
→ Professional code of conduct (2)

NEA → Eo. को ककुवितको जाली काम जने।

↳ professional training to fresh Eo.
↳ Training of different essential softwares
↳ Internship for real world problem.

Bridge construction

1. Need identification & Planning stage

1.1. Identification of need

- ↳ connectivity problem

- ↳ Economic & social importance

Responsible bodies: DoR, Local Government, Ministry of physical Infrastructure & Transport (MoPIT)

2. Land selection & Feasibility study

- ↳ River width & alignment

- ↳ Geological & Hydrological condition

- ↳ Accessibility

Feasibility

- ↳ Topographic survey

- ↳ Geological & geotechnical investigation (borehole, SPT)

- ↳ Hydrological study (HFL, LWL, scour depth)

- ↳ Preliminary bridge type selection

Approval authority: DoR, Local Governments, Donors

3. Legal & Paper works

3.1. Land acquisition

- ↳ Land Acquisition Act, 1934 (1977)

- ↳ compensation determined by District Compensation Committee

- ↳ public notice published

- ↳ ROW clearance.

3.2. Environmental Clearance

- IEE
- EIA $\rightarrow$ as per Environment Protection Act, 2076
- Approved by Ministry of Forests & Environment

3.3 Other Approvals

- Local government consent
- Utility shifting approvals (NEA, water supply, Telecom)
- Tree cutting permit

4. Detailed Survey & Design

4.1. Detailed Survey

- $\rightarrow$ Detailed topographic survey & Hydraulic modeling
- $\rightarrow$ seismic Hazard analysis (NBC seismic provisions)

4.2 Structural Design

- $\rightarrow$ Bridge type finalization
- $\rightarrow$ Load considerations:
 - IRC / AASHTO / Nepal Bridge standards
 - Seismic zone (Zone factor of Nepal)
 - Wind & Temperature effect
- $\rightarrow$ Foundation design
- $\rightarrow$ Drawings & BOB preparation

Design approval: DoR Bridge Branch / Consulting Engineers

5. Tendering & Contract Award

5.1 Tender Process

- $\rightarrow$ Tender notice published (PPMD portal)
- $\rightarrow$ Bid submission (Technical + Financial)
- $\rightarrow$ Evaluation based on Public Procurement Act, 2063
- $\rightarrow$ Lowest Evaluated responsive bidder selected.

5.2 Contract signing

6. Construction Phase

6.1. Mobilization

- $\rightarrow$ Site office setup $\rightarrow$ Contractor mobilization
- $\rightarrow$ Material testing laboratory setup

6.2 Foundation Works

- $\rightarrow$ Cofferdam construction
- $\rightarrow$ Excavation $\rightarrow$ Pile or well foundation
- $\rightarrow$ concreting & curing

6.3 Substructure works

- $\rightarrow$ Abutments $\rightarrow$ Pier $\rightarrow$ Pier caps $\rightarrow$ Bearings installation

6.4 Superstructure works

- $\rightarrow$ Girders / truss $\rightarrow$ Deck slab $\rightarrow$ Expansion joints
- $\rightarrow$ Parapet & railings

6.5. Ancillary works

- $\rightarrow$ Approach road $\rightarrow$ Drainage $\rightarrow$ River training works $\rightarrow$ slope protection
- $\rightarrow$ Asphalt & or wearing coat

6.6 Quality control

- Material testing (concrete, steel)
- cube tests → load test → supervision by consultant

7. Inspection, Testing & completion

7.1. Final inspection

- ↳ by client, contractor and consultant
- Rectification of defects.

7.2. Load Testing

- static or dynamic load testing
- structural performance verification

8. Handover and operation

8.1. Provisional Handover

- completion certificate issued
- Bridge opened for traffic
- Defects liability period (usually 1 year)

8.2. Final Handover

- After DLP completion
- Final payment released
- Bridge officially handed over to authority.

9. Operation & Maintenance (Post-construction)

- Routine Inspection
- Periodic maintenance
- Emergency repair planning

Gwarako Overpass/Flyover/Grade Separating Intersection

(Cause of delay)

- 1st project of such type (lots of testing required)
- 1st project to use EPC model (Engineering Procurement Construction)
- Design fault:

Delay of 5-6 months

Design: Pile foundation, 34m depth & 1.5m dia with temporary casing
(Equipment for providing temporary casing was not found)
Equipment of lesser capacity was found. So,
Design change: 30m depth & 1.2m dia pile foundation

- Difference in quality of soil in different places (Additional ground improvement required)
- Transfer of Government workers involved in this project
- Late approvals from Government Engineers
- Delay in filling during rainy season.

1. Society, Technology & social change.

(Q.1) Define social change. What are the major factors bringing social changes in a society?

- Social change refers to the alteration in the social order of a society - changes in human interactions, relationships, cultural norms, and institutional structures over time.
- It involves transformation in the values, norms, behaviour, and organizations that constitute a society.

Major factors:

- Technology: Inventions like internet, mobile phones, and AI have drastically changed communication, work patterns, and lifestyles.
- Education: Spread of education raises awareness, promotes equality, and challenges traditional values.
- Economic factors: Industrialization, capitalism, and globalization shift social structures and class relations.
- Cultural diffusion: Exchange of ideas b/w societies (eg. Western influence on Nepal) changes customs and values.
- Political factors: Revolutions, laws, and government policies reshape social institutions (eg. Nepal's transition to federalism).
- Natural Environment: Natural disasters, climate change, and resource availability force societies to adapt.
- Population change: Migration, urbanization and demographic shifts alter community structures.
- Religious and Ideological Movements: Changes in spiritual beliefs and ideologies influence social behaviour.



(Q2) Explain the various theories of social change with examples:

• Evolutionary Theory:

↳ prepared by Herbert Spencer

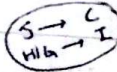
↳ Society evolves from simple to complex form over time

↳ (eg Hunter-gatherer to industrial society)

↳ Assumption based on anthropological / historical evidence

↳ Influence of Charles Darwin's organic evolution

↳ Evolutionary process implies that societies would necessarily reach new & high level of civilization



• Cyclical Theory:

(13)

↳ Societies rise and fall in cycles

↳ Eg. Spengler's theory of civilization growing old and dying

↳ Assumes each civilization is like a biological organism and has a similar life-cycle: birth, maturity, old age & death

↳ Focus on the rise & fall of civilization attempting to discover & account these patterns of growth & decay

↳ Each society faces challenges at first from environment, internal enemies / external enemies

• Functionalist theory:

(14)

↳ Changes occur to maintain social equilibrium

↳ When one part of society changes, others adjust to restore balance

↳ Assumes that society consist of interdependent parts, each of which helps to maintain the stability of the entire social system

- social change occurs when internal or external strain such as unemployment or war throw the system out of balance

• Conflict Theory (Marxist)

↳ Social changes arise from conflict b/w classes existing in society

↳ Eg. Worker's movements leading to labor law reforms

↳ Peoples war caused major political / social change

↳ Developed by Karl Marx and later developed by sociologists

↳ Different classes of different interests

↳ Classes are fundamentally on the economy based

↳ The form of society can be defined as socialist / slave / feudal / capitalist / communist

• Modernization Theory:

↳ Traditional society modernize by adopting western economic and social practices

✓ Most applicable: Conflict-Theory - Nepal's political revolution (2006 BS, 2062/2063 BS, 2082 - Gen Z revolution) show change driven by conflict b/w oppressed and ruling classes

(Q3) Describe the impact of technology (ICT/AI) on Nepalese society

Positive impacts

• E-governance:

~~Online~~ Online services like Nagarik app, Land Revenue portal reduce corruption and save time.

• Education:

Online learning platforms expanded during COVID-19 reaching remote areas

• Communication:

Mobile networks and Internet connect remote villages with urban centers

• Economic growth:

- ✓ E-commerce, digital banking (eSewa, Khalti) have formalized transactions.
- ✓ Remittance transfers via mobile banking.

• Healthcare:

Telemedicine and health apps have improved access to medical advice.

• Trust:

↳ Promotion through social media.

Negative impacts:

• Digital Divide:

↳ Rural-urban gap in internet access creates inequality.

• Unemployment:

↳ Automation threatens traditional jobs.

• Social Issues:

↳ Cybercrime, addiction to social media, misinformation spread.

• Cultural Erosion:

↳ Western digital culture displaces traditional Nepali values.

(Q) How does individual freedom balance with societal goals?

→ Individual freedom:

Rights of a person to act, think, and live according to personal choice - guaranteed by Nepal's constitution 2015.

(Article 17: Right to Freedom; Article 18: Right to Equality)

• Societal goals:

collective objectives: equality, development, security, environmental sustainability, and social harmony.

• The conflict: Individual freedom (eg. right to property, expression) can clash with societal goals (eg. land reform, censorship for social harmony, environmental regulation)

• Balancing Mechanisms:

- ✓ Constitutional provisions: Nepal's constitution guarantees fundamental rights but allow reasonable restrictions for public interest.
- ✓ Rule of law: Legal systems mediate between personal freedom and public welfare.
- ✓ Social Responsibility: Citizens, including engineers, must balance self-interest with public good.
- ✓ Democratic process: Policy-making through participatory governance reconciles diverging interests.

2. Engineering Profession, Ethics & Moral.

(Q1) Define professionalism and describe its key characteristics.

→ Specialized knowledge
→ Code of ethics
→ Accountability
→ Autonomy
→ Commitment to public interest
→ Self-regulation
→ Professional reputation, integrity
→ CPD

→ Professionalism refers to the conduct, aims, or qualities that characterize a profession or a professional person.

It encompasses the skills, competencies, ethical behaviors, and standards expected of an individual in their professional role.

Key characteristics:

• Specialized knowledge:

↳ Mastery of technical skills acquired through formal education and experience.

• Code of ethics:

Adherence to a defined set of ethical principles that guide professional behaviour.

• Accountability:

Taking responsibility for one's professional actions & decisions.

• Commitment to public interest:

Placing public safety, health, and welfare above personal gain.

• Autonomy:

Ability to exercise independent judgement within one's area of expertise.

• Self-regulation:

Professional bodies (NEA, NEC) regulate members and enforce standards.

• Continuous Learning:

Commitment to keeping knowledge up-to-date through

CPD (Continuing Professional Development)

• Professional integrity:

Honesty, transparency, and avoidance of conflict of interest.

- Public safety
- Trust
- Accountability
- Prevention of misconduct
- Professional dignity
- Legal compliance

Q1) Define Ethic. Why is it necessary for engineers to follow a code of conduct?

→ Ethic is a branch of philosophy that deals with questions about right and wrong conduct, moral principles, and values that guide human behaviour.

In engineering, ethic refers to the moral principles and professional standards that govern engineer's actions.

Why code of conduct is necessary

• Public safety

↳ Engineers design structures and systems that affect public life. Ethical practice ensures these are safe.

• Trust

↳ Clients, employers and public trust engineers to act honestly.

A code of conduct maintains this trust.

• Accountability

↳ A defined code makes engineers answerable to their professional decisions.

• Prevention of misconduct

↳ Clear guidelines prevent bribery, negligence, and fraudulent practices.

• Professional dignity

↳ Ethical standards maintain the reputation and status of the engineering profession.

• Legal compliance

↳ The NEC act 2005 requires licensed engineers to follow professional ethics.

Q3) Define negligence, tort and liability with examples

→ Negligence

Failure to exercise the care that a reasonably prudent person would exercise under similar circumstances, resulting in harm to another

⊗ Eg: An engineer designs a building without proper soil investigation and building cracks - this is professional negligence

Tort:

A civil wrong (other than breach of contract) that causes harm or loss to another person, for which the victim can seek compensation.

⊗ Eg: If an engineer's negligent design causes injury to an occupant, the engineer commits a tort.

Liability:

The legal responsibility of a person or organization to compensate for harm or damage caused. Two types:

⊗ Civil liability: Monetary compensation to the injured party.

⊗ Criminal liability: Prosecution by the state for criminal negligence causing death or serious harm.

A tort is vicarious liability

⊗ Elements of Negligence (to prove all four)

- Duty of care:
The Pt. had a professional duty towards the injured party.
- Breach of duty: (Standard)
The Pt. failed to meet the required standard of care.
- Causation:
The breach directly caused the harm.
- Damage:
Actual loss or harm was suffered.

#	Feature	Tort	Vicarious Liability
1	What it is	A civil wrong causing harm	A rule assigning liability to an employer.
2	Who is liable?	The person who did the wrong	The employer, for their employee's wrong
3	Requires personal fault?	Yes - the tortfeasor must have done smt. wrong.	No - the employer may have done nothing wrong at all.
4	Basis	Duty of care + breach + damage	Employment relationship + act within scope of employment
5	Remedy	Compensation (damages) to the victim.	Same - but paid by the employer.
6	Can both happen?	Yes - tort is the underlying wrong; vicarious liability shifts who pays.	Yes - they work together, but not against each other.

Utilitarian → greatest good for greatest no.
 Eternal → natural scriptures, as you like others to do to you.
 Universalism → good means same, there is no change.
 Distributive Justice → justice equal for all.
 Personal liberty →

Q4) Define Moral Dilemma. What are the fundamental laws to overcome it?

→ Moral dilemma is a situation where a person faces a choice between two or more actions each of which involves conflicting moral principles, and there is no clear right answer.

Eg: An Engr discovers a safety flaw in a project but reporting it may cause his employer financial loss and risk his own job.

Fundamental laws/methods to overcome Moral Dilemma:

• Utilitarian Approach.

① Choose the action that produces the greatest good for the greatest number.

↳ greatest benefit for largest no. of people.

② Promotes idea of maximizing happiness and minimizing suffering for greatest no. of people.

• Kantian (Deontological) Approach

① Follow your moral duty regardless of consequences.

↳ Act only according to principles you'd want to be universal laws.

• Rights-based approach:

↳ Protect the fundamental rights of all parties involved.

• Virtue Ethics:

↳ Ask what a person of good character would do in this situation.

• Golden Rule:

↳ Treat others as you would wish to be treated.

• Professional code:

Refer to NEC's code of conduct for specific professional guidance.

> Eternal law of ethics

↳ based on nature & scriptures.

① Do unto others as you would have others do unto you.

↳ Do not harm others unjustly.

② Utilitarian

> Universalism

↳ based upon the motive or intent of doer.

↳ professional must have good motive behind their doing.

> Distributive justice

↳ based upon the primacy of justice equal to all.

↳ universal laws apply to all people.

↳ outgrowth of equality.

> Personal liberty

↳ based on personal liberty.

↳ any act which violates anybody's personal liberty even if the act creates greater benefit for the larger number of people is not accepted.

Accountability
Transparency
Security/Privacy
Safety
Bias & Fairness
Job displacement
Professional competence

(9.5) Discuss the ethical considerations related to the use of AI in engineering.

As AI becomes increasingly integrated into engineering design, monitoring, and decision-making, the following ethical concerns arise:

• Accountability:

When an AI system makes an engineering design decision, it is unclear who is responsible - the engineer, the software developer, or the client.

• Bias and Fairness:

AI algorithms trained on biased data can produce discriminatory outcomes in infrastructure planning (e.g., prioritizing wealthy neighborhoods).

• Transparency:

AI decision making processes are often opaque (black box), making it difficult for engineers to explain or verify results.

• Safety:

↳ Over-reliance on AI without human review risks safety failures especially in structural engineering.

• Privacy:

↳ AI systems used in smart buildings or cities may collect personal data without consent.

• Job displacement:

↳ AI automation threatens to displace engineering technicians and drafters.

• Professional competence:

Engineers must maintain sufficient knowledge to critically assess AI outputs - they cannot simply trust algorithmic results blindly.

✓ Engineers should use AI as a tool while maintaining professional judgement, accountability, and transparency.

3. NEA & NEC

(9) Diff. NEA & NEC

Basic	NEA	NEC
Nature	Voluntary professional association of engineers.	Statutory body established by NEC Act 2055.
Purpose	Promote professional development, welfare of engineers.	Regulate and license engineering professionals.
Membership	Any graduate engineer can join voluntarily.	All practicing engineers must register (mandatory).
Power	No legal authority to punish.	Can cancel licenses, take legal action.
Power	Advocacy, training, seminars, welfare.	Registration, licensing, quality control.
Head	Elected president from members.	Government-appointed council.
Funding	by membership fees.	by registration fees and government.
Roles	Advocacy, capacity building, professional networking, scholarship program, promoting engineering culture in Nepal.	Maintain E register, set qualification standards, investigate misconduct, enforce code of ethics, determine fee structures.

Mandatory licensing
Code of conduct
Disciplinary action
Quality assurance
Public complaints

(Q2) How does the Nepal Engineering Council act contribute to public safety?

• Mandatory Licensing

Only registered engineers with a valid license can practice engineering, ensuring minimum competency.

• Code of conduct

NEC prescribes ethical standards engineers must follow protecting clients and the public.

• Disciplinary action

NEC can suspend or revoke licenses of engineers who act negligently or unethically.

② • Continuing Professional Development

Engineers must update their skills to retain licensure.

• Quality Assurance

NEC sets standards for engineering education and practice, improving overall quality.

• Public complaints

The public can file complaints against engineers who violate professional standards.

→ Code of conduct (NEC later)

Financial pressure
Organizational pressure
Fear of job loss
Conflict of interest
Weak enforcement
Ignorance

(Q3) Why do engineers behave unethically? Role of NEC to control unethical behavior

→ Reasons

① Financial pressure: Bribery, kickbacks & corruption for personal gain

② Organizational pressure: Supervisors demanding approval of substandard work to meet deadlines

③ Ignorance: Lack of awareness of professional ethics codes

④ Conflicts of Interest: Personal financial stakes in outcome

⑤ Fear of Job loss: Whistle blowing perceived as career risk

⑥ Weak Enforcement: Insufficient legal and professional accountability mechanisms

Role of NEC:

✓ Only registered eng. may legally practice

✓ Investigate complaints of professional misconduct

✓ Suspend or cancel registration for unethical acts

✓ Issue and enforce codes of ethics for eng. practice

✓ Promote continuing professional development (CPD) and ethical training

✓ Collaborate with govt to enforce eng. standards and public safety

Mandatory mentorship program
CPD
Internship & practical exposure
Technical training
Soft Skill Development

Research and publication
Job placement
Ethical awareness
Site visits & etc.

(Q) As a NEA member, what would you suggest to promote professional capacity of a fresh engineer?

LC1) Mandatory Mentorship program:

Pair fresh graduates with exp. senior eng. for structured monitoring.

(2) CPD : Workshops, seminars, online courses

(3) Internship & Practical Exposure

(4) Technical Training : (GIS, BIM, AutoCAD, AI applications)

(5) Soft Skill Development:

Communication, Leadership, Project management and client relation, training.

(6) Site visits and field exposure

(7) Research and publication support

(8) Ethical and legal awareness

(9) Job placement assistance

Surendra Sharma

4 Job Description of Forth Engineer.

(Df) In the public sector (Nepal)

→ Position: Sub-Engineer / Junior Engineer / Gazette Third class officer
(depending on qualification and exam).

Key Duties:

- ↳ Survey and data collection for infrastructure projects (roads, bridges, irrigation, buildings)
- ↳ preparation of technical drawings, designs, estimates, and BOSs (Bill of Materials)
- ↳ Site supervision during construction to ensure quality, specification compliance and safety.
- ↳ Preparation of progress reports, measurement books, and project documentation.
- ↳ Coordination with contractors, consultants, and Sr Engineer
- ↳ Implementing government policies and standards (NBC, DOHIDA standards, etc)
- ↳ Conducting feasibility studies and environmental screening.
- ↳ Handling procurement process - preparing bid documents, evaluating bids
- ↳ Public consultation and community coordination in development projects
- ↳ Ensuring compliance with labour law on construction sites

Survey
drawing, design, estimate, BOB
Site supervision
report & documentation
Coordination - client, contractor
Procure
Gov. pol.
community
environment & etc

(P) In private sector (Nepal)

→ Position: Site Engineer / Design Engineer / Project Engineer in consulting firm, construction company or industry

Key Duties:

- ↳ Preparing structural and architectural designs using software (AutoCAD, STAAD, ETABS)
- ↳ Preparing technical proposals, cost estimates, and detailed project reports (DPR).
- ↳ Site supervision: monitoring work, program, quality control, and contractor management
- ↳ Client coordination: understanding requirements and providing technical solutions.
- ↳ Preparing tender documents and assisting in procurement.
- ↳ Risk assessment and safety management on construction sites.
- ↳ Preparing invoices, payment certificates, and variation orders.
- ↳ Complying with professional ethics and NCE licensing requirements.
- ↳ Participating in team meetings, presenting reports to senior management

Est. & Proc. design
cost estimation, proposal, DPR
Site supervision
client coordination
Invoice, running bills, VO
tender doc & assist in Procure
Safety mgmt
compliance with code of ethics NCE.
presenting reports

- Construction Companies (Kalika, C4, NCELL)
- Consulting firms (SIL, TAC, Integrated consultants)
- IT companies (FI soft, Dearwalk, Leapfrog)
- Bank & financial institutions (Rastri)
- INGO/NGO (UN agencies, World Bank projects, ADB)
- Real estate & construction developers

5. Contract Law & Tendering

(B1) Define contract and its essential elements:

Offer & acceptance - with
Consideration
Two or more parties
legally enforceable
free consent
Capacity
certainty
possibility of performance
not declared void

→ A contract is a legally enforceable agreement b/w two or more parties that creates obligation to do or not to do a particular thing. In Nepal, contracts are governed by the Contract Act 1992.

Essential elements of a valid contract: ~~DECK~~ (OC³ FPLN)

• Offer and Acceptance:

↳ A clear offer by one party and unconditional acceptance by the other.

• Consideration:

↳ Something of value exchanged b/w parties (eg money or service).

• Capacity:

↳ All parties must be legally competent (adult of sound mind, not disqualified).

• Free consent:

↳ Agreement must be free from coercion, undue influence, fraud, or misrepresentation.

• Lawful object:

↳ The purpose of the contract must be legal.

• Certainty:

↳ Terms of contract must be clear and specific, not vague.

• Possibility of performance:

↳ The contract must be capable of being performed.

• Not declared void:

↳ The contract must not be one that the law declares void (eg wagering contracts).

rescind

Void vs Voidable contract

• void contract:

↳ A contract that has no legal effect from the beginning (eg. contract with a minor, illegal object)

• voidable contract

↳ void until one party chooses to avoid it (eg. contract made under coercion or misrepresentation - the affected party can rescind it)

(Q2) Define tender and explain the essential info. in a tender notice.

→ Tender is a formal invitation issued by a client/government inviting contractors or suppliers to submit bids for carrying out specified work or supplying goods/services at a stated price within a stated time.

Essential info:

↳ Name and address of the procuring org.

↳ Description and location of the work/service required.

↳ Estimated cost of work.

↳ Eligibility criteria for bidders (class of contract, experience, financial capacity)

↳ Method of procurement (NCB, ICB, sealed quotation, etc.)

↳ Bid security amount and validity period.

↳ Date, time, and place for obtaining bid documents.

↳ Deadline for submission of bids.

↳ Date and place of bid opening.

↳ Contact person for queries.

Q. 10.10.10

Basis	Void contract	Voidable contract
Definition	<u>Has no legal effect from the start.</u>	<u>Valid until rescinded by aggrieved party.</u>
Enforceability	<u>Not enforceable at all.</u>	<u>Enforceable until avoided.</u>
Cause	<u>Illegal object, impossible performance, lack of capacity.</u>	<u>Made under coercion, fraud or misrepresentation.</u>
Effect	<u>No party gains rights under it.</u>	<u>Aggrieved party can affirm or rescind.</u>
Example	<u>Contract to commit a crime.</u>	<u>Contract signed under threat.</u>

Methods of Consultant selection in Nepal

- (1) QCBS (2) OBS (3) Fixed Budget selection (FBS) (4) CBS (5) Consultant Qualification selection (CQS)

(1) QCBS (EOI/20) (TP/FP) only TP

(3) Fixed Budget selection (FBS) Client fixed budget in RFP only TP submitted within Budget (highest quality)

(4) CBS Client first firm submit their qualification & experience. Most qualified firm is directly invited to submit proposal & negotiate.

(6) Single source selection (SSS) / Direct selection.

↳ Specific consultant directly approached w/o competition.

↳ No shortlisting & competition.

Consultant selection process

1. Preparation of Terms of Reference (TOR)
2. Cost Estimate for the Assignment
3. Advertising / Expression of Interest (EOI)
4. Shortlisting of firms (usually 3-6 firms)
5. Issue of Request for Proposal (RFP)
6. Pre-proposal conference (if needed)
7. Receipt of proposals (Technical + Financial)
8. Technical evaluation
9. Financial evaluation (if applicable)
10. Combined scoring / Selection
11. Contract negotiation
12. Contract award and signing

TOR → Define scope, objectives, deliverables and timeline of the assignment.

EOI → Initial advertisement inviting firms to express interest & submit qualifications.

RFP → Detailed invitation to shortlisted firms to submit full technical & financial proposals.

TP → Consultant's methodology, work plan, team CVs, firm experience.

FP → Consultant's fee structure - staff costs, reimbursables, taxes.

6 Intellectual property Rights (IPR)

Types: (Copyright, patent, trademark and design rights)

Penalty for violating copyright in Nepal.

(9) Define IPR. Explain copyright, patent, trademark, and design right.

→ IPR are legal rights that protect creation of the mind - inventions, literary works, artistic works, symbols, names, and images - giving their creator exclusive right to use and benefit from their work for a certain period.

Types of IPR:

• Copyright:

↳ protects original literary, artistic, musical, and software works. In Nepal, governed by copyright Act 2059.

Duration: Life of author + 50 years

Eg:- An engineer's technical manual, software code.

• Patent

↳ Protect new inventions or processes.

↳ Grant exclusive right to make, use, sell the invention

Duration: 20 years. 7 year (Renew 2 times = 21yr)

Eg:- A patented construction technology, governed by Patent, Design and Trademark act 2022

• Trademark:

↳ protect distinctive symbols, logos, brand names, or slogans that distinguish goods/service.

Duration: Renewable every 7 years in Nepal

eg. A consulting firm's logo,

• Design Right:

↳ Protects the aesthetic or visual appearance of a product.

Eg. Unique architectural designs.

(7, 10 yrs) (5 yr sec 2 → 15 yr)

• Trade secret:

↳ protects confidential business information

eg. Proprietary construction mix design.

Penalty for violating copyright in Nepal (Copyright Act 2019)

• First Offense:

Fine up to Rs. 50,000 or imprisonment up to 6 months, or both.

• Repeat Offense

Fine up to Rs. 100,000 or imprisonment up to 1 year, or both.

• Seizure or destruction of infringing copies.

7. Labour Law & Business Enterprises

a key provision of Labor Act 2074 of Nepal

a characteristic, advantage, & disadvantage of business enterprise

(81) Key provisions of Labour Act 2074 of Nepal

• Working hours:

8 hours per day, 48 hours per week. Overtime limited to

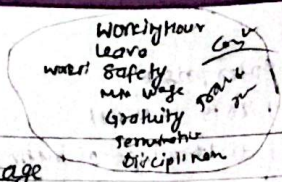
4 hours/day and 24 hours/week, paid at 1.5x normal rate. (every 5 hr → 30 min break)

• Leave and Holidays

Nature of Leave	Labour Act 2074
Weekly Holiday	1 day every week
Public Holiday	13 days including May day. Additional 1 day to female employees including Int'l women Labor Day.
Annual Leave	1 day for every 20 worked days
Sick leave	- Half paid upto 15 days - Eligibility: completion of 1 year of service
Mourning leave	13 days
Leave in lieu	For the labor put in work on public holiday or weekly off
Maternity Leave	98 days, fully paid upto 60 days.
Paternity leave	15 days, fully paid.
Special leave	No provision

• Health and safety

Employers must provide a safe working environment, safety equipment, and first aid facilities.



• Minimum Wage

Government periodically sets minimum wage rate.

• Gratuity:

Employee receive gratuity upon completion of service.

• Termination:

Fair process must be followed.

Worker cannot be dismissed w/o due process.

• Disciplinary action: (for misconduct)

Warning → Suspension → Dismissal

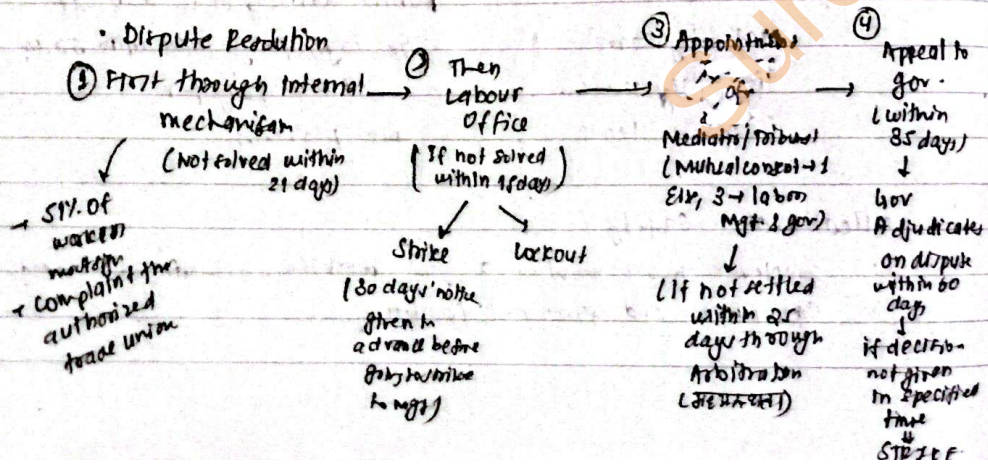
(following proper procedure)

• Worker's compensation

Employer are liable to compensate for workplace injuries.

• Mandatory training and safety protocols

• Dispute Resolution



(g2) Characteristics, Advantages, and disadvantages of business enterprises

(a) Sole proprietorship Firm

• Characteristics:

Owned and managed by one person, unlimited liability, simple registration

• Adv:

Quick decision-making, all profits to owner, easy to establish, full control,

• Disadv:

Unlimited liability (personal assets at risk), limited capital, limited skills, no continuity after owner's death.

(b) Partnership Firm

• Characteristics:

2 to 20 partners, governed by partnership act, joint management

• Adv:

More capital, shared responsibility, combined expertise, easy formation

• Disadv:

Unlimited liability for all partners, risk of disagreement, disruption if one partner leaves.

(c) Limited Company (Pvt. Ltd. or Ltd.)

• Chr:

Registered under Company Act 2063, share holders have limited liability, separate legal entity.

• Adv:

Limited liability, can raise large capital, perpetual existence, professional management

• Disadv:

Complex registration, subject to more regulation, profit shared among share holders.

8. Conflict & Dispute Management

(Q.1) What is conflict? What are the causes and methods to mitigate conflict?

→ Conflict is a state of opposition, disagreement, or incompatibility between two or more parties arising from different interests, values, needs, or goals. It is considered an inevitable outcome of human interaction.

Causes of conflict:

- ↳ Poor communication or misunderstanding between parties.
- ↳ Differing interests, goals, or values.
- ↳ Resource scarcity (budget, materials, manpower).
- ↳ Scope of work disputes between client, contractor, and consultant.
- ↳ Personality clashes and ego issues.
- ↳ Ambiguous contract terms.
- ↳ Delays and performance failures.

Methods to resolve/mitigate conflict: (Aron rule)

↳ Negotiation:

Direct discussion between parties to reach a mutually acceptable solution (most preferred, lowest cost).

↳ Mediation:

A neutral third party facilitates negotiation without imposing a decision.

↳ Conciliation:

↳ Similar to mediation, the conciliator may suggest solutions.

Negotiation → Mediation → Conciliation → Arbitration
↓
Adjudication
↓
Litigation

↳ Arbitration:

A neutral arbitrator hears both sides, and makes a binding decision. Common in engineering contracts.

↳ Adjudication:

A quick binding decision by a neutral adjudicator, subject to later review.

↳ Litigation:

Court proceedings - last resort due to high cost and time.

Q2) Is conflict inevitable? Should it be avoided?

→ Yes, conflict is inevitable in professional and social interactions because people have different interests, perceptions, and goals. However, whether it should be avoided depends on the nature of the conflict:

• Constructive conflict (Functional)

Can stimulate creativity, innovation, and better decision making. Engineers debating design alternatives improve the final outcome.

• Destructive conflict (Dysfunctional)

Leads to wasted resources, damaged relationships, and project failure.

Conclusion: Rather than trying to eliminate all conflict, professionals should aim to manage conflict constructively - channeling disagreements into productive problem solving.

Conflict of Interest

↳ poses interest interfering with professional duty, including apparent conflicts

Harm: problem of trust; resource misallocation; safety risks; inequality; corruption normalization

• Formal types

(1) Financial conflict

Personal financial gain influences professional decisions.

(2) Nepotism/Family conflict

Decisions favor family member over merit

(3) (Symbiont) Friendship conflict

Decision favors friends or associates

(4) Political conflict

Political affiliation or loyalty influences professional decisions.

(5) Professional/Institutional conflict

Dual roles create competing obligations.

E.g. - A lawyer who represents both parties in a dispute

(6) Academic/Research conflict

Research outcomes are influenced by funding sources

9. Globalization, PPPs Development

(Q.1) Define PPP. Explain its importance in development.

→ Public private partnership (PPP) is a long-term contractual arrangement between a public sector authority and a private sector entity for the provision of public infrastructure or services where the private partner bears significant risk and management responsibility.

ch (2)

Eg: Melamchi Water supply project (partly PPP),
Kathmandu-Tenai Fast Track Road (proposed PPP),
Hydropower project.

Importance:

- ↳ Reduce burden on government budget - private capital fills the financing gap.
- ↳ Introduces private sector efficiency, technology, and management skills.
- ↳ Risk is shared b/w government and private partner
- ↳ Faster project delivery compared to purely government-executed projects
- ↳ Encourages innovation in design, construction, and service delivery.
- ↳ Stimulates economic growth and employment generation.

A project may be implemented on private investment by following modes

[Build and operate infrastructure act 2063 (amended on 2073)]

- | | | |
|---|---|---|
| (a) Build and Transfer (BT) | { | (e) Lease, operate and Transfer (LOT) |
| (b) Build, operate & transfer (BOT) | | (f) Lease, build, operate & transfer (LBOT) |
| (c) Build, own, operate & Transfer (BOOT) | | (g) Develop, operate, and Transfer (DOT) |
| (d) Build, Transfer & Operate (BTO) | | (h) By other methods of similar kind. |

	Tort	Liability
What is it?	A specific type of civil wrong	The legal obligation to answer for any wrong.
Scope	Narrow - one category of civil law.	Broad - covers contract tort, statute, crime.
Requires a contract?	NO - operates independently	Depends on source (contract liability needs a contract)
Remedy?	Damages (compensation)	Damages, penalties, criminal punishment, injunction depends on type.
Relationship	Tort is a cause of liability	Liability is the effect of committing a tort (or other wrong)

(82) Merits and demerits of globalization for Nepal:

↳ Merits

• Technology Transfer:

Nepal gains access to modern engineering technologies and construction methods.

• Foreign Investment:

Multinationals bring capital and employment opportunities.

• Knowledge exchange:

Exposure to international best practices in engineering and management.

• Remittance economy:

Globalization enables Nepali workers to work abroad, sending remittances home (major GDP contributor).

• Export opportunities:

Engineering consulting firms can offer services internationally.

Demerits:

• Brain Drain:

Skilled engineers migrate to developed countries, weakening Nepal's professional capacity.

• Cultural Erosion:

Western influence diminishes traditional Nepali values and practices.

• Economic dependency:

Nepal becomes dependent on imports and foreign technology.

• Unfair competition:

Local firms struggle to compete with multinational corporations.

• Environmental concerns:

Rapid industrialization linked to globalization increases pollution and resource depletion.

(83) Construction is Destruction to Environment?

→ Arguments In Favour (Construction = Destruction)

- Deforestation: Clearing land for roads, buildings, and dams.
- Soil Erosion: Excavation & grading destabilizes slopes, increases erosion.
- Water pollution: Construction runoff.
- Air pollution: Dust, diesel emissions from construction machinery.
- Biodiversity loss: Habitat destruction during project developments.
- Nepal eg: Hydropower project displacing communities.

Counter-Arguments (Responsible Eng. Mitigates impacts):

- EIA: Mandatory for large projects in Nepal (EIA, 2076).
- Green Building Design: LEED-certified buildings reduce energy consumption by 30-50%.
- Reforestation: Compensatory plantation.
- Waste management plans: Recycling & proper disposal.
- Community consultation:
Incorporating local knowledge in project design.

Conclusion: Construction is not inherently destructive if engineers apply sustainable design principles, follow EIA requirements, and prioritize environmental stewardship along side ~~development~~ development goals.

eg: Road through a forest must include a wildlife crossing structure and tree replantation plans.

10. Safety, Risk & Benefit Analysis

- (Q.1) Describe safety, risk, and benefit analysis in engineering practice.
- Safety engineering refers to the application of engineering principles to ensure that systems, structures, and processes do not cause harm to people or the environment.

Risk:

The probability that a hazard will result in harm combined with the severity of that harm.

$$\text{Risk} = \text{Probability} \times \text{Consequence}$$

Benefit:

The positive outcomes of an engineering project - economic gain, improved quality of life, connectivity, etc.

Safety, Risk, and Benefit Analysis Process:

• Hazard Identification:

Identify all potential sources of harm in the project

• Risk Assessment

Estimate the likelihood and severity of each hazard.

• Risk Mitigation

Design safety measures to eliminate or reduce risks (eg. safety harnesses, protective barriers)

• Benefit Assessment

Quantify the economic, social, and environmental benefits of the project

Hazard identification
Risk assessment
" mitigation
Benefit analysis
Decision

• Decision making:

Compare risks and benefits - proceed only when benefits clearly outweigh risks.

• Monitoring

Continuously monitor safety performance during construction and operation.

Example:

Building a dam provides irrigation and hydropower benefits (high benefits) but risks flooding downstream community and displacing indigenous people (high risk) - a thorough analysis must precede a decision.

Company Registration process in Nepal (Company Act 2063)

- (1) ^{create} Choose a company name and check availability at the Office of the Company Registrar (OCR).
- (2) Prepare Memorandum of Association (MOA) and Articles of Association (AOA).
- (3) Submit registration application with required documents:
(authenticate) Citizenship copies, MOA, AOA, passport photos.
- (4) Pay registration fees based on authorized capital (max 2%) ^{fee acc. to registered capital of company}.
- (5) Obtain company registration certificate from OCR.
- (6) Register for PAN/VAT at the Inland Revenue Department.
- (7) Register with local municipality/ward office.
- (8) Open company bank account.

* Documents req^d

- ✓ Application for company registration
- ✓ MOA, ✓ AOA
- ✓ Citizenship certificate of promoter/shareholder.
- ✓ content letter of director
- ✓ Copy of company name approval
- ✓ Registered office address details
- ✓ Photographs of promoter/shareholder
- ✓ If public company: Approved prospectus
- ✓ If foreign involvement: Approval from Department of Industry.

Obligations after registration

• Notification of Registration

↳ Submitted to OCR within 8 months of company registration.

• Shareholding Details

↳ within 1 month after paid-up share capital is deposited by shareholder

• Details of Director

↳ to OCR within 7 days of assuming office

• AGM

↳ first AGM within 1 year from date of company establishment

• Accounting and financial requirements

↳ proper books of account

↳ audited every financial year

• Appointment of Auditor

↳ by shareholder

↳ OCR must be notified about it within 15 days

NBC: 208 → Sanitary & Plumbing Design Req.
 207 → Electrical " "
 206 → Architectural " "
 114 → Construction Safety
 113 → Aluminium; 112 → Timber; 111 → Steel

NBC 110: Plain & Reinforced concrete.
 109 → Masonry: Unreinforced.
 108 → seismic design of building in Nepal.
 104 → Wind Load
 000 → State-of-art Design

#

Basic	Private Company	Public Company
Ownership	Limited person	General public.
Members	1-101	Min. 7, no Max.
Capital	No min ^m req.	Min NPR 10 million
Share Issue	Cannot Invite public	Can invite public
Transfer of shares	Restricted	freely transferable
Name	Pvt. Ltd.	Ltd.
Director.	Min. 1	Min. 3
Prospectus	Not req.	Compulsory
Stock Exchange	Cannot be listed	Can be listed in Nepse.
Scale	Small business	Large business.

Building Codes

1. Current state-of-art design

The min^m standards set for Nepal are also met the philosophies and analytical techniques that appears in the codes of more developed countries

2. Professionally engineered design

- Standard code requirements that all professionally qualified engineers will recognize and follow when designing structures in Nepal.
- covers all major structures such as hospitals, factories, multi-story buildings and larger residential buildings.

3. Pre-engineered construction (Rule of thumb)

- criteria as h_t config, no. of storeys & floor area, rule of thumb approach

4. Guidelines for non-engineered construction (Advisory guidelines)

- Provides simple rules for improving seismic safety of building
- Mandatory for all types of public buildings to be built throughout Nepal.
- Mandatory for all residential buildings to be built in municipal & urban areas where a building permit process exists.

EPP (CE 752) – QUESTIONS & ANSWERS

Q: Discuss significant contributions of Eastern societies to the field of engineering. Provide specific examples. [4]

Eastern societies - particularly from China, India, Mesopotamia (Iraq), Egypt, and the Indus Valley - made foundational contributions to engineering long before the Western industrial revolution.

1. Ancient China:

- Great Wall of China (7th century BCE – 17th century CE): 21,000 km of fortification - an extraordinary feat of civil engineering involving millions of workers, sophisticated logistics, and advanced construction techniques.
- Grand Canal (605–618 CE): 1,776 km long - the world's longest and oldest canal, still in use. Required complex hydraulic engineering for water level management.
- Paper (105 CE) and Printing (868 CE): Enabled knowledge dissemination - a technology that transformed civilization globally.
- Gunpowder and Iron Casting: Chinese innovations in metallurgy and chemical engineering.

2. Ancient India:

- Indus Valley Civilization (~3300–1300 BCE): Harappa and Mohenjo-daro had grid-planned cities, covered drainage systems, standardized brick sizes, and public baths - the world's first urban sanitation engineering.
- Sushruta Samhita (~600 BCE): Advanced surgical instruments and procedures - biomedical engineering of the ancient world.
- Iron Pillar of Delhi (~5th century CE): 7-meter iron pillar that has not rusted in 1,600 years - demonstrating extraordinary metallurgical knowledge.
- Mathematical contributions (Aryabhata, Brahmagupta): Zero, decimal system, and trigonometry - foundational to all engineering mathematics.

3. Mesopotamia and Egypt:

- Pyramids of Giza (~2560 BCE): 2.3 million limestone blocks, each weighing 2.5 tonnes, placed with millimeter precision. Engineering feats involving surveying, logistics, and structural calculations.
- Irrigation systems: Mesopotamian civilizations (Sumerian, Babylonian) built complex canal irrigation networks supporting large-scale agriculture.
- Cuneiform writing and early mathematics (Babylonian): Quadratic equations and astronomical calculations.

Lesson for Nepal: Nepal's own indigenous engineering - Newari architecture, Rana Pokhara water management, Prithvi Narayan Shah's fortifications - reflects this same tradition of solving practical problems with available materials and knowledge.

Q: List the roles and responsibilities of the main professional engineering institutions in Nepal that help you run your career smoothly. [4]

The two main professional engineering institutions in Nepal are the Nepal Engineering Council (NEC) and the Nepal Engineers' Association (NEA).

Nepal Engineering Council (NEC) - Statutory Regulator:

- Establishes minimum educational and competency standards for engineering practice in Nepal.
- Registers and licenses all practicing engineers (mandatory under NEC Act 2055).
- Prescribes and enforces the Code of Conduct for engineers.
- Investigates complaints of professional misconduct and can suspend/cancel licenses.
- Accredits engineering educational institutions and programs.
- Facilitates recognition of Nepali engineers' qualifications internationally.
- Promotes Continuing Professional Development (CPD) requirements.

Nepal Engineers' Association (NEA) - Professional Body:

- Advocates for engineers' professional rights, career development, and welfare.
- Organizes seminars, workshops, and training for skill upgrading.
- Provides networking opportunities connecting engineers across sectors and disciplines.
- Represents engineers' interests to government in policy formulation.
- Publishes technical journals and promotes research.
- Assists engineers during professional disputes and disciplinary proceedings.
- Runs employment exchanges and professional placement services.
- Organizes Engineers' Day and recognition of outstanding engineering achievements.

Other Relevant Institutions:

- Institute of Engineering (IOE), TU: Provides engineering education; alumni network.
- Department of Roads, Department of Irrigation, KUKL etc.: Public sector employers with defined career progression.
- Construction Entrepreneurs' Association of Nepal (CEAN): Relevant for engineers in contracting.

Q: As a member of Nepal Engineers' Association (NEA), what would you suggest to promote professional capacity of a fresh engineer? [6]

As an NEA member, I would suggest the following comprehensive program to develop fresh engineers into competent professionals:

1. Structured Mentorship Program:

- Pair every fresh graduate with an experienced senior engineer for 1–2 years.
- Monthly meetings to review work, discuss challenges, and provide guidance.
- Mentors share real-world experience that textbooks cannot teach.

2. Mandatory Induction Training:

- 6-month structured induction covering: professional ethics and NEC code of conduct; contract management basics; site safety; report writing; use of software tools (AutoCAD, ETABS, SAP2000).
- Modelled on JICA/ADB technical training programs already run in Nepal.

3. Continuing Professional Development (CPD) Framework:

- NEA should create a CPD point system requiring engineers to earn minimum points annually through training, seminars, publications, and project experience.
- CPD compliance linked to NEC license renewal.

4. Site Exposure and Apprenticeship:

- Mandatory minimum 6–12 months of supervised field work before solo practice.
- NEA to coordinate with public agencies (DoR, DoI) and consulting firms for structured placements.

5. Technical Skill Enhancement:

- NEA should run affordable short courses on: GIS and remote sensing; structural design software; project management (PMP certification); environmental assessment.

6. Soft Skills Development:

- Communication, report writing, presentation skills, and negotiation.
- Ethics case studies and professional responsibility workshops.

7. Research and Innovation Culture:

- NEA engineering journal for fresh engineers to publish work.
- Annual innovation competition for young engineers addressing Nepal's specific problems.

8. Networking and Industry Connection:

- Annual NEA Job Fair connecting fresh graduates with employers.
- Regional chapters in all 7 provinces for local networking.

Q: Discuss the intellectual property right and its related policies and regulations in Nepal. [4]

Intellectual Property Rights (IPR) are legal protections given to creators for their intellectual work - inventions, artistic works, symbols, and designs.

Legal Framework for IPR in Nepal:

- Patent, Design and Trademark Act, 2022 BS (1965 AD): Governs patents (inventions), trademarks (brand identity), and industrial designs. Administered by the Department of Industry.
- Copyright Act, 2059 BS (2002 AD): Protects literary, artistic, musical, and software works. Administered by the Copyright Registrar's Office under the Ministry of Education.
- Plant Variety Protection and Farmers' Rights Act, 2067 BS: Protects new plant varieties and farmers' traditional seed rights.
- Industrial Enterprises Act, 2076 BS: Provides framework for industrial property rights.

Registration Process for Trademarks/Patents (Nepal):

- File application with the Department of Industry with prescribed fee and documents.
- Examination for novelty, distinctiveness, and compliance.
- Publication in Nepal Gazette for public objection (90 days).
- Registration certificate issued if no valid objection received.
- Patent validity: 20 years; Trademark: 7 years renewable; Copyright: Life + 50 years.

Penalties for Violation:

- Copyright infringement: Fine up to Rs 50,000 and/or 6 months imprisonment (first offense); Rs 100,000 and/or 1 year (repeat).
- Trademark infringement: Fine up to Rs 25,000 and/or up to 1 year imprisonment.
- Seizure and destruction of infringing materials.

Nepal's Obligations: As a WTO member, Nepal is obligated to comply with TRIPS Agreement (Trade-Related Aspects of Intellectual Property Rights), which sets minimum IPR standards.

Q: Prepare a Tender Notice for construction of a temporary office building. Approximate cost Rs 2 crore. [4]

TENDER NOTICE

XYZ Consulting Pvt. Ltd.
Jumla, Karnali Province, Nepal
Tender Notice No.: XYZ/2081/01

XYZ Consulting Pvt. Ltd. invites sealed bids from eligible and qualified contractors for the construction of a temporary office building at Jumla, Karnali Province.

Details of Work:

- Name of Work: Construction of Temporary Office Building
- Location: Jumla Municipality-2, Jumla District, Karnali Province
- Estimated Cost: Rs. 2,00,00,000 (Two Crore Rupees)
- Source of Funds: Internal project budget
- Procurement Method: National Competitive Bidding (NCB)

Eligibility Criteria:

- Licensed contractor of 'C' class or above registered with Department of Urban Development and Building Construction (DUDBC).
- VAT and PAN registered firm.
- Similar work experience: At least one building construction project of Rs 50 lakh or above completed in the last 5 years.
- Valid tax clearance certificate.

Key Dates:

- Bid document sale: 2081 Falgun 1 to Falgun 20 (office hours)
- Bid document fee: Rs 5,000 (non-refundable)
- Bid submission deadline: 2081 Falgun 25, 3:00 PM
- Bid opening: 2081 Falgun 25, 3:30 PM (in presence of bidders)
- Bid validity period: 90 days from bid submission date
- Bid security: 2% of bid amount (valid for 120 days)

Contact for Information:

- Office Manager, XYZ Consulting Pvt. Ltd., Jumla
- Tel: 087-XXXXXX | Email: info@xyzcons.com.np

Note: The company reserves the right to accept or reject any or all bids without assigning reason.

Project Manager, XYZ Consulting Pvt. Ltd.

Q: Define vicarious liability with examples. [Part of short notes] [4]

Vicarious Liability is the legal principle that holds one party responsible for the wrongful acts committed by another party, based on their relationship (typically employer-employee or principal-agent), even if the first party did not personally commit the act.

Legal Basis: The doctrine rests on two principles: (1) respondeat superior - 'let the master answer'; (2) the employer benefits from the employee's work, so should also bear the risk of harm caused.

Examples:

- **Engineering Firm Liability:** A site engineer employed by ABC Consulting negligently approves substandard concrete. The building later cracks. The firm ABC Consulting is vicariously liable along with the engineer - even though the firm's directors were unaware of the negligence.
- **Government Liability:** A government-employed road engineer approves a poorly designed culvert that fails and injures a pedestrian. The government department is vicariously liable.
- **Contractor Liability:** A contractor's worker negligently operates an excavator and damages a neighbouring property. The contractor (employer) is vicariously liable.

Conditions for Vicarious Liability:

- There must be a relationship (employer-employee, not independent contractor).
- The wrongful act must have occurred during the course of employment (not on personal time).
- The act must be within the scope of the employee's duties.

Distinction from Direct Liability: In direct liability, the person who committed the act is responsible. In vicarious liability, someone else (the employer) is also responsible even without personal fault.

Nepal Context: Under Nepal's Civil Code 2074, employers can be held liable for employee negligence committed during employment - engineers and consulting firms must therefore maintain supervision and quality control systems.

Q: Explain procurement types - Sealed Bidding, Sealed Quotation, and Direct Purchase as per Public Procurement Act 2063. [4]

Nepal's Public Procurement Act 2063 BS (2007 AD) governs all government procurement. Three main methods:

1. Sealed Bidding (Competitive Bidding):

- Used for: Large contracts (generally above Rs 20 lakh for works, Rs 10 lakh for goods as per thresholds).
- Process: Open tender notice published; bid documents issued; sealed bids submitted by deadline; bids opened publicly; technically and financially evaluated; lowest evaluated responsive bid awarded.
- Types: National Competitive Bidding (NCB) - open to Nepali firms; International Competitive Bidding (ICB) - open internationally for large or specialized contracts.
- Advantage: Most transparent and competitive method; best value for money.

2. Sealed Quotation:

- Used for: Medium-sized contracts (between Rs 5 lakh and Rs 20 lakh for works approximately).
- Process: Invitation sent to at least 3 qualified firms; sealed quotations submitted; lowest evaluated quotation accepted.
- Simpler and faster than full competitive bidding.
- Used for routine purchases, small construction works, or specialized items with limited suppliers.

3. Direct Purchase (Direct Procurement):

- Used for: Small amounts (generally below Rs 5 lakh), emergency procurements, or highly specialized items with only one supplier (sole source).

- Process: Direct negotiation with a single supplier without competitive bidding.
- Requires justification - not to be used to circumvent competition.
- Prone to misuse - regulations require documentation and approval.

Method	Threshold (approx.)	Transparency	Speed
Sealed Bidding (NCB/ICB)	Above Rs 20 lakh (works)	Highest	Slowest
Sealed Quotation	Rs 5–20 lakh (works)	Medium	Medium
Direct Purchase	Below Rs 5 lakh	Lowest	Fastest

Q: Differentiate between bid validity period and bid security validity period. [2]

Basis	Bid Validity Period	Bid Security Validity Period
Definition	Period during which the bidder is bound by their submitted bid price and conditions	Period during which the bid security (guarantee) remains valid and can be encashed
Purpose	Gives procuring entity time to evaluate and award contract	Protects procuring entity if bidder withdraws or fails to sign contract
Typical Duration	90–120 days from bid submission date	Bid validity + 30 days (to allow encashment process)
What happens at expiry	Bidder is no longer bound by bid; must be asked to extend	Bank guarantee cannot be encashed; security becomes worthless
Nepal practice	Usually 90 days for NCB contracts	Usually 120 days (bid validity + 30 days)

Q: As an engineer, how does knowledge of contract help you in your professional career? [2]

- Protects professional interests: Understanding contract terms helps an engineer know their rights and obligations - preventing exploitation by employers or clients.
- Avoids disputes: Clear understanding of scope of work, payment terms, and timelines prevents misunderstandings that lead to costly disputes.
- Professional liability protection: Knowledge of indemnification and liability clauses helps engineers limit their exposure to legal claims.
- Better project management: Understanding variation orders, claim procedures, and extension of time provisions enables proactive project management.
- Ethical compliance: Contract knowledge helps ensure engineers deliver what was promised - core to professional ethics.
- Career advancement: Engineers who understand contracts are valued in consulting firms and government - it is a key differentiator for senior roles.

Q: Describe globalization and Public Private Partnership (PPP) with suitable examples. [4]

Globalization is the process of increasing interconnection and interdependence among the world's economies, cultures, and populations, facilitated by trade, investment, technology, and migration.

Examples: A Nepali engineer working for an Indian consulting firm in Nepal on a World Bank-funded project - all three dimensions of globalization simultaneously. Nepal's remittance economy (\$9 billion/year) is a direct product of economic globalization.

PPP (Public Private Partnership) is already answered in detail in the main document.

Additional points:

- Types of PPP Models: BOT (Build-Operate-Transfer) - private builds, operates for concession period, transfers to government. BOOT (Build-Own-Operate-Transfer) - private owns during concession. BTO (Build-Transfer-Operate) - transferred immediately but private operates. Management contract - government owns but private manages.
- Nepal Example: Upper Tamakoshi Hydropower (domestic investment through shares); Kathmandu-Tarai Fast Track Road (being developed as PPP); Tilganga Eye Hospital (successful health PPP).
- Globalization and PPP Connection: Globalization attracts Foreign Direct Investment (FDI) into Nepal's PPP projects - e.g., Indian, Chinese, and Norwegian investors in hydropower PPPs.

Q: Explain the Engineering Council Code of Conduct and Council Act 2055 BS. [6]

Nepal Engineering Council (NEC) Act 2055 BS (1998 AD):

- Established NEC as a statutory body to regulate engineering profession in Nepal.
- Mandates registration of all engineers practicing in Nepal - practicing without registration is illegal.
- Categories of registration: Graduate Engineer (after BE), Sub-Engineer (Diploma), Specialized Engineer (post-graduate), Senior Engineer.
- Registration fees and renewal: Engineers must renew every 5 years, showing evidence of CPD.
- Council composition: 15 members including government nominees, elected representatives from engineering associations, and IOE representatives.
- Jurisdiction: Can investigate complaints, hold hearings, suspend or revoke licenses of engineers who violate the code of conduct.

NEC Code of Conduct - Key Provisions:

- Public safety first: Engineer must hold public safety, health, and welfare paramount above all other considerations.
- Competence: Only practice in areas of competence; seek help for work beyond expertise.
- Honesty and integrity: No falsification of qualifications, data, or reports.
- Conflict of interest: Disclose any personal interests that conflict with professional duties; avoid situations of conflict.
- Confidentiality: Protect client confidential information unless disclosure is required by law or public safety.
- No bribery or corruption: Never offer or accept bribes, gifts, or kickbacks in connection with professional work.
- Respect for colleagues: No unfair criticism of other engineers; no taking credit for others' work.

- Environmental responsibility: Consider environmental impacts in all professional decisions.
- Continuing education: Keep technical knowledge current.
- Whistleblowing duty: Report colleagues who violate safety or ethical standards - professional loyalty does not override public duty.

Q: Explain the process of registering copyright in Nepal and the penalty for violation. [2+2]

Copyright Registration Process in Nepal (Copyright Act 2059):

- Copyright in Nepal is automatic - it comes into existence the moment an original work is created. Registration is optional but provides legal evidence of ownership.
- Step 1: Prepare the application with details of the work (title, nature, year of creation, author's name).
- Step 2: Submit application to the Copyright Registrar's Office under the Ministry of Education.
- Step 3: Attach two copies of the work (for literary/artistic works), or description/sample for software.
- Step 4: Pay prescribed registration fee.
- Step 5: Registrar reviews and issues Copyright Registration Certificate.
- Duration: Life of author plus 50 years; for institutional works, 50 years from publication.

Penalty for Copyright Violation (Section 25 of Copyright Act 2059):

- First offense: Fine of Rs 10,000 to Rs 50,000 OR imprisonment of 6 months, or both.
- Repeat offense: Fine of Rs 50,000 to Rs 1,00,000 OR imprisonment of up to 1 year, or both.
- Infringing copies: All infringing copies and reproduction equipment may be seized and destroyed.
- Civil remedy: Copyright holder can also sue in civil court for damages in addition to criminal penalties.

Q: Write company registration procedure in Nepal briefly. [3]

Company registration in Nepal is governed by the Company Act 2063 BS (2006 AD), administered by the Office of the Company Registrar (OCR).

Steps:

- Step 1 - Name Reservation: Apply online at OCR website (ocr.gov.np) for company name approval. Names must be unique and not confusingly similar to existing companies. Valid for 35 days.
- Step 2 - Prepare Documents: Memorandum of Association (MoA) - states company's objectives; Articles of Association (AoA) - governs internal management; Citizenship certificates of all shareholders/directors; Passport-size photographs; Proposed company address proof.
- Step 3 - Submit Application: File application at OCR with all documents and pay registration fee (based on authorized capital - scales from Rs 1,000 to Rs 50,000+).
- Step 4 - OCR Review and Registration: OCR verifies documents (1–3 working days); issues Company Registration Certificate.

- Step 5 - Tax Registration: Register for PAN (Permanent Account Number) at Inland Revenue Department within 30 days of company registration.
- Step 6 - VAT Registration: If annual turnover expected above Rs 50 lakh, VAT registration required.
- Step 7 - Municipality Registration: Register the business with local Ward Office.
- Step 8 - Bank Account: Open company bank account using registration certificate.
- For Engineering Consulting Firms: Additionally register with the Consultancy Association of Nepal (CAN) and obtain approval from relevant technical bodies (NEC for engineering services).

Q: Define percentage contract and in which procurement category it is adopted. [2]

Percentage Contract (Rate Contract) is a type of construction contract where the contractor agrees to execute work at a fixed percentage above or below the government's Schedule of Rates (SOR). The contractor bids a percentage (e.g., 5% above DSR, or 3% below DSR) rather than individual item rates.

Key Features:

- Payment is based on actual quantities measured $\times$ (DSR rate $\pm$ bid percentage).
- Suitable when work scope is well-defined but exact quantities are uncertain.
- Simpler bid evaluation - only one figure to compare among bidders.

Procurement Category:

- Percentage contracts are used in the Sealed Bidding / National Competitive Bidding category.
- Most commonly used for: Road maintenance works, building repair and renovation, small civil works where the Department of Roads (DoR) or DOLIDAR has established SOR.
- Example: A contractor bids '2% above DSR' for road maintenance work in Sindhupalchok - all items are paid at the DoR schedule rate + 2%.

Q: Explain the steps of disciplinary action for misconduct as per Labour Act 2074 of Nepal. [4]

The Labour Act 2074 BS (2017 AD) provides a defined process for disciplinary action to protect both employer and employee rights.

Types of Misconduct (Schedule 1, Labour Act 2074):

- Minor misconduct: Late arrival, leaving early, negligent work, minor disobedience.
- Major misconduct: Fraud, theft, criminal behavior, serious insubordination, destruction of property, sexual harassment.

Disciplinary Action Steps:

- Step 1 - Show Cause Notice: Employer issues written notice to employee specifying the alleged misconduct and asking them to explain within stipulated time (minimum 24 hours for minor, 7 days for major).
- Step 2 - Employee Response: Employee submits written defense/explanation. If employee does not respond within deadline, proceeding continues ex parte.

- Step 3 - Inquiry Committee (for major misconduct): A three-member inquiry committee is formed to investigate the allegation - at least one member should be from outside the department.
- Step 4 - Inquiry Hearing: Committee examines evidence, hears witnesses, and allows employee to defend themselves.
- Step 5 - Inquiry Report: Committee submits written report with findings and recommendations.
- Step 6 - Decision: Management reviews report and takes appropriate action based on severity:
 - Minor misconduct: Warning letter → Salary deduction (up to 10%) → Demotion
 - Major misconduct: Suspension without pay → Demotion → Dismissal
- Step 7 - Appeal: Employee can appeal to Labour Court within 35 days if unsatisfied with decision.

Important Provisions:

- Employee cannot be dismissed without going through this process - instant dismissal without due process is illegal.
- Double jeopardy: Employee cannot be punished twice for the same offense.
- During inquiry, employee continues to receive basic salary.

Q: Write a short note on Building Codes and Bylaws. [4]

Building Codes are sets of standards and regulations that specify the minimum requirements for the design, construction, alteration, and maintenance of buildings, to ensure the safety, health, and welfare of occupants and the public.

Nepal Building Code (NBC):

- Nepal Building Code was first developed in 1994 with UNDP/UNCHS assistance, revised post-2015 earthquake.
- NBC covers: Structural design (seismic loading critical for Nepal's earthquake-prone terrain); fire safety; building materials specifications; foundation requirements; ventilation and sanitation.
- NBC 205:1994 (Mandatory Rules of Thumb) provides simplified earthquake-resistant construction rules for non-engineered buildings - targeting the vast majority of Nepal's rural housing.
- Professional engineers are legally required to follow NBC in all structural designs.

Building Bylaws:

- Local governments (municipalities) issue Building Bylaws under the Local Government Operation Act 2074 to control land use and building construction within their jurisdiction.
- Typical provisions: Setback from road and plot boundary; maximum floor area ratio (FAR); building height limits; parking requirements; green space ratio.
- Kathmandu Metropolitan City Building Bylaw 2064 specifies: Minimum road width requirements; height restrictions (5 floors max in most residential zones); mandatory structural engineer certification for buildings over 3 floors.

Post-2015 Earthquake Reforms:

- All municipal buildings must now have engineer-certified structural drawings.
- Ward offices conduct site inspections at foundation and slab levels.
- Owners building without permit face demolition orders and fines.

Importance: The 2015 earthquake demonstrated catastrophically that non-code-compliant buildings kill people. Enforcing building codes and bylaws is therefore a public safety imperative, not a bureaucratic formality.

Q: 'Engineering profession always emphasizes safety first in engineering delivery.' Describe with typical examples. [8]

Safety First is not merely a slogan but a fundamental ethical principle of the engineering profession - codified in the NEC Code of Conduct and all international engineering ethics codes. Engineers hold public safety, health, and welfare paramount above cost, schedule, or client convenience.

Why Safety is Central to Engineering:

- Engineers design systems (bridges, buildings, dams, electrical grids) that millions of people use daily without understanding the technical details. Society trusts engineers to get it right.
- Failures have catastrophic, irreversible consequences - unlike most other professional errors.
- Professional liability: Engineers can face criminal negligence charges if safety failures occur due to their decisions.

Examples of Safety-First in Engineering Practice:

- Structural Safety (Factor of Safety): Engineers never design to the exact calculated load - they apply Safety Factors (typically 1.5 to 3.0) to account for material variability, construction errors, and unexpected loads. A beam calculated to safely carry 10 tonnes is designed for 20 tonnes.
- Construction Site Safety: Nepal's Labour Act 2074 and Occupational Safety guidelines require: hard hats, safety harnesses, scaffolding inspections, electrical safety, and trained first-aiders on all major construction sites.
- Bridge Design: The New Suspension Bridge design in Nepal uses NBC seismic loading, flood return period analysis (100-year design flood), and overdesign for construction quality variability.
- Dam Safety: Kali Gandaki 'A' Hydropower Project has an emergency spillway designed for the Probable Maximum Flood (PMF) - a rare but possible extreme event - even though it may never be needed.
- Fire Safety: Buildings must have fire escape routes, fire extinguishers, smoke detectors, and fire-resistant construction as per NBC requirements - even before a fire ever occurs.
- Whistleblowing Duty: When engineer Ranjit discovers that his contractor is using substandard reinforcement bars to cut costs, professional ethics requires him to stop the work and report it - even if pressured by employer or client to overlook it.
- Earthquake Engineering (Post-2015 Nepal): All new designs incorporate NBC 105 seismic design requirements; soft storey effects eliminated; quality of construction materials tested and verified.

Professional Consequences of Ignoring Safety:

- 2015 earthquake: 9,000 deaths largely because buildings were not designed or constructed to code. Engineers who certified non-compliant buildings face professional and legal liability.
- Bhotekoshi Bridge Failure (2014): Premature failure of bridge during load test - investigation revealed design errors. Engineers held accountable.

Conclusion: Safety first means: design conservatively; verify construction; never compromise standards for cost or schedule; report safety concerns regardless of consequences to oneself.

Surendra Sharma

PART A: Questions & Model Answers

Q1. Irrigation Canal - Local Contractors Demanding Sub-Contract

You are working as an Engineer in a Irrigation Canal Construction of a Rural Village. Contractor was working and Locals disturbed the work demanding that they should be given the work (i.e. Sub Contract to the Local Contractors).

Client/Govt Body also recommended the contractor to sub contract the remaining works to the local.

If you are an Engineer/Project manager from Contractor What will you do ?

Scenario:

Locals disrupted work demanding sub-contracts. The client/government body also recommended sub-contracting to locals. What should you do as the Engineer/Project Manager?

Answer:

As Engineer/Project Manager, I would take a structured, diplomatic, and professionally responsible approach:

1. **Step 1:** Formally document the disturbance and convene a tripartite meeting with the client, main contractor, and local representatives.
2. **Step 2:** Since the client has recommended sub-contracting, this carries contractual weight. Identify portions of work suitable for local sub-contracting - earthworks, manual labor, or finishing - without compromising quality.
3. **Step 3:** Ensure all sub-contracts are formalized in writing with clear scope, specifications, quality standards, timelines, and payment terms.
4. **Step 4:** The main contractor remains fully responsible for quality and progress under the primary contract - this responsibility cannot be delegated.

Key Ethics Principle:

Engineering ethics require balancing project progress with community stakeholder interests. Ignoring locals risks prolonged disruption; sub-contracting without documentation risks quality failures. A structured, documented approach protects all parties legally and professionally.

Q2. Water Supply - HDPE Pipe Excavation Method Change

You are working as an Engineer in a Water Supply Project. Contractor has started Laying 110 mm dia HDPE Pipes Near Tikabhairab Lalitpur alongside the Road. As per specification, it was written that, contractor has to excavate the foundation manually.

However, due to difficulty in excavation manually and taking more time, the movement of vehicle was disturbed and hence local people asked to Excavate using equipment and complete early. Contactor asked you for the approval for the Same. What will you do? Will you allow for that or Not ? Why?

Scenario:

Specification requires manual excavation. Contractor seeks approval to use mechanical equipment due to difficulty and traffic disruption. What will you do?

Answer:

I would NOT immediately approve mechanical excavation without due process. However, given the genuine public inconvenience, I would act quickly through proper channels:

- Review the contract specification carefully - manual excavation is explicitly specified, so any deviation is a contractual variation.
- Consult the client/employer before approving any change - unilateral approval exposes me to professional liability.
- Assess technical implications: Will mechanical excavation damage existing utilities, road structure, or the pipes?
- If client approval is obtained and technical feasibility confirmed, issue a written Site Instruction (SI) or Variation Order permitting mechanical excavation with conditions (controlled depth, protection measures).

I cannot approve unilaterally. As a consulting engineer, I am bound by the contract. The contractor's request is technically reasonable - but the process must be followed. Speed matters, but process protects everyone.

Key Ethics Principle:

Engineers must comply with contract specifications and protect the public interest. Deviations require formal variation orders through the client. Professional independence means following due process even under pressure.

Q3. Bangkok Hotel Collapse - Multi-Party Responsibility Analysis

A 3 story Hotel was operating for > 10 years in Bangkok. Owner Decided to add 2 more story. He asked an Engineer to Design for the additional 2 story. Engineer asked for old design and Drawings but Owner did not show it saying that it is lost. First refused for the design but owner convinced him by paying additional amount. Municipality also approved the design. During Construction in 1997, the whole building collapsed (Concrete Failure occurred) suddenly and killed > 72 people in the Building! Who is Responsible for this

incident? Client Consultant (Engineer) Contractor and/or Bangkok Municipality? Analyze the situation and Justify your Answer

Scenario:

A 3-story hotel operating for 10+ years. Owner wanted 2 additional floors. Engineer designed without original drawings (claimed lost). Municipality approved. Building collapsed in 1997, killing 72+ people.

Answer - Responsibility Analysis:

Owner/Client - Highest Responsibility

- Deliberately concealed original drawings by claiming they were 'lost.'
- Applied financial pressure on the engineer to proceed despite his initial refusal.
- Withholding critical structural information constitutes gross negligence and potentially criminal conduct causing death.

Consultant/Engineer - Significant Professional Responsibility

- Initially refused - which was the correct, ethical response.
- Reversed his decision under financial inducement - a serious breach of engineering ethics.
- A licensed engineer must never compromise professional judgment for monetary gain.
- Had a duty to obtain or reconstruct structural data before designing. Without it, proceeding was professionally indefensible.
- Liable for professional negligence; Engineering Council can revoke his license.

Bangkok Municipality - Regulatory Negligence

- Approved the design without verifying structural adequacy or requesting proof of the original building's load capacity.
- Municipal approval must involve independent technical scrutiny, not just rubber-stamping documents.

Contractor - Minimal Responsibility

- If the contractor built exactly as designed and approved, primary fault lies with the designer.
- However, if structural anomalies were visible and ignored during construction, shared liability applies.

Conclusion: The owner bears the greatest moral and legal responsibility. The engineer bears the greatest professional responsibility. All parties failed in their respective duties. The collapse was foreseeable and preventable.

Q4. Job Offer While Friend Could Be Fired

Abc Construction firm is working in Nepal for more than 20 years. Your friend Mr. X is working there as a civil Engineer for few Years. The HR Manager of that Company once called you and said they want to hire you and fire Mr. X at the same time. You are unemployed now. What will you do?

- A. Accept the Offer
- B. Reject the Offer
- C. Call your friend Mr X and know the situations and decide
- D. Any other

Answer: Option C - Call Mr. X first, then decide

Before accepting or rejecting, a moral duty exists to understand the full situation:

- If Mr. X is being let go for legitimate professional reasons (misconduct, incompetence, redundancy), accepting the job does not harm him unfairly.
- If the company is replacing him without cause simply to hire you at lower cost or due to favoritism, accepting blindly is ethically questionable.
- After speaking with Mr. X, if the situation is legitimate, accept with a clear conscience. If unjust, decline or negotiate.

Key Ethics Principle:

Engineers must act with integrity and fairness in all professional dealings. Using a friend's misfortune for personal gain without inquiry violates the ethical standard of professional loyalty and fairness.

Q5. Fresh Engineer Asked to Prepare Running Bill

You joined as a fresh Engineer in a Construction Company. Your Supervisor Mr. X asked you to Visit the Construction Site and Prepare a Running Bill (Interim Payment Certificate) within three days. Being fresh Er you are not confident enough and ready to prepare the bill by yourself alone.

How do you respond to the Situation so that you can save your Job?

If you could not tackle properly you might have to loose the Job.

Answer:

The professional middle path is transparency, initiative, and seeking mentorship - not pretending confidence you don't have, nor refusing the task.

1. **Step 1:** Honestly communicate to Supervisor Mr. X that you are a fresh engineer with limited Running Bill experience.

For more notes and resources: www.surendrasharma0001.com.np/

2. **Step 2:** Request guidance - ask Mr. X or a senior colleague to walk you through the process once, or provide a template/previous bill.
3. **Step 3:** Visit the site diligently, measure quantities carefully, and document everything with photographs and field notes.
4. **Step 4:** Prepare a draft bill and ask Mr. X to review it before finalization.

Key Ethics Principle:

Fabricating or guessing quantities in a Running Bill is fraudulent and creates legal liability. Asking for help is not weakness - it is professional responsibility. Engineering ethics demand honesty and continuous learning.

Q6. M&E Visit - Incomplete Structure Recorded as Complete

You are working as an Engineer in XYZ Consulting company. Your job is to visit the Water Supply Project for Monitoring and Evaluation of the Project and Submit the Report to the Client.

You visited the Project in Gorkha District where a NGO was assigned to provide Technical Assistance and User's committee was responsible for construction.

Normally there are 5 M&E visit during whole lifecycle of the Project. At the Final Visit, you found that one structure (Interruption Chamber – IC) was not constructed.

But after coming back from site, you checked the previous report submitted to the client and where it was written that IC was already constructed. That report was prepared by one of your close friend.

While asking about this situation, Your friend said, he did not visit the jungle area where this structure is to be built and Villagers told that IC is completed and believed them and written the report accordingly.

You are in dilemma now – what to write? What to do?

If you write “not constructed”

Answer: Report the IC as NOT CONSTRUCTED.

Writing 'constructed' when it is not is a false statement in an official monitoring report - this constitutes **fraud and professional misconduct.**

- **Speak privately with your friend first**, informing him of what you found and what you intend to write.
- **Document the facts with photographs as field evidence.**
- In your report, **state accurately that the IC was found not constructed** and note that the previous report indicated otherwise, potentially due to incorrect information from the user committee.
- **Recommend corrective action and allow the client to investigate further.**

If the client or any auditor later discovers the truth, the consequences - blacklisting, legal action, loss of professional registration - are far more severe than the short-term discomfort of honesty.

Key Ethics Principle:

Engineers must never knowingly make false statements in reports (Code of Ethics - Integrity and Honesty). Covering up a colleague's error makes you equally culpable. Your friend must also accept accountability for reporting without field verification.

Q7. Director Asks You to Leak Bid Amount to Competitor

You are working as a Senior Engineer in a Construction Company. You were involved in Preparing Tender For a National Pride Project in Nepal. One day before Last date of Submission of Bid, your company Director asked you to Provide your estimate/bid amount to another Contractor, who is supposed to be the competitor.

WHAT WILL YOU DO?

HOW ARE YOU GOING TO RESPOND WITH YOUR DIRECTOR? WHY?

Answer: Firmly refuse this instruction.

How to respond to the Director:

- This constitutes bid rigging, which is illegal under Nepal's Public Procurement Act and CIAA regulations.
- It violates the fundamental principle of fair competition in tendering.
- It could result in criminal prosecution, blacklisting of the firm, and revocation of my engineering license.
- As the engineer who prepared the bid, I have a professional and legal obligation to maintain confidentiality.
- If the Director persists, formally document my refusal in writing (email/memo), creating a record of my objection. If necessary, report to CIAA or the Public Procurement Monitoring Office.

Key Ethics Principle:

Participating in bid rigging - even under instruction from a superior - does not absolve me of personal responsibility. 'Following orders' is not a legal or ethical defense. My professional license, integrity, and freedom are at stake.

Q8. Contractor Offers Personal Benefit to Approve New Gravel Source

In A Road Construction Project, you are working as a Construction Supervision Engineer (CSE) from a Consulting Firm. The Contractor as per the specification had approved the Gravel from Dolalghat.

Near the Road site, Granite (Stone) was available. So contractor requested you for the approval to use that gravel. He said that he can save some money from that and is ready to share benefit (WIN-WIN) if you allow him.

What will you do?
(Normally, that granite gavel is ok for use)

Answer:

I would approve the technical change IF justified, but absolutely refuse the personal financial benefit.

1. **Step 1:** Evaluate the granite gravel from the new source against specification requirements (grading, strength, absorption, etc.).
2. **Step 2:** If it meets all technical criteria, issue formal written approval through proper SI or Variation Order process - with the client's knowledge if required.
3. **Step 3:** Firmly and clearly decline the contractor's offer to share savings. Explain that accepting any personal benefit is a conflict of interest and constitutes bribery under Nepal's anti-corruption laws.

Key Ethics Principle:

Accepting financial benefit for approvals - even when the approval itself is technically valid - is a serious breach of engineering ethics. The approval decision must be based solely on technical merit. Professional independence is non-negotiable.

Q9. Slipping on Site Floor - Who is Responsible?

Mr x was my close friend. Upon my request, Contractor subcontracted the tiling works to mr. X I visited the Site and slipped on the floor and Broke my Leg. There was no any sign of Danger put anywhere near the site Who is responsible? Myself – I had to take care Contractor Sub Contractor, Mr. X None . Bad Luck

Answer: The Sub-Contractor (Mr. X) is primarily responsible; the Main Contractor shares liability.

- A construction site has a legal duty of care to all visitors and workers under occupational health and safety laws.
- The absence of warning signs (e.g., 'Wet Floor,' 'Slippery Surface') during tiling work is a direct failure of site safety management - this is Mr. X's responsibility.
- The Main Contractor, with overall site responsibility, is also liable for failing to enforce safety protocols.
- Your personal negligence (walking on an active work area) could be considered contributory negligence, potentially reducing compensation - but it does not eliminate the sub-contractor's liability.
- The fact that you arranged the sub-contract does not grant Mr. X immunity - it was a professional assignment, not a personal favor that waives safety standards.

Key Ethics Principle:

Under Occupier's Liability and site safety regulations, site owners and contractors must ensure hazards are clearly marked. Failure to do so creates legal liability regardless of who the visitor is.

Q10. Uncle Requests Favor for Sub-Contract Work

I am a Engineer from Consultant. My uncle, a local Contractor, came to me and asked to favor for few works, which I can instruct my Contractor to give. What Should I do? Upon my instruction, Contractor gave some works as subcontract to my uncle. Once I visited the site to check the Quality of the works, and found cheating (putting few bags of cement than required) which was the responsibility of my Uncle. What should I do? Action against Contractor Action against Uncle Do not take action as it was my uncles's job... Or....

Part 1 - Should I instruct the contractor to give work to my uncle?

No. Instructing a contractor to sub-contract to my relative is a conflict of interest and a breach of my professional duty as a consultant's representative. This violates engineering ethics on fairness, independence, and integrity.

Part 2 - Found cheating (under-cementing). What to do?

- Issue a formal non-conformance notice and stop the defective work immediately.
- Require rectification at the sub-contractor's cost.
- Report the situation to the main contractor and client as required under the supervision agreement.
- Do not take action against the main contractor for something done at my instruction - I bear moral responsibility for creating this conflict.

Key Ethics Principle:

Quality and public safety cannot be compromised for family loyalty. If the structure fails, I am professionally and legally liable. Concealing the defect constitutes professional negligence and fraud. The ethical path is costly but necessary.

Q11. Thief Injured on Construction Site

In A Construction Site, Few group of thieves went at night to take the materials (thieve). One thief just fell into the pit and broke his knee. His friends came to office and threatened to bear all the cost of his friend otherwise they will go to police/court. What will you do?

Answer:

This is legally complex. While the individuals are trespassers and thieves, the site may still carry partial liability under certain legal doctrines.

1. **Step 1:** Do NOT panic or make verbal commitments. Remain calm and professional.

2. **Step 2:** Immediately document site conditions (pit location, barriers, lighting, signage) with photographs.
3. **Step 3:** Consult a lawyer before making any response or payment offer.
4. **Step 4:** Report the incident to the police - the intruders were trespassing and engaged in theft.

Legal Analysis: If the pit was properly barricaded and signed, site liability is minimal. If it was open and unprotected at night, the site owner/contractor may share partial liability under 'attractive nuisance' doctrine. Offer no payment without legal counsel. Courts will also examine the fact that these individuals were committing a crime at the time of injury.

Q12. Wrongful Design by Employee - Vicarious Liability

Mr Ram is working as a Design Engineer in your Office. Your Client Mr Shyam came for the Design of his building. You asked Ram for the same. Mr Ram was not satisfied with you and salary he get. So, he designed wrongly. Later, the part of the Building Collapsed. Upon investigation it was found that the design was wrong. Shyam came to you and asked for the Compensation. By that time, Mr Ram had already left your office and the Country. So, told Shyam that Ram is responsible for that pls Consult him or tell to do whatever you can to him' What should Shyam Do? – VICARIOUS LIABILITY --

Answer - What Shyam (Client) Should Do:

The consulting firm is liable under the principle of Vicarious Liability - the legal doctrine that an employer is responsible for the negligent acts of employees committed in the course of employment.

- Ram designed the building as part of his job duties; therefore, his employer bears legal responsibility for the consequences.
- Shyam should sue the consulting firm, not just the individual engineer Ram.
- The firm cannot escape liability by saying 'Ram is gone' - the contract was with the firm, not Ram personally.
- The firm may seek indemnity from Ram separately, but Shyam's legal remedy is against the firm.

For the Firm: They should maintain Professional Indemnity Insurance to cover exactly such situations. They are also exposed to regulatory action from the Engineering Council.

Key Ethics Principle:

Firms must establish proper design review processes so that one engineer's error doesn't pass unchecked. Systematic review is both an ethical duty and a legal safeguard.

Q13. Incorrect BOQ - Soil Investigation Report Copied from Another Site

In a Building Construction Site, The excavation work was going on. In BOQ, hard soil was mentioned. But during excavation mostly, 80% or more were rocky. Contractor, stopped the work and asked for Variation Order since it is not as per Contract. Later CIAA investigated the issue and found that Consultant (Er.) did not investigate the site properly. The document was copied and pasted of the nearby construction site as per the request of Client. Client's logic was that they are in time Pressure so requested Consultant to submit the report early and copy that drawing/design of previous Building. Are you Liable or Not? – Liable under Contract?

Answer: Yes - the Consultant is highly liable, both professionally and potentially legally.

- The consultant produced a Soil Investigation Report/BOQ stating 'hard soil' when the actual condition was 80%+ rock.
- This was done by copying data from a neighboring site - equivalent to falsification of a technical document.
- The fact that the client 'requested' early submission and copying does not transfer full responsibility. A professional engineer has an independent duty to refuse unethical instructions.
- The CIAA investigation found consultant negligence - making the consultant liable under contract (for incorrect deliverables) and potentially under criminal law (false professional report).

Mitigation: If the client's pressure was formally documented and the consultant objected before complying, liability might be shared. However, no such documentation exists here, and the act of copying another site's report was inherently dishonest.

Key Ethics Principle:

The consultant is liable for breach of professional duty, negligence, and potentially fraud. The client also bears moral responsibility for applying unethical pressure, but cannot be fully absolved since they did not produce the false document.

Q14. Rebar Approval Without Testing - Holiday Closure

You are working as a Site Engineer from Consulting Firm. You have to approve the Rebar which Contractor proposes, after testing. Due to Dashai Vacation, the Pulchowk Campus material test lab was closed and could not be tested in time. So, contractor submitted the manufacturer's Document showing all is as per the specification and requested you to grant approval. If you do not approve, the project will be delayed by one month and contractor threatened for Claim for Extension of Time of Completion of the Project. What will you do?

Answer:

I would NOT grant final approval based solely on manufacturer's documents, but I would find a practical middle path:

1. **Step 1:** Contact alternative accredited testing laboratories (NTC, private labs) to check if testing can be done urgently during the holiday.
2. **Step 2:** Allow the contractor to proceed with rebar installation on a conditional/provisional basis, clearly documented in writing as 'pending test results.'
3. **Step 3:** Require the contractor to segregate and mark the provisionally approved rebar so it can be removed if tests later fail.
4. **Step 4:** Upon lab reopening, test immediately and issue or withdraw final approval based on results.
5. **Step 5:** Document everything - the conditional approval, the contractor's request, and the circumstances - to protect both parties legally.

The contractor's threat of an Extension of Time Claim is legitimate if the delay was not his fault - but that is a separate contractual matter from my technical duty of care.

Key Ethics Principle:

Rebar quality directly affects structural integrity and public safety. Accepting manufacturer certificates alone without independent testing is professional negligence. If the structure fails due to substandard rebar, I am liable for the approval.

Q15. Informal Advice to Neighbor - Am I Liable?

One of your neighbor asked you to give Advice on addition of a floor of his building. As you know him very well that he is not going to pay you professional fee, you just said him ok ... ok and go ahead with your plan. You advised him to add the floor. Later during construction, floor collapsed and two people died. He, your neighbor came to you and threatened to sue you and complain in Council. You said that since you have not paid for my professional advice, I am not liable. Are you RIGHT?

Answer: Yes - you ARE liable, even without receiving a professional fee.

The argument 'I was not paid, so I am not liable' has no legal or ethical basis. Liability in engineering arises from:

- The act of giving professional advice, not from payment received.
- Reliance - your neighbor acted on your advice and two people died as a result.
- Duty of Care - as a licensed engineer, you owe a duty of care to anyone who reasonably relies on your professional knowledge, regardless of whether a fee was paid.

Legal Principle - Negligent Misstatement

Under tort law, a professional who voluntarily gives advice, knowing the other party will rely on it, can be held liable for damage caused by negligent advice - even informally and without charge.

- Under the Engineering Council Act, giving professional advice without following proper procedures (structural assessment, drawings, calculations) is a violation that can result in license suspension or revocation.
- Saying 'ok, ok, go ahead' without proper analysis - knowing people's lives depend on it - is both negligent and unethical.

Correct response if unwilling to take professional responsibility: 'I cannot advise you on this without a proper structural assessment.' A polite refusal is always better than an uninformed approval.

Key Ethics Principle:

Professional liability attaches to professional knowledge and the reliance placed on it - not to the existence of a fee agreement. Once you act as an engineer, engineering law applies.

Q 16. Scenario: A bridge designed by a designer (on behalf of consultant) was built by an 'A' class contractor. Cracks appeared 6 months after completion. Investigation reveals: design procedure was fine, but steel material was not tested; workmanship was below specification; no proper supervision by consultant; design load was 20 tons but overloaded vehicles (>20 tons) also passed. The consultant was a friend of the contractor.

Analysis of Liability:

- Contractor's Fault: The contractor used untested steel material and delivered substandard workmanship despite being an 'A' class contractor. This is a clear breach of contract and professional duty.
- Consultant's Fault: The consultant failed to supervise construction adequately. This is professional negligence. The friendship with the contractor creates a conflict of interest.
- Road Department's Fault: Allowing overloaded vehicles (>20 tons on a 20-ton bridge) contributed to the failure. This represents administrative negligence.
- Designer: The design procedure was reportedly correct, so the designer bears minimal fault in this case.

Conclusion: The primary responsibility lies with the Contractor (for material and workmanship failure) and the Consultant (for inadequate supervision and conflict of interest). Both are liable. The road department bears secondary administrative responsibility for permitting overloading.

Q 17. Scenario: Engineer Shashikala (municipality) convinced her college friend Pran (consultant) to change a road alignment through her land to increase its value, against public interest. The project was approved in her presence.

Analysis:

- Shashikala is GUILTY on the following grounds: She misused her official authority to influence the road alignment for personal financial benefit (her land value). This is abuse

of public office. She violated the engineering code of ethics — placing personal gain above public interest. She was part of the approval process, creating a clear conflict of interest which she failed to disclose.

- Pran is also guilty but to a lesser degree: As a professional consultant, he should not have changed the alignment based on a personal request that contradicts public interest. He violated professional independence and ethics.

Primary Guilt: Shashikala bears the heavier responsibility because she directly misused public authority entrusted to her. Pran is a secondary guilty party who failed to maintain professional independence.

Q 18. Scenario: Mr. A discovers a chemical waste leak that could harm the environment. Boss asks him to stay silent under threat of job loss.

What Mr. A should do:

- According to engineering code of ethics, Mr. A's primary duty is to public health, safety, and welfare — above loyalty to employer.
- He should first document the finding formally and report it in writing to the immediate supervisor, creating a record.
- If the employer continues to suppress the information, he should report to the relevant government authority (Department of Environment, or Municipality).
- He should NOT remain silent, as doing so would make him complicit in a public health violation.
- He should consult the NEA or NEC for guidance and protection as a whistleblower.

Whistleblower Protection: Professional ethics strongly supports reporting genuine hazards. While job risk is real, long-term professional credibility and public duty outweigh employer pressure.

PART B: Exam Strategy Guide

How to Answer Engineering Professional Practice Scenario Questions for Maximum Marks

1. The Golden Formula for Scenario Answers

Every 5-8 mark EPP scenario question rewards the same structure. Memorize and apply it:

#	Step	What to Write	Why It Earns Marks
1	State your position	Give a clear, direct answer in the first sentence. Do NOT be vague.	Examiners want decisiveness - engineers must be able to make decisions.
2	Identify the core issue	Name the ethical/legal principle at stake (e.g., conflict of interest, negligence, bid rigging).	Shows knowledge of EPP concepts - earns content marks.
3	Give numbered steps	List 3-5 concrete actions you would take, in logical order.	Demonstrates practical professional competence.
4	Justify legally	Cite relevant law or regulation (Public Procurement Act, CIAA, Engineering Council Act, Contract law, Tort law).	Legal grounding is expected for full marks.
5	State the ethical principle	End with the ethics principle violated or upheld (integrity, public safety, fairness, independence).	Ties the answer to the subject's core learning outcomes.

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2. Key Legal Concepts to Know

Legal Concept	Definition & When to Apply It
Vicarious Liability	An employer is legally responsible for the wrongful acts of their employees done in the course of employment. Apply when: a firm's employee causes harm and the client/victim sues the firm.
Negligence	Failure to exercise the standard of care expected of a competent engineer that causes damage. Apply when: an engineer provides substandard work, wrong advice, or fails to investigate properly.
Negligent Misstatement	Liability for giving incorrect professional advice even informally, when the other party reasonably relies on it. Apply when: an engineer gives casual advice (without fee) that leads to harm.
Duty of Care	A legal obligation to avoid acts or omissions that could foreseeably harm others. Engineers always owe a duty of care regardless of payment.

Conflict of Interest	When personal interests interfere with professional obligations. Apply when: relatives, personal gain, or personal relationships affect engineering decisions.
Bid Rigging	Illegal coordination between competitors to manipulate tender outcomes. Violates Public Procurement Act and CIAA regulations in Nepal.
Variation Order (VO)	A formal written change to the contract scope, method, or specifications. Required whenever deviating from the original contract - cannot be done verbally or informally.
Professional Indemnity Insurance	Insurance that protects professionals against claims of negligence. Consulting firms should maintain this to cover design errors.
Contributory Negligence	When the injured party's own negligence contributed to their harm. May reduce but does not eliminate the defendant's liability.

3. Core Ethical Principles - Always Mention These

Every answer should connect to at least one of these foundational engineering ethics principles:

- **Public Safety First** - The welfare, health, and safety of the public overrides all other considerations.
- **Integrity and Honesty** - Never falsify reports, measurements, or professional opinions, regardless of pressure.
- **Professional Independence** - Your judgment must be free from personal, financial, or political influence.
- **Competence** - Only undertake work you are qualified to perform. Seek help when needed.
- **Fairness and Impartiality** - Treat all parties (contractors, clients, sub-contractors, public) equitably.
- **Confidentiality** - Protect client and project information, especially in competitive tender situations.
- **Accountability** - Accept responsibility for your decisions and actions. 'Following orders' is not a defense.
- **Sustainable Development** - Consider long-term environmental and social impact of engineering decisions.
- Avoid Conflict of Interest.
- Follow Contract & Law.
- Document Everything.
- Refuse Corruption.
- Engineer is Personally Liable for Negligence.
- You may lose a job,
But never lose your license, integrity, or conscience.
- Nepotism and quality compromise are unethical

4. Common Mistakes to Avoid in Exam Answers

WRONG Approach	CORRECT Approach
Being vague: 'I would handle it carefully'	Being specific: 'I would issue a Site Instruction and notify the client in writing within 24 hours'
Ignoring the legal dimension entirely	Citing relevant law (CIAA, Procurement Act, Engineering Council Act, Contract law)
Only giving your action without justification	Explaining WHY each action is professionally/ethically required
Choosing money or convenience over ethics	Always prioritizing public safety and professional integrity
Saying you would do nothing or 'it's not my problem'	Taking ownership - as an engineer, you are always responsible within your scope
Accepting bribes or personal benefits	Refusing any personal benefit; all decisions based on technical merit only
Writing 'I would consult my senior' without more detail	Stating what you would consult about and what action follows
Covering up errors made by friends or colleagues	Reporting accurately - professional duty overrides personal loyalty

5. Power Phrases for Exam Answers

Use these phrases to signal professional knowledge to the examiner:

- 'As a consulting/site engineer, I am bound by the terms of the contract...'
- 'This constitutes a conflict of interest and violates my professional independence...'
- 'Under the principle of Vicarious Liability, the firm is legally responsible...'
- 'Accepting personal financial benefit for an official approval constitutes bribery...'
- 'A Variation Order / Site Instruction must be issued in writing before any deviation...'
- 'The contractor's claim for Extension of Time is a separate contractual matter from my technical duty...'
- 'Public safety is the paramount concern that overrides all other considerations...'
- 'My professional license and registration compel me to...'
- 'Following orders from a superior is not a legal or ethical defense...'
- 'As per the Engineering Council Act / CIAA regulations / Public Procurement Act...'

6. Quick Reference - Responsible Party Decision Guide

When a question asks 'who is responsible?', use this checklist:

For more notes and resources: www.surendrasharma0001.com.np/

Party	They are responsible when...
Client/Owner	They concealed information, applied improper pressure, or gave unlawful instructions
Consultant/Engineer	They gave wrong advice, approved without testing, falsified reports, or compromised professional judgment for money
Contractor	They deviated from specifications, used substandard materials, or failed to maintain site safety
Sub-Contractor	They performed defective work or failed to follow safety protocols within their scope
Regulator/Municipality	They approved without proper technical scrutiny or failed in their oversight duty
Employer (Firm)	They are vicariously liable for employee negligence done in the course of employment

Remember: In EPP, there are rarely 'wrong' answers if your reasoning is sound, professional, and ethically grounded. Examiners want to see that you think like a responsible professional engineer - one who prioritizes public safety, follows due process, refuses corruption, and accepts accountability. Good luck!