

27 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2074 Chaitra

Exam.	Regular		
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 any **Six** questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

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

Exam.	Back		
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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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- ✓ 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 21st 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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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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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 21st century. [2+2]
7. What is climate change? How can Renewable Energy Technologies can help mitigate climate change. [4]

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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 ^{conversion} 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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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) SO₂ emission and its impact

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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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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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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
