



TRIBHUVAN UNIVERSITY  
INSTITUTE OF ENGINEERING  
Examination Control Division  
2076 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	BEX, BCT	Pass Marks	16
Year / Part	IV / I	Time	1½ hrs.

**Subject: - Energy, Environment and Society (EX 701)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt **All** questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

1. What are the key impacts of technology on society? Describe. [4]
2. Describe the relations between human development index and energy consumption. What types of energy sources are being used in Nepal? [2+2]
3. What are the ways to drive electric vehicles? What are the advantages of electrical vehicles specially in case of Nepal? How can electric vehicle deliver energy to grid? [2+3+3]
4. Explain how sunlight can be converted to electrical energy. How this electrical energy can be used to power internet server in remote area? Explain with block diagram. [4+2]
5. Explain how does solar based power system work to pump water? What are its limitations? [4+2]
6. How can you generate electrical energy from wind? Where can this energy be used? [3+1]
7. List down forms of energy storage and briefly describe about hybrid vehicle. [4]
8. What are the key hazardous elements of energy resources that impacts on environment. [4]

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**Examination Control Division**  
2075 Chaitra

Exam.	Regular / Back		
Level	BE	Full Marks	40
Programme	BEX, BCT	Pass Marks	16
Year / Part	IV / I	Time	1 ½ hrs.

**Subject: - Energy Environment and Society (EX 701)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt **All** questions.
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- ✓ Assume suitable data if necessary.

1. What is appropriate technology? What are the difference between appropriate technology and indigenous technology? Explain with suitable example. [1+3]
2. What is the energy use trend in Nepal? How can you relate Energy with Maslow's hierarchy of needs in our Nepalese context? [3+2]
3. Explain working principle of hydropower. How hydropower has been categorized in Nepal? [3+3]
4. What is the total renewable energy development potential in Nepal? What are the challenges for the country to harvest maximum energy production from those resources? What energy policy and strategy should be taken up? [3+3+2]
5. Explain the working principle of Polymer membrane electrolyte fuel cell and solid oxide fuel cells. What are the positive attributes of geothermal energy? [4+1]
6. Discuss the potential effect of nuclear hazard with suitable example. How can a supercapacitor be used as energy storage device? [3+2]
7. What are the energy storage technologies? Why energy storage become challenge in 21<sup>st</sup> century? [2+2]
8. What is Clean Development Mechanism (CDM)? How CDM projects contribute to achieve the Sustainable Development Goals (SDGs)? [1+2]

TRIBHUVAN UNIVERSITY  
INSTITUTE OF ENGINEERING  
**Examination Control Division**  
2076 Ashwin

Exam.	Back		
Level	BE	Full Marks	40
Programme	BEX, BCT	Pass Marks	16
Year / Part	IV / I	Time	1 ½ hrs.

**Subject: - Energy Environment and Society (EX 701)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt **All** questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

1. What do you understand by technology transfer? What are the opportunities and challenges for developing countries to adopt new technology? [2+2]
2. What are greenhouse gases? Write cause and impacts of global warming in context to Nepal. What are the factors affecting Human Development Index. [1+2+2]
3. Why biomass conversion is needed? Explain Thermo chemical Bioconversion process. Differentiate fuel cell and Battery. [2+3+3]
4. What is solar constant? Discuss the potential of solar PV and solar thermal power in context to Nepal. [2+4]
5. Discuss the type of turbines use for hydropower generation. Write basic difference between these turbines. [2+2]
6. What is hazard? Explain Battery, Emission and Nuclear hazard. [1+3]
7. Why energy storage is necessary? Describe forms of energy storage system. [2+3]
8. Write short note on: (Any two) [2+2]
  - a) Demand and Supply of energy in world
  - b) Hybrid Vehicles
  - c) Load Shedding vs load shifting method

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**Subject: - Energy Environment and Society (EX701)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt any Six questions.
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1. Describe the term technology with its importance and method of transfer technology in modern time. [2+4]
2. Draw Maslow's hierarchy of needs and explain according to importance of needs. Describe clean development mechanism and sustainability issues for overall development of country. [2+4]
3. Write solar radiation as source of energy with solar cell and solar plant function with appropriate diagrams. [2+4]
4. What are the availabilities wind energy sources? Explain wind turbines, wind parks and power control system of wind energy production. [2+4]
5. How the synthetic fuel from the biomass works? Explain about bio fuel cells. [2+4]
6. What are the basics of electrochemistry? Explain about hydrogen production and storage. [2+4]
7. Write short notes on: [2+2]
  - i) Battery hazard
  - ii) Smart grid

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*Subject: - Energy Environment and Society (EX701)*

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- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. What is Energy in the sense of technological development? Describe relation between energy, environment and society. [8]
2. Write briefly on energy trends, demand and supply of energy in content of Nepal? [8]
3. Describe about the suitability of use of solar energy as an alternative source of energy in the context of Nepal. [8]
4. How nuclear hazard is significant in today's technological advancement? Describe long term and short-term effects of nuclear hazard. [8]
5. Write short notes on: (any two) [2×4]
  - i) Climate change and its impacts in our country
  - ii) Geothermal energy as alternative energy source
  - iii) Hybrid vehicle

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Exam.	Programme		
Level	BE	Full Marks	40
Programme	BEX, BCT	Pass Marks	16
Year / Part	IV / I	Time	1 ½ hrs.

**Subject: - Energy Environment and Society (EX701)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt **All** questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Write your answers to the point asked in the question considering the time available to you. Do not write your answer in redundant and unnecessary detail.
- ✓ Assume suitable data if necessary.

1. Write down the importance of Technology Transfer [3]
2. "Global Warming is posing a global threat." Write down some impacts of global warming which alarms us as a global threat. Write down your ideas about the way forward to reduce this threat in the light of Kyoto Protocol or Paris Agreement [5]
3. Write the definition of Insolation, Solar Constant, and Air Mass [6]
4. "Hydrogen based energy could take a larger role in future energy system". Write down the potentials and challenges of the hydrogen based energy system. [4]
5. Write down a basic synopsis of use of Geothermal Energy. [4]
6. Explain the working of a solar cell. [4]
7. Write down the processes of achieving energy from diverse biomass sources. [3]
8. "The incident like Chernobyl and Fukusima accidents makes us cautious on the use of Nuclear Power". Explain with reference to the Nuclear hazard issue. [3]
9. "A smarter grid applies technologies, tools and techniques available now to bring knowledge to power knowledge capable of making the grid work far more efficient" Smart Grid". Write down your understanding of the Smart Grid. [4]
10. Write down your findings of the case study in this subject. [4]

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**Subject: - Energy Environment and Society (EX701)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
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1. How can we say a micro-hydro project in a rural area in sustainable? [4]
2. How do you classify the water turbines? Differentiate between impulse and reaction turbines? [1+3]
3. How can you relate Energy with Maslow's hierarchy of needs in our Nepalese context? [3]
4. What is biogas? List any four major routes for the conversion of biomass to energy and other useful products. [1+3]
5. What are the latest technologies for the energy storage? Describe briefly about the complications of the storage. [2+3]
6. What will be the parameters to be consider while designing the solar Mini grid in the village. [3]
7. What is Hydrogen Fuel? Describe about advantages and disadvantages of Hydrogen Fuel. [1+3]
8. Describe the types of wind machines used today and what are the applications of Wind Energy in Nepalese context. [1+2]
9. What are the common pollutants for the emission hazard how can it affects of the health. [4]
10. Describe about the recent activities of Conference of the Parties (COP) in UNFCCC. [6]

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Programme	BEX, BCT	Pass Marks	16
Year / Part	IV / I	Time	1 ½ hrs.

**Subject: - Energy Environment and Society (EX701)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ All questions carry equal marks.
- ✓ Assume suitable data if necessary.

1. What is Appropriate Technology? Also explain it in detail.
2. Explain and comment on the current Global and National Energy Scenario.
3. Write down the definition of Insolation, Solar Constant, Irradiance and Peak Sun.
4. What do you understand by wind energy? Write down the factors that determine the available wind energy in any area. Also write down its scope.
5. Write down the potentials and challenges of the hydropower based energy system.

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Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	40
Programme	BEX, BCT	Pass Marks	16
Year / Part	IV / I	Time	1 ½ hrs.

**Subject: - Energy Environment and Society (EX701)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ All questions carry equal marks.
- ✓ Assume suitable data if necessary.

1. What do you mean by appropriate technology? What are the elements for the sustainable development?
2. What is biogas? List any four major routes for the conversion of biomass to energy and other useful products. How it reduces climate change effect?
3. What are the energy storage technologies? Why energy storage become challenge in 21<sup>st</sup> century?
4. What is hydrogen fuel? Describe about advantages and disadvantages of Hydrogen fuel. Also compare with solar energy.
5. Describe the types of wind machines used today and what the applications of Wind Energy are in Nepalese context. Also write down its limitation.

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Exam.	Regular		
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**Subject: - Energy Environment and Society (EX701)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. Describe technology transfer and its importance to society and nation. [4]
2. Explain how development of any country depend upon its energy consumption rate? Explain HDI and compare HDI for Nepal with other developed country with example of energy consumption. [8]
3. Discuss the need of energy in each steps of Maslow's hierarchy of needs. [4]
4. What are the various biomass conservation process? Explain the IV curve for solar photovoltaic cell with temperature variation. How can you have the wind mapping data? Explain in brief. [8]
5. Write about solar thermal energy and its application. [4]
6. What is Hydrogen Fuel? Describe about advantages and disadvantages of Hydrogen Fuel. [4]
7. Write short notes on: [4×2]
  - i) Hybrid vehicle
  - ii) Smart grid system

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**Examination Control Division**  
2072 Kartik

Exam.	New Back (2066 & Later Batch)		
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Programme	BEX, BCT	Pass Marks	16
Year / Part	IV / I	Time	1 ½ hrs.

**Subject: - Energy Environment and Society (EX701)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt **All** questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

1. What do you mean by Appropriate Technology? Which types of Technology would be appropriate in context of Nepal in transport sector? Explain. [8]
2. Describe the principle of solar cell (PV) technology and its applications. [8]
3. A potential site has the net head of 100 m with 200 lit/sec of flow, what will be the power deliver from such site if the constructed power house overall efficiency is 50%? Which types of turbines would be suitable for such plants / site and also write its features. [8]
4. What is biomass? List any four major routes for the conversion of biomass to energy and other useful products. [1+3]
5. Describe the basic construction of solid oxide fuel cells (SOFCs). [4]
6. What are the energy storage technologies? Why energy storage become challenge in 21<sup>st</sup> century. [2+2]
7. What is climate change? How can Renewable Energy Technologies can help mitigate climate change. [4]

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**Examination Control Division**

2071 Shawan

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	40
Programme	BEX, BCT	Pass Marks	16
Year / Part	IV / I	Time	1½ hrs.

**Subject: - Energy Environment and Society (EX701)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. What are the impacts of technology on society? How the appropriate technology helps in the sustainable development of the country? [2+3]
2. Describe the relation between "Human Development Index and Energy Consumption". [4]
3. How do you classify the water turbines? Differentiate between impulse and reaction turbines? [1+2]
4. What is biomass? Describe any thermo-chemical conversion process of biomass? [1.5+2.5]
5. Define beam, diffuse and global radiation and show the relation between them. [3]
6. What are the different economic and environmental advantages of wind and geothermal energy in Nepal? [4]
7. What is fuel cell? How hydrogen fuel cell functions? [3]
8. Explain somatic and genetic effects due to nuclear hazards in human beings. [3]
9. What are the types of batteries? Describe about smart grid system? [2+3]
10. Write short notes on: (any three) [2×3]
  - a) Solar Constant
  - b) Storage of hydrogen
  - c) Global warming
  - d) SO<sub>2</sub> emission and its impact

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**Examination Control Division**  
2070 Chaitra

Exam.	Regular		
Level	BE	Full Marks	40
Programme	BEX, BCT	Pass Marks	16
Year / Part	IV / I	Time	1½ hrs.

**Subject: - Energy Environment and Society (EX701)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. What do you mean by appropriate technology? Describe the impact of technology on society. [4]
2. What is the trend of consumption of energy sources in the world? Describe the importance of renewable energy sources? [2.5+2.5]
3. Define E number. How biofuels differ from other sources of energy? [1+3]
4. List out different factors affecting the solar intensity and applications of solar energy. [2+2]
5. What are the minimum constructional requirements to develop a hydropower system? [4]
6. What are the environmental impacts of wind machine? [4]
7. What is fuel cell? How does a solid oxide fuel cell work? [4]
8. The wide spread use of batteries has created many environmental concerns. Describe this concept. [4]
9. Write briefly about the working principle of hybrid vehicles. Also discuss the environment impacts. [2+2]
10. How the energy crisis of our country Nepal can be avoided? Describe its potential solutions in short. [3]

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Exam.	Regular		
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**Subject:** - Energy, Environment and society (EX701)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt **All** questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

1. What is a technology transfer? What impact technology has in your life? [1.5+1.5]
2. What is a clean Development Mechanism (CDM). What are the potential areas of CDM in Nepal? [2+2]
3. What do you understand by solar constant, global irradiation and peak sun? [3]
4. What is geothermal energy? Write down its application. [1+2]
5. Write briefly about briquette and biogas as energy sources in the context of Nepal. [4]
6. What are fuel cells? Explain briefly its working. [4]
7. What are the potential hazard of batteries. How you think this hazard can be prevented? [2+1]
8. What are smart grid and super-capacitor? [2+2]
9. Very briefly give your experience of the case study which you performed. [2]
10. Define the following is not more than three sentences. [2×5]
  - a) Appropriate technology
  - b) HDI
  - c) Solar water heater
  - d) Hydrogen as fuel
  - e) Application of Geothermal Energy

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**Examination Control Division**  
2070 Ashad

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Year / Part	IV / I	Time	1½ hrs.

**Subject:** - Energy, Environment and Society (EX701)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
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- ✓ Assume suitable data if necessary.

1. What do you understand by the term "Appropriate Technology"? [3]
2. What are the conventional and non-conventional energy sources? [3]
3. Write in short about the working of a solar cell. [3]
4. What is a source of hydropower? How can you categorize the hydropower plants? [1+2]
5. What is the major factor determining the availability of wind power? What are the major components of wind turbine? [1+3]
6. What is biomass? Write example of any two different conversion of biomass into fuel. [2+2]
7. Write about battery along with the working principle of anyone type. [4]
8. Write briefly about the emission hazard and their impact. [4]
9. Write very briefly your experience on the case study you performed. [2]
10. Define the following briefly: [2×5]
  - a) Technology transfer
  - b) Certified Emission Reduction
  - c) Characteristics curve of solar cell
  - d) Solar dryer
  - e) Classification of hydropower plant

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